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Monitoring female directors and earnings management, does corporate governance matter?

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ABSTRACT

In contrast to prior research on female directors' participation, this study focuses on female directors playing a monitoring role within boardrooms. In addition, the current study investigates whether these female directors freeride from other strong governance mechanisms in place. Based on a sample of US firms, we document that female directors fulfilling monitoring responsibilities play a crucial role in protecting shareholders' interests in both weak and strong corporate governance settings. In addition, interestingly, our results suggest that female directors, particularly monitoring female directors, significantly mitigate earnings management in firms audited by Big-4 and non-Big-4 auditors although their impact seems to be more prominent within non-Big-4 audit firms. That is, it seems that these directors are more likely to scrutinize managers closely when they feel that shareholders are at risk of being subjected to deception due to opportunistic practices by managers (i.e. when managers deliberately choose relatively low-quality auditors to audit corporate financial reports).

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1. Introduction

This study examines the extent to which monitoring female directors can serve as a substitute for firms' internal and external corporate governance mechanisms. The composition of gender-diversified boards has emerged as a pivotal issue in contemporary discourse. Numerous countries have implemented regulations mandating the inclusion of female directors within boardrooms to promote gender equality. However, these mandates may potentially undermine the efficacy of corporate boards. For instance, to adhere to such regulations, firms might appoint female directors primarily to fulfill statutory requirements, which could inadvertently impair corporate performance in the long term. This scenario has prompted extant research to explore whether the involvement of female directors genuinely enhances shareholder value.

The literature remains inconclusive regarding the impact of female directors on firms' outcomes. For instance, Krishnan and Park (2005), utilizing a sample from the Fortune 1000, reported that gender diversity correlates positively with enhanced financial performance. Similarly, Lückerath-Rovers (2013) demonstrated that Dutch firms exhibit better performance with increased female representation on their boards. Conversely, Adams and Ferreira (2009) identified potential adverse effects of gender diversity on firm performance, suggesting that increased female board participation might not uniformly translate into positive corporate outcomes. Moreover, Gregory-Smith et al. (2014) found no empirical evidence to substantiate the claim that female directors significantly influence firm performance. These disparate findings underscore the complexity and multifaceted nature of the relationship between board gender diversity and corporate outcomes, warranting further rigorous investigation to elucidate these dynamics.

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A critical limitation of these performance-based studies is that firms' performance is reliance on reported earnings, which can be subject to manipulation. Numerous studies have documented instances where firms engage in earnings management to inflate reported earnings, potentially biasing the results of such performance-based analyses. Consequently, other studies have focused on examining whether female directors contribute to reduced earnings management. For instance, Alves (2023), Arun et al. (2015), Labelle et al. (2010), Thiruvadi and Huang (2011), Zalata et al. (2018), and Srinidhi et al. (2011) provide evidence that the presence of female directors constrains accrual-based earnings management. Furthermore, Cumming et al. (2015) highlight that Chinese firms with female board members exhibit a lower incidence of financial reporting fraud, indicating a potential deterrent effect against egregious accounting irregularities.

However, the aforementioned research predominantly centers on the overall involvement of female directors, allocating comparatively lesser emphasis to their specific roles within the boardroom (Zalata et al., 2019). Arguably, board effectiveness is contingent upon its committees, as most board decisions are made through these subcommittees (Adams, 2003; Adams et al., 2010; Guo & Masulis, 2015). In support of this, Zalata et al. (2019) show that not all female directors are able to mitigate earnings management, and only those who are in monitoring, instead of advisory committees, are more likely to mitigate earnings management. However, Zalata et al. (2019) did not investigate whether the value of monitoring female directors is contingent on corporate governance. For instance, having a dual strong monitoring system (both monitoring females along with other governance mechanisms) might make the board less friendly to executive members, and therefore, insider directors would be less motivated to disclose strategic and essential information required for monitoring executives and achieving firms' strategic objectives (Adams & Ferreira, 2009). That is, while monitoring female directors is willing to monitor management, in tough governance settings characterized by high information asymmetry between executive and monitoring female directors, they would not be able to perform their monitoring role effectively. In addition, in a strong governance environment, monitoring female directors might free-ride on other strong governance mechanisms in place, and would be less eager to monitor their fellow executive directors.

In contrast, in settings where corporate governance is weak, female directors (being more risk-averse) might be more concerned about their reputation and have stronger motivation (being more ethical) to protect shareholder interests. That is, in this setting, the value of having female directors is more pronounced. However, despite these contradictory theoretical views, there is no empirical evidence to confirm or refute them. Therefore, this study contributes to extant research by investigating whether firms' corporate governance moderates the relationship between earnings management and monitoring female directors.

Based on a sample of US firms from 2007 to 2014, this study finds evidence in line with Zalata et al. (2019) that female directors playing monitoring roles are significantly associated with less earnings management. In addition, the analysis provides new insights suggesting that female directors with monitoring roles mitigate earnings management in both strong and weak internal corporate governance contexts. In addition, interestingly, our results suggest that female directors, particularly monitoring female directors, significantly mitigate earnings management in firms audited by Big-4 and non-Big-4 auditors although their impact seems to be more prominent within non-Big-4 audit firms.

This study makes two distinct contributions to the extant accounting research. First, the current study contributes to existing research by showing that monitoring female directors provides superior oversight of managerial opportunism in both strong and weak corporate governance contexts, suggesting that the quality of female monitoring directors is not contingent on other costly governance mechanisms, and it seems that these female directors do not free-ride on other governance mechanisms. Small firms could substitute monitoring female directors for other costly governance mechanisms. Second, the results of this study have important implications for firms; in particular, the findings provide new insights demonstrating that appointing female directors to monitoring roles could actually be a substitute for hiring costly big-4 auditors.

