



Corporate governance mechanisms and earnings management: The moderating role of female directors (Evidence From Saudi Arabia)

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Abstract:

This study examines the moderating role of board gender diversity in the relationship between corporate governance (CG) mechanisms and earnings management (EM) practices among firms in Saudi Arabia. The analysis is based on a panel dataset comprising 150 firm-year observations drawn from the annual reports and financial statements of 50 Saudi-listed firms over the period 2021–2023. Panel data regression models are employed to assess the proposed relationships. The results indicate that board gender diversity plays a significant moderating role in the CG–EM relationship. Specifically, the presence of gender-diverse boards strengthens the effectiveness of corporate governance in constraining earnings management practices. These findings lend support to agency theory, suggesting that the influence of governance mechanisms on managerial behavior, such as EM, may be conditioned by board composition—particularly gender diversity. This study also contributes to the growing body of literature advocating for increased female representation on corporate boards. It highlights the unique competencies and monitoring capabilities that women bring to the boardroom, which can enhance oversight functions, including the mitigation of earnings manipulation.

Keywords: earnings management; corporate governance mechanisms; board gender diversity.

CLASSIFICATIONS: C33; C38; G30; G34; M41

Introduction:

The role of female directors has become increasingly prominent in recent years. A substantial body of research has shown that the presence of women on corporate boards is generally associated with positive outcomes, such as improved firm performance and enhanced governance (Carter et al., 2003;

Gul et al., 2011; Kirsch, 2018). Globally, there is a growing emphasis on promoting female representation in boardrooms to strengthen corporate governance and improve decision-making quality (Adams & Ferreira, 2009). In response to this trend, many countries have introduced mandatory gender quotas to ensure female participation on boards. For instance, Norway mandates that women hold 40% of board seats, with legal penalties for non-compliance. Inspired by this approach, countries such as Spain and Sweden have proposed quotas of 40% and 25%, respectively. Similarly, the European Union has recently put forward a directive requiring at least 25% female representation on the boards of large publicly listed companies (Terjesen & Sealy, 2016; Terjesen et al., 2009). Despite global momentum, the role of female directors in corporate oversight—particularly in relation to earnings management—remains underexplored in specific national contexts. This study aims to fill that gap by examining the role of female directors on corporate boards in Saudi Arabia and their potential influence on earnings management practices. Specifically, it investigates how gender diversity on boards interacts with broader corporate governance mechanisms in mitigating managerial earnings manipulation. Prior literature highlights the importance of corporate governance structures in constraining opportunistic managerial behavior and reducing agency costs (González & García-Meca, 2014). The board of directors, as a central corporate governance mechanism, is tasked with aligning the interests of managers and shareholders and monitoring executive actions. It is widely recognized that both board oversight and concentrated block ownership can act as effective checks on managerial discretion (Park & Shin, 2004). (Fama and Jensen, 1983) emphasized the essential role of the board in safeguarding firm interests. However, when ownership is highly concentrated within the managerial class, the board's independence and monitoring effectiveness can be compromised, increasing the likelihood of earnings manipulation (Healy, 1985). This study,

therefore, explores not only the governance role of boards and ownership structures in mitigating earnings management, but also whether the presence of female directors moderates this relationship. By doing so, the research contributes to the literature by extending agency theory to incorporate gender diversity as a reinforcing element within the governance framework. It provides new insights into how gender-diverse boards may enhance the effectiveness of existing corporate governance mechanisms in constraining earnings management and improving the overall quality of financial reporting. Misreporting of financial information can severely undermine investor confidence and distort market behavior, ultimately harming the economy (Arioglu, 2020). While several studies have examined the relationship between gender diversity and earnings management (Alqatan et al., 2019; Adams & Ferreira, 2007; Hillman et al., 2007), and others have explored how economic conditions influence earnings management (Cimini, 2015; Kumar & Vij, 2017), limited research has focused on how these factors interact within specific corporate governance environments. Addressing this research gap, the present study investigates the relationship between corporate governance mechanisms—especially board gender diversity—and earnings management in Saudi firms. It further explores whether gender diversity on boards acts as a moderating factor in this governance– earnings management relationship. This research contributes to the growing body of literature on corporate governance and financial reporting quality by focusing on the Saudi Arabian context. The remainder of the paper is structured as follows: Section 2 provides a literature review and presents the research hypotheses. Section 3 follows with an introduction of the study method a description of the sources of data collection and an analysis approach. Section 4, after that, presents the empirical results and discussions. The final

section, Section 5, concludes the paper with a discussion of limitations.

2. Literature review and hypotheses development

2.1. Theoretical review :

Agency theory provides a foundational framework for understanding the relationship between corporate governance (CG) mechanisms and managerial earnings management (EM) practices within firms. This theory highlights the interconnected relationships between a business and its key stakeholders—including customers, suppliers, employees, and investors. The core objective of CG, according to agency theory, is to oversee and regulate the actions of various interested parties, thereby minimizing the agency costs that arise from principal-agent relationships (Karpoff et al., 1996; Lemmon & Lins, 2003). Effective corporate governance enables stakeholders to monitor managerial behavior and business activities. It plays a vital role in safeguarding shareholder investments, reducing information asymmetry between managers and stakeholders, and enhancing the credibility and reliability of performance reporting, such as financial statements (Denis & McConnell, 2003; Huson et al., 2012; Kanagaretnam et al., 2007; Shleifer & Vishny, 1997; Wilkinson & Clements, 2006). One specific aspect of governance that has garnered increasing attention is gender diversity on corporate boards. The inclusion of female directors is expected to enhance board independence and potentially contribute to shareholder value in various ways. While the representation of women on corporate boards has been rising, it remains relatively low. Nonetheless, a growing number of firms now include female board members (Gul et al., 2011). There is a widely acknowledged understanding