The remainder of the paper is organized as follows: Section 2 introduces theories and hypothesis development, Section 3 presents the research design and sampling procedures, Section 4 reports the empirical findings, and Section 5 concludes the paper.

2. Theory and hypothesis development

Agency theory elucidates the critical role of monitoring directors in curbing earnings management practices. Unmonitored managers, driven by opportunism, may act against shareholders' interests (Abernathy et al., 2014; Adams & Ferreira, 2008). To mitigate agency problems, corporate executives need oversight by independent, objective outside directors (Powell & Ansic, 1997). Based on agency theory, monitoring directors play a pivotal role in mitigating managerial misbehavior and reducing agency costs in principal-agent relationships (e.g. Lemmon & Lins, 2003). Specifically, they protect shareholders' investments and reduce information asymmetry, among other benefits (Kanagaretnam et al., 2007; Shleifer & Vishny, 1997). Based on agency theory, this oversight ensures that managerial actions align with shareholders' interests, enhancing overall corporate governance.

Existing research has shown that including female directors is an essential monitoring mechanism in mitigating agency conflicts, with gender diversity increasingly recognized as vital for board composition (Kirsch, 2018; Schoonjans et al., 2024). This is due to their behavioral differences, which contribute to more effective monitoring and ethical conduct within the boardroom. The behavioral differences between females and their male counterparts have long been subject to controversy, and there is less theoretical consensus in the extant literature. For example, according to occupational socialization theory, once men and women are exposed to organizational culture, incentives for achievements, and occupational training, gender differences (in terms of risk aversion, ethics, and other related behaviors outcomes) should disappear (Gomez-Mejia, 1983; Harris, 1990; Lacy et al., 1983; Posner & Munson, 1981). Consistent with occupational socialization theory, Adams and Ragunathan (2017) evince less significant differences in risk-taking between women and men in the financial industry. Similarly, Sila et al. (2016) find no evidence of less risk-taking in firms with female representation within their boardrooms. Finally, Bugeja et al. (2012) show insignificant variation between female and male CEOs' compensation, implying that females are not necessarily risk averse to the extent that this might lead them to reject risky compensation, such as those that are based on their performance.

In contrast, there are ample of studies suggesting that gender differences already exist. Gender socialization theory suggests that females possess different values, which leads them to have different views of individuals and situations, and therefore, they tend to process moral dilemmas differently (Gilligan, 1993). For example, Cumming et al. (2015), Eagly and Carli (2007), and Eagly and Johnson (1990) contend that women holding leadership positions are more concerned about people and their welfare, whereas their male counterparts possess traits enforcing competition and hierarchy. Ibrahim et al. (2009) and Cumming et al. (2015) suggest that female leaders are more ethically sensitive than their male counterparts. Ginglinger and Raskopf (2023) found that women on boards enhance firms' environmental and social performance and that female directors have more environmental and social experience than their male counterparts prior to appointment. In addition, psychological studies have already suggested that females are less risk tolerant and overconfident than their male counterparts. Given these behavioral differences between female and male rivals, one might expect a significant difference between them in processing and making dilemma decisions. The scholarly discourse posits that the inclusion of female directors, particularly those occupying non-executive positions, improves the financial reporting environment. For example, Gul et al. (2011) are associated with higher voluntary disclosure, especially in large firms, and Liao et al. (2015) show that firms with female directors have a greater tendency to voluntarily disclose more about greenhouse gas. In addition, it is widely recognized that female directors are associated with lower earnings management (i.e. Labelle et al., 2010; Srinidhi et al., 2011; Thiruvadi & Huang, 2011; Zalata et al., 2019). This evidence is not restricted to the US environment but is also observed interngasesationally (e.g.Akter et al., 2024; Githaiga et al., 2022; Li et al., 2023; Mensah & Boachie, 2023; Mnif & Cherif, 2021).

Zalata et al. (2019) argue that given the fact that female directors possess hard and soft skills that make themes behaviorally different, firms should appoint them into strategic roles (in particular monitoring roles) in order for them to create and add value to their firms. However, this study argues that the value of monitoring female directors might be contingent on the strength of their firms' corporate governance. For example, in a strong corporate governance setting, the value of monitoring female directors might diminish to the extent that their participation might lead to high earnings management, or at least behave similarly to male directors. In this setting, the incentives for monitoring female directors to closely monitor managers may decrease because of freeriding the efforts of other governance

mechanisms. In addition, having more monitoring of female directors along with other taught governance mechanisms might lead to over monitoring to the extent that over monitoringover monitoring will lessen the incentives for executive directors to disclose the strategic information required by female directors to perform their monitoring roles.

On the other hand, considering the propensity of female directors towards higher ethical standards or risk aversion, their value might be more noticeable and observable in a weak governance setting. In this context, female directors may be more concerned about their reputation, leading them to devote increased time and effort to scrutinizing and challenging management's financial reporting decisions. This heightened vigilance is driven by the fear of being held accountable for managers' opportunistic behavior, particularly in the absence of other stringent governance mechanisms that could assume full responsibility. Extant research suggests that strong governance mechanisms refer to both internal and external governance. Arguably, it is contended that internal governance mechanisms might include the size of the board and the audit committee, the proportion of independent directors, their equity stakes, outside directorships in other unaffiliated firms, and percentage of financial expert directors. (e.g. Yao, 2023; Zattoni et al., 2023).

In addition, extant research demonstrates that the capacity of corporations to manage earnings is constrained when audited by prominent Big-4 audit firms (Becker et al., 1998; Francis et al., 1999). For instance, high auditor quality, such as audits by the Big 4, is associated with lower abnormal accruals (Reichelt & Wang, 2010) and timely restatement disclosures (Schmidt & Wilkins, 2013). Whether female directors complement or substitute for audit quality remains an open research question. Lai et al. (2017) suggest that the presence of female directors should be accompanied by higher-quality audits, implying a complementary relationship. In contrast, Kirsch (2018) contends that women are appointed to boards when their inclusion yields beneficial outcomes for firms. Given their heightened ethical sensitivity and risk aversion (Bernardi & Arnold, 1997) and their exclusion from 'old boys' networks' (Kirsch, 2018), female directors are appointed to enhance board monitoring especially in weak governance settings. Thus, it is hypothesized that female directors' monitoring impact is more pronounced in firms audited by non-Big 4 auditors. In such firms, where external audit quality may be less stringent, their enhanced internal oversight becomes crucial in mitigating earnings management.

Hence, this study uses external auditors' size as a proxy for external governance mechanisms. Based on these arguments, this study develops the following two hypotheses.

H1a: *the impact of monitoring female directors is more pronounced in firms with weak internal mechanisms.*

H1b: *the impact of monitoring female directors is more pronounced in firms audited by one of the non-big4 auditors.*

3. Research design

3.1. Measurements of earnings management

In this study, we measure earnings management using discretionary accruals rather than real earnings management (REM) because CEOs play a critical role in shaping and implementing firm strategies. REM pertains to daily operational decisions and depends on private management information, which may not always be fully disclosed to the board of directors (Osma, 2008). Even if management is inclined to share detailed and up-to-date operational information, it remains challenging for directors to accurately distinguish between beneficial and detrimental REM. Additionally, boards of directors must fulfil their fiduciary duties without becoming entangled in the firm's day-to-day operational decisions.

Many previous studies have developed models to divide total accruals into their discretionary (managed) and non-discretionary (unmanaged) components. One of the models that outperforms other models and is hence widely used by extant research is the adjusted for performance Jones (1991) model as outlined below:

$$\frac{ACCRUALS_{i,t}}{TOTAL\_ASSETS_{i,t-1}} = \beta_0 + \beta_1 \frac{1}{TOTAL\_ASSETS_{i,t-1}} + \beta_2 \frac{Adj\_REV_{i,t}}{TOTAL\_ASSETS_{i,t-1}} + \beta_3 \frac{PPE_{i,t}}{TOTAL\_ASSETS_{i,t-1}} + \beta_4 \frac{NET\_INCOME_{i,t}}{TOTAL\_ASSETS_{i,t-1}} + \varepsilon_{it} \quad (1)$$

where ACCRUALS is total accruals, measured as the difference between cash flows from operating activities and net income before extraordinary items. TOTAL_ASSETS is firms' total assets, and Adj_REV is adjusted sales measured as [(current year sales – last year sales) minus (current year accounts receivable – last year accounts receivable)]. PPE refers to total Property, Plant and Equipment. NET_INCOME is the net income. We run Equation (1) annually for each two-digit SIC industry with a minimum of eight yearly observations, and then estimate discretionary accruals (DIS_ACC) as the residuals from Equation (1). We focus on the absolute value of DISACC, and higher values indicate higher earnings management.

3.2. Measurements of main independent variable

This research deviates from the prevailing literature, which primarily emphasizes the mere presence of female directors in boardrooms, by going beyond this focus to examine female directors holding monitoring roles (MONT_FEM). Following Faleye et al. (2011)[1], non-executive female directors are considered monitoring directors if they serve at least two of any of the board monitoring committees (audit, nomination, governance, and compensation committee) and then calculate MONT_FEM as the proportion of non-executive monitoring female directors to the total number of non-executive monitoring directors.

3.3. Empirical model

To test our main hypothesis (H1a), we used two alternative methods. *First*, we build on the main model in Zalata et al. (2019) and extend them by interacting between internal governance mechanisms (GOV) and MONT_FEM as follows:

$$\begin{aligned} DISACC = {} & \beta_0 + \beta_1 MONT\_FEM + \beta_2 GOV + \beta_3 GOV \times MONT\_FEM + \beta_4 SIZE + \beta_5 LEV \\ & + \beta_6 OCF + \beta_7 ROA + \beta_8 GROWTH + \beta_9 LOSS + \beta_{10} LAG\_NOA + \beta_{11} LAG\_ACCRUALS \end{aligned} \quad (2)$$

The coefficients of interest are $\beta_{1,}$ which refers to MONT_FEM in a weak governance setting, and $\beta_{3,}$ which refers to MONT_FEM in a strong governance setting.

Where GOV refers to the firms' corporate governance mechanisms. There is no consensus on how to measure strong and weak corporate governance. Some studies have used the individual components of governance mechanisms (Peasnell et al., 2000, 2005; Xie et al., 2003; Yang & Krishnan, 2005), however, other studies argue that these individual components are substitutes or complementary to each other, generating a governance index (Cyert et al., 2002; Karamanou & Vafeas, 2005; Mande et al., 2012; Zalata & Roberts, 2016). Therefore, in this study, we developed a composite measure that captures strong and weak corporate governance. This measure is based on the following variables: board size, audit committee size, board independence, the stock ownership of independent directors, the outside directorships of independent directors, and the percentage of expert directors on the audit committee. Prior studies suggest that large boards can result in governance problems, such as poor communication and coordination and free-riding (Abbott et al., 2004; Beasley, 1996). In addition, there is a general agreement that firms with large audit committees and directors with more independent and financial expertise are more likely to engage in accurate financial reporting (i.e. Klein, 2002; Xie et al., 2003; Zalata & Roberts, 2016). In addition, extant research suggests that agency problems increase with independent directors' stock ownership (i.e. Bédard, 2004) and their outside directorships (i.e. Beasley, 1996; Zalata & Roberts, 2016).

Drawing on this, firms are coded one if their board size is less than the sample median and zero otherwise. If the proportion of dependent directors is greater than the sample median, we set the firm-year observation to one, and zero otherwise. Similarly, firms are coded one if the proportion of their audit committee size to the board size is greater than the sample median and zero otherwise. Firms are scored one if the proportion of financial expert directors to audit committee size is higher than the sample median, and zero otherwise. Firms are coded one if the proportion of independent directors' stock ownership to outstanding shares is lower than the sample median, and zero otherwise. Finally, firms are coded one if the average number of independent directors' outside directorships is lower than the sample median, and zero otherwise. The composite measure for governance quality (GOV) is the sum of each individual variable's score, where a higher sum reflects more effective governance mechanisms.

Table 1. Comparative descriptive analysis of entities with at least one female director in a monitoring role versus those without any female directors in such positions.

	Firms without MONT_FEM (N: 3675)			Firms with MONT_FEM (N: 3844)			Test of difference between mean	
Variable	MEAN	MEDIAN	STD_DEV	MEAN	MEDIAN	STD_DEV	t-statistic	P value
DISACC	0.08	0.05	0.08	0.07	0.04	0.08	7.4308	0.0000
GOV	2.99	3	1.24	2.79	3	1.18	7.1084	0.0000
BIG4	0.89	1	0.32	0.97	1	0.16	−15.0514	0.0000
SIZE	7.51	7.33	1.41	8.16	8.02	1.57	−19.0648	0.0000
LEV	0.47	0.25	0.87	0.75	0.48	1.19	−11.5517	0.0000
OCF	0.11	0.11	0.07	0.11	0.1	0.07	1.844	0.0652
ROA	0.06	0.06	0.08	0.06	0.06	0.07	0.8298	0.4067
GROWTH	2.85	2.16	2.51	3.16	2.24	3.14	−4.7633	0.0000
LOSS	0.15	0	0.35	0.12	0	0.32	3.903	0.0001
LAG_ACCRUALS	−0.06	−0.05	0.07	−0.06	−0.05	0.06	−1.5339	0.1251
LAG_NOA	0.78	0.6	0.67	0.8	0.57	0.7	−1.0526	0.2926

DISACC: discretionary accruals estimated as a residual from Eq. 1.
GOV: the sum of each individual governance variables' score.
BIG4: indicator variable set to one when the auditor belongs to one of the big four auditing firms, and zero otherwise.
SIZE: the natural logarithm of a corporation's market value at the end of the year.
LEV: the proportion of long-term debt at the end of the year to book value of equity at the year-end.
OCF: the proportion of operating cash flows to total assets. ROA is proportion of net income before extraordinary items to total assets.
ROA: net income scaled by total assets.
GROWTH: the proportion of firms' market value at the year-end to book value of equity at the year-end.
LOSS: indicator variable equal to one if ROA is negative and zero otherwise.
LAG_ACCRUALS: total accruals scaled by the total assets at the start of the financial year.
LAG_NOA: net operating assets divided by sales at the start of the financial year.

Second, we partition our full sample into two subsamples—firms with strong internal governance mechanisms and those with rather weak governance mechanisms–and run the following model for these samples separately:

$$DISACC = \beta_0 + \beta_1 MONT\_FEM + \beta_2 SIZE + \beta_3 LEV + \beta_4 OCF + \beta_5 ROA + \beta_6 GROWTH + \beta_7 LOSS + \beta_8 LAG\_NOA + \beta_9 LAG\_ACCRUALS \quad (3)$$

To investigate H1b, we divide our sample into two groups: entities audited by a Big-4 firm and those audited by non-Big-4 firms. We then apply Equation (3) independently to each group[2].)

Also, our model controls for firm size (SIZE), firms' debt level (LEV), operating cash flows (OCF), return on assets (ROA), growth firms (GROWTH), loss (LOSS), lagged net operating assets (LAG_NOA), and last year accruals (LAG_ACCRUALS). We provide full definition of these variable in Table 1.

3.4. Sample selection and data sources

The financial data required for this study were obtained from the annual compustat for 2007 and 2014. Similar to extant financial accounting, this study excludes firms belonging to the financial sector given their distinct financial reporting requirements. This study excludes firm-year observations with missing financial data required to run the different equations. To ensure sufficient data are required to measure the dependent variables, this study further excludes industry-year observations with fewer than eight observations. These financial data are merged with data pertaining to female directors, which were sourced from the ISS database. Finally, we excluded observations that were missing data pertaining to corporate governance. These procedures led to a final sample of 7519 firm-year observations over the sample period.

4. Results

4.1. Descriptive statistics

We show the descriptive statistics for firms with at least one monitoring female director (*MONT_FEM)* and for other firms without such directors in Table 1. It shows that firms with *MONT_FEM* have

less earnings management than other firms, which confirms the findings of prior research that *MONT_FEM* is more beneficial. Interestingly, Table 1 shows that *MONT_FEM* firms are characterized by statistically significantly weak governance mechanisms, suggesting that these firms might appoint female directors in monitoring roles as substitutes for other governance mechanisms. Furthermore, Table 1 suggests that firms with *MONT_FEM* are more likely to appoint BIG4 auditors, which might raise concerns about whether *MONT_FEM* is indeed associated with less earnings management or, instead, BIG4 auditors rather than monitoring female directors to improve earnings quality. However, Table 1 illustrates that these two groups are significantly different in terms of SIZE, LEV, OPCF, MBV, and LOSS.

Table 2 exhibits the Spearman Correlation Matrix, and overall, it appears that our analysis is not afflicted by any discernible issues of multicollinearity.

4.2. Regression analysis

To investigate H1a, we add corporate governance quality (*GOV*) as a continuous variable to our model and create an interaction variable between *GOV* and *MONT_FEM*. The results of these analyses are reported in Table 3 (under column 2), which shows a significant negative relationship *MONT_FEM* and *DISACC* suggesting that firms with weak governance *MONT_FEM* are characterized by less *DISACC*. In addition, there is an insignificant relationship between *DISACC* and the interaction between *GOV* and *MONT_FEM* suggesting that the behavior of *MONT_FEM* in strong governance firms is not significantly different from that in other firms with weak governance, suggesting that *MONT_FEM* is a key player within boardrooms irrespective of the strength of firms' governance quality. That is, *MONT_FEM* provides superior oversight of managerial opportunism in both weak and strong governance environments.

As an alternative method for testing H1a, we divide the main sample into two groups: firms with strong governance and firms with weak governance and run Equation (3) separately for each of these groups. We consider weak governance firms as those in the lowest quintile with respect to their governance quality (*GOV*). The results of this analysis are reported in Table 4, which show a significant negative relationship between *MONT_FEM* and *DISACC in both samples.* Unreported results show insignificant differences between the coefficients of *MONT_FEM* in these two samples, demonstrating that female directors appointed in monitoring roles constrain firms' accrual-based earnings management in both strong and weak governance settings.

Prior studies suggest that the potential for earnings management by companies is substantially curtailed when they are audited by Big-4 auditing firms (Becker et al., 1998; Francis et al., 1999). Therefore, in order to investigate whether the ability of *MONT_FEM* in constraining earnings management is contingent on Big-4 auditors (H2b), the sample is categorized into two groups: namely firms audited by a Big-4 auditing firm and those audited by non-Big-4 auditing firms—and re-run Equation (3) separately for each of these two groups[3]. We report this analysis in Table 5. The results show that *MONT_FEM* is significantly negative in both samples, suggesting that *MONT_FEM* successfully mitigates accrual-based earnings management in both settings. In addition, Panel B shows significant differences between the coefficients of *MONT_FEM* in these two samples, thereby suggesting that the impact of *MONT_FEM* is more prominent in firms audited by a non-Big-4 auditor. That is, the quality of female directors is not contingent on audit quality; rather, it seems that these directors are more likely to closely scrutinize managers when they feel that shareholders are at risk of being misled by managers' opportunistic practices (i.e. when managers deliberately choose relatively low-quality auditors to audit corporate financial reports). That is, appointing female directors could be a substitute for hiring high-quality auditors.

In summary, our analysis suggests that appointing female directors in monitoring roles substantially adds value to firm monitoring. It seems that monitoring female directors can obtain the required strategic information to perform their monitoring role activities not only in weak but also in strong corporate governance settings, and we did not find empirical support that suggest that these directors might freeride the efforts of other governance mechanisms in place.

Table 2. Correlation matrix.

Variables	DISACC	MONT_FEM	GOV	BIG4	F_SIZE	LEV	OCF	ROA	GROWTH	LOSS	LAG_NOA	LAG_ ACCRUALS
DISACC	1											
MONT_FEM	−0.07***	1										
GOV	0.04***	−0.08***	1									
Big4	−0.07***	0.15***	−0.06***	1								
F_SIZE	0.04***	0.19***	−0.08***	0.25***	1							
LEV	−0.08***	0.11***	−0.03**	0.09***	0.09***	1						
OPCF	0.30***	−0.02	0.02**	−0.01	0.17***	−0.13***	1					
ROA	0.18***	0.00	0.03**	−0.04***	0.28***	−0.16***	0.58***	1				
GROWTH	0.19***	0.07***	−0.01	0.01	0.27***	0.42***	0.34***	0.34***	1			
LOSS	0.00	−0.03**	0.00	−0.02**	−0.27***	0.07***	−0.29***	−0.65***	−0.13***	1		
LAG_NOA	−0.07***	−0.01	0.06***	0.06***	0.17***	0.18***	−0.13***	−0.21***	−0.20***	0.04***	1	
LAG_ACCRUALS	−0.09***	0.02	−0.02	−0.03***	0.07***	−0.03**	−0.21***	0.11***	−0.05***	−0.16***	−0.06***	1

*** p<.01, ** p<.05, * p<.1.
We define variables in Table 1.

Table 3. The relationship between discretionary accruals and monitoring female directors (Using internal corporate governance firms as a continuous variable).

	(1)	(2)
Variables	Without control variables	With control variables
MONT_FEM	−0.0320***	−0.0245***
	(0.0092)	(0.0083)
GOV		0.0017
		(0.0011)
GOV × MONT_FEM		0.0024
		(0.0063)
SIZE		−0.0008
		(0.0012)
LEV		−0.0098***
		(0.0016)
OCF		0.2451***
		(0.0254)
ROA		0.0743**
		(0.0299)
GROWTH		0.0048***
		(0.0008)
LOSS		0.0300***
		(0.0045)
LAG_NOA		0.0031
		(0.0020)
LAG_ACCRUALS		−0.0402**
		(0.0181)
_CONS	0.0949***	0.0455***
	(0.0037)	(0.0094)
Observations	7519	7519
R-squared	0.0191	0.1405
YEARS	YES	YES

Standard errors are in parentheses.
*** p<.01, ** p<.05, * p<.1.
We define variables in Table 1.

Table 4. The relationship between discretionary accruals and monitoring female directors (weak versus strong internal corporate governance firms).

	(1)	(2)
Variables	Firms with weak internal corporate governance	Firms with strong internal corporate governance
MONT_FEM	−0.0214*	−0.0255**
	(0.0120)	(0.0104)
SIZE	−0.0002	−0.0012
	(0.0017)	(0.0014)
LEV	−0.0112***	−0.0090***
	(0.0020)	(0.0021)
OCF	0.2364***	0.2506***
	(0.0401)	(0.0312)
ROA	0.0398	0.0899**
	(0.0420)	(0.0376)
GROWTH	0.0043***	0.0052***
	(0.0010)	(0.0010)
LOSS	0.0344***	0.0266***
	(0.0059)	(0.0058)
LAG_NOA	0.0042	0.0027
	(0.0032)	(0.0024)
LAG_ACCRUALS	−0.0320	−0.0447*
	(0.0264)	(0.0230)
_CONS	0.0459***	0.0507***
	(0.0134)	(0.0115)
Observations	2842	4677
R-squared	0.1219	0.1530
YEARS	YES	YES

Standard errors are in parentheses.
*** p<.01, ** p<.05, * p<.1.
We define variables in Table 1.

Table 5. Panel A: The relationship between discretionary accruals and monitoring female directors (Big4 versus non-Big 4 Auditors).

	(1)	(2)
Variables	Non-BIG4 firms	BIG4 firms
MONT_FEM	−0.0797**	−0.0213**
	(0.0388)	(0.0085)
SIZE	−0.0125*	0.0001
	(0.0074)	(0.0012)
LEV	−0.0042	−0.0096***
	(0.0042)	(0.0016)
OCF	0.3031***	0.2387***
	(0.0702)	(0.0258)
ROA	0.0356	0.0670**
	(0.0873)	(0.0308)
GROWTH	0.0132***	0.0043***
	(0.0027)	(0.0007)
LOSS	0.0144	0.0295***
	(0.0146)	(0.0047)
LAG_NOA	0.0181**	0.0020
	(0.0080)	(0.0021)
LAG_ACCRUALS	0.0416	−0.0524***
	(0.0586)	(0.0187)
_CONS	0.1028**	0.0427***
	(0.0497)	(0.0097)
Observations	518	7001
R-squared	0.2727	0.1315
YEARS	YES	YES
Panel B: Coefficient difference between Big4 and non-Big 4 firms		
Differences on coefficient of MONT_FEM	0.0584	chi2(1) = 3.75 Prob > chi2 = 0.0529

Standard errors are in parentheses.
*** *p*<.01, ** *p*<.05, * *p*<.1.
We define variables in Table 1.

4.3. Addressing potential endogeneity

The results presented in the primary analysis could be influenced by self-selection bias monitoring female directors and accrual-based earnings management are endogenously determined. Consequently, the conclusion derived from this analysis might be misrepresentative. To address this problem, we follow Liu et al. (2014) and use the lagged value of *MONT_FEM*. Using this approach, Table 6 reports the findings of this analysis and shows that the lagged measure of *MON_FEM* is still negative and significant in samples with weak and strong governance mechanisms and in firms audited either by BIG-4 or non-BIG-4 auditors. Consequently, the findings reported in the previous section are not driven by endogeneity concerns, and reverse causality does not seem to explain these findings.

Another potential method to address the endogeneity issues inherent in the analysis is Heckman's (1976) procedure. In particular, Heckman developed a two-stage model, and using its first stage, the inverse Mills ratio (MILLS) was calculated using a probit model that captures the determinants of the presence of MONT_FEM. More specifically, in the first-stage probit model, we include females in the industry, firm size, return on assets, sales growth, annual stock return, Tobin's Q, independent directors, and average number of outside directorships. In the subsequent stage, we control for inverse MILLS in Equation (3). The findings of this analysis are reported in Table 7, and they are qualitatively similar to the results reported in the main analysis, suggesting that the results reported under the main analysis are not subject to self-selection bias.

4.4. Controlling for other earnings management

In the main analysis, we did not control for other earnings management methods when testing discretionary accruals. This omission could introduce bias, as firms may simultaneously engage in multiple earnings management strategies, potentially confounding our results[4]. Therefore, as a robustness analysis, we control for real earnings management methods, such as discretionary expenses, abnormal cash flows, and abnormal production costs, as well as for classification shifting through special items. In essence, we

Table 6. Panel A: The relationship between discretionary accruals and monitoring female directors (addressing potential endogeneity using lagged MONT_FEM).

	(1)	(2)	(3)
Variables	All firms	Non-BIG4 firms	BIG4 firms
MONT_FEM	−0.0300***	−0.0910**	−0.0269***
	(0.0090)	(0.0441)	(0.0092)
GOV	0.0011		
	(0.0011)		
GOV × MONT_FEM	0.0061		
	(0.0065)		
SIZE	−0.0009	−0.0130	0.0001
	(0.0013)	(0.0093)	(0.0013)
LEV	−0.0096***	−0.0051	−0.0096***
	(0.0018)	(0.0044)	(0.0017)
OCF	0.2205***	0.2820***	0.2127***
	(0.0285)	(0.0734)	(0.0289)
ROA	0.0885**	0.0754	0.0755**
	(0.0346)	(0.1123)	(0.0347)
GROWTH	0.0047***	0.0150***	0.0043***
	(0.0009)	(0.0038)	(0.0008)
LOSS	0.0303***	0.0151	0.0294***
	(0.0050)	(0.0176)	(0.0051)
LAG_NOA	0.0036*	0.0207**	0.0025
	(0.0022)	(0.0094)	(0.0022)
LAG_ACCRUALS	−0.0565***	−0.0201	−0.0634***
	(0.0211)	(0.0654)	(0.0217)
_CONS	0.0365***	0.0873	0.0352***
	(0.0092)	(0.0537)	(0.0095)
Observations	6072	407	5665
R-squared	0.1340	0.2930	0.1244
YEARS	YES	YES	YES
Panel B: Coefficient difference between Big4 and non-Big 4 firms			
Differences on coefficient of MONT_FEM		0.0641	chi2(1) = 3.55 Prob > chi2 = 0.0596

Standard errors are in parentheses.
*** p<.01, ** p<.05, * p<.1.
We define variables in Table 1.

follow Roychowdhury (2006) and run three expectation models to estimate discretionary expenses, abnormal cash flows, and abnormal production costs, using the residuals from these models[5]. We estimate each of these models cross-sectionally for each industry year with at least eight observations. Finally, we compute a composite measure for real earnings management (*REM*) as (−1 × discretionary expenses) + (−1 × abnormal cash flows) + abnormal production costs. Additionally, we include special items (*SPI*) as a proxy for the firm's ability to engage in classification shifting. Prior research (McVay, 2006) indicates that firms are more likely to misclassify their core expenses when they have income-decreasing special items. *SPI* is a dummy variable set to one if the firm has income decreasing special items and zero otherwise. We report our analysis after controlling for *REM* and *SPI* in Table 8 and our findings remain qualitatively similar to our baseline findings.

4.5. Other measures

The primary analysis is based on a measure of *DISACC* derived from Jones (1991) and adjusted for the performance expectation model. However, other studies developed a measure for discretionary accruals using an expectation model drawn from McNichols (2002) as follows: Therefore, to ensure the robustness of our analysis, we re-estimate Equation (3) utilizing a measure of discretionary accruals derived from McNichols (2002), as outlined below:

$$\frac{ACCRUALS_{i,t}}{TOTAL\_ASSETS_{i,t-1}} = \beta_0 + \beta_1 \frac{OP\_CASH\_FLOWS_{i,t-1}}{TOTAL\_ASSETS_{i,t-2}} + \beta_2 \frac{OP\_CASH\,FLOWS_{i,t}}{TOTAL\_ASSETS_{i,t-1}} + \beta_3 \frac{OP\_CASH\_FLOWS_{i,t+1}}{TOTAL\_ASSETS_{i,t}} + \beta_4 \frac{\Delta SALES_{i,t}}{TOTAL\_ASSETS_{i,t-1}} + \beta_5 \frac{PPE_{i,t}}{TOTAL\_ASSETS_{i,t-1}} + \varepsilon_{it} \quad (4)$$

Table 7. Panel A: The relationship between discretionary accruals and monitoring female directors (addressing potential endogeneity using Inverse Millis ratio).

	(1)	(2)	(3)
Variables	All firms	Non-BIG4 firms	BIG4 firms
MONT_FEM	−0.0192**	−0.0926**	−0.0160*
	(0.0086)	(0.0395)	(0.0087)
GOV	0.0018*		
	(0.0011)		
GOV × MONT_FEM	0.0026		
	(0.0063)		
SIZE	0.0008	−0.0148*	0.0018
	(0.0014)	(0.0078)	(0.0014)
LEV	−0.0090***	−0.0058	−0.0088***
	(0.0016)	(0.0038)	(0.0016)
OCF	0.2460***	0.2901***	0.2389***
	(0.0253)	(0.0719)	(0.0256)
ROA	0.0640**	0.0538	0.0565*
	(0.0300)	(0.0914)	(0.0309)
GROWTH	0.0045***	0.0140***	0.0040***
	(0.0008)	(0.0027)	(0.0008)
LOSS	0.0290***	0.0159	0.0285***
	(0.0045)	(0.0150)	(0.0047)
LAG_NOA	0.0024	0.0205**	0.0012
	(0.0021)	(0.0083)	(0.0021)
LAG_ACCRUALS	−0.0386**	0.0498	−0.0499***
	(0.0180)	(0.0583)	(0.0185)
MILLS	0.0130**	−0.0248	0.0139**
	(0.0059)	(0.0201)	(0.0061)
_CONS	0.0232*	0.1432**	0.0184
	(0.0136)	(0.0624)	(0.0139)
Observations	7516	518	6998
R-squared	0.1421	0.2775	0.1333
YEARS	YES	YES	YES
Panel B: Coefficient difference between Big4 and non-Big 4 firms			
Differences on coefficient of MONT_FEM		0.0766	chi2(1) = 5.94 Prob > chi2 = 0.0148

Standard errors are in parentheses.
*** p<.01, ** p<.05, * p<.1.
We define variables in Table 1.

Where *OP_CASH_FLOWS* is the operating cash flow, and *ΔSALES* is the change in sales. untabulated results using this measure are qualitatively similar to the main analysis, and suggest that *MONT_FEM* constrains accrual-based earnings management in both weak and strong governance environments.

5. Conclusion

Regulators in different jurisdictions have raised concerns about the participation of female directors within the boardroom and consequently issued a spate of regulations requiring more representation of female directors with the intention of improving board effectiveness. Arguably, female directors are behaviorally different from their male counterparts, and this difference affects the quality of their decisions. For example, female directors exhibit a greater propensity toward ethical conduct and display a lower level of risk tolerance in comparison to their male counterparts. Despite the rapid move towards allocating more board seats to female directors, and extant research already suggesting that female participation within boardrooms adds value to the quality of firms' outputs, Zalata et al. (2019) noted that there is less consideration of the roles that females directors ought to undertake within corporate boardrooms. In addition, Zalata et al. (2019) found that female directors are better able to add value to their firms when they play a monitoring role. However, they did not investigate whether the behavior of female directors is contingent on the strength of the surrounding governance mechanisms. Therefore, this study investigates whether the surrounding governance mechanisms moderate the relationship between monitoring female directors and earnings management. This study is among the first to address this research question.

Drawing on a sample of US firms, this study shows that monitoring female directors is associated with lower earnings management in both strong and weak internal corporate governance. Furthermore, this

Table 8. Panel A: The relationship between discretionary accruals and monitoring female directors (controlling for other earnings management methods).

	(1)	(2)	(3)
Variables	All firms	Non-BIG4 firms	BIG4 firms
MONT_FEM	−0.0190**	−0.0681*	−0.0163*
	(0.0091)	(0.0381)	(0.0093)
GOV	0.0020*		
	(0.0011)		
GOV × MONT_FEM	0.0035		
	(0.0068)		
SIZE	−0.0008	−0.0131*	0.0002
	(0.0012)	(0.0075)	(0.0013)
LEV	−0.0105***	−0.0048	−0.0102***
	(0.0018)	(0.0042)	(0.0017)
OCF	0.2436***	0.3210***	0.2374***
	(0.0269)	(0.0733)	(0.0273)
ROA	0.0875***	0.0352	0.0825**
	(0.0320)	(0.0882)	(0.0329)
GROWTH	0.0051***	0.0135***	0.0045***
	(0.0008)	(0.0027)	(0.0008)
LOSS	0.0270***	0.0174	0.0262***
	(0.0047)	(0.0156)	(0.0049)
LAG_NOA	0.0095***	0.0182**	0.0084***
	(0.0023)	(0.0080)	(0.0024)
LAG_ACCRUALS	−0.0384**	0.0265	−0.0508***
	(0.0189)	(0.0604)	(0.0196)
REM	0.0024***	0.0022**	0.0023***
	(0.0002)	(0.0011)	(0.0003)
SPI	0.0117***	−0.0006	0.0136***
	(0.0026)	(0.0076)	(0.0027)
_CONS	0.0352***	0.1030**	0.0298***
	(0.0098)	(0.0514)	(0.0100)
Observations	6659	498	6161
R-squared	0.1448	0.2916	0.1354
YEARS	YES	YES	YES
Panel B: Coefficient difference between Big4 and non-Big 4 firms			
Differences on coefficient of MONT_FEM		0.0581	chi2(1) = 2.93 Prob > chi2 = 0.0868

Standard errors are in parentheses.
*** p<.01, ** p<.05, * p<.1.
We define variables in Table 1.

study shows that the value of monitoring female directors is not contingent on external auditors' quality; instead, it evinces that their impact is more pronounced when firms hire non-big4 auditors. These results remain robust even after controlling for the possible presence of endogeneity.

In essence, the results suggest that female directors contribute uniquely to monitoring processes, providing valuable strategic insights that improve oversight effectiveness regardless of the strength of existing corporate governance mechanisms. This finding challenges the existing argument (Adams, & Ferreira, 2009; Lai et al., 2017) that female directors' impact is contingent on the overall strength of governance structures. Instead, our findings highlight that female directors can leverage their distinct perspectives and skills to add substantive value to governance practices. Theoretically, this underscores the importance of diversity in the boardroom, particularly in monitoring roles, and suggests that female directors are more suitable to play the monitoring roles given that they bring unique perspectives and skills that enhance oversight. Practically, it highlights the benefits of including more women in monitoring roles, not only to improve compliance and oversight but also to bolster the effectiveness of governance mechanisms as a whole.

From a practical standpoint, our findings advocate for the increased inclusion of female directors in monitoring roles. The evidence that female directors can effectively gather and utilize strategic information in both weak and strong governance environments suggests that their involvement can enhance governance effectiveness without necessarily relying on the strength of other mechanisms. This has significant implications for corporate boards and policymakers, reinforcing the value of gender diversity in enhancing firm performance and accountability. This insight could guide future policies and practices aimed at optimizing board composition to achieve more effective corporate governance. That is, our study did not find empirical support for the notion that female directors might free-ride on the efforts

of other governance mechanisms. This challenges concerns that female directors could potentially leverage existing governance structures without contributing effectively. Instead, it supports the view that female directors actively engage in their monitoring roles, contributing meaningfully to the firm's governance framework.

Overall, our findings highlight the importance of incorporating diverse perspectives into boardrooms and provide a compelling case for revaluating the roles and contributions of female directors within corporate governance. Further research could explore the specific mechanisms through which female directors enhance monitoring and how these dynamics interact with various aspects of corporate governance. However, these results may be subject to some limitations. For example, the measurement of dependent and independent variables may be biased and may not reflect reality. Finally, our sample extends only up to 2014, and it remains uncertain whether the current findings can be generalized to other time periods. With the increasing participation of female directors, more recent data could potentially provide a deeper insight into the impact of female directors on earnings management and enhance our understanding of this dynamic.

Notes

1. More discussion about the rationale behind this operationalization can be found in Faleye et al. (2011).
2. About 93% of our sampled firms have been audited by one of the Big 4 auditors and, therefore, interaction between Big 4 and *MONT_FEM* would lead to creation of a multicollinearity problem.
3. About 93% of our sampled firms have been audited by one of the Big 4 auditors and, therefore, interaction between Big 4 and MONT_FEM would lead to creation of a multicollinearity problem.
4. Thank you to the anonymous reviewer for pointing this bias out to us.
5. For a more detailed discussion of these models, please refer to Roychowdhury (2006).

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Authors' contributions

Mohammed A. Alhossini: Writing - original draft; Funding acquisition.
Alaa Zalata: Data collection; formal analysis; Supervision.
Sameeh Elmahdy Samaha: Writing - original draft.
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Data availability statement

Data are accessible from publicly cited sources in the paper, and authors do not have permission to share them publicly.

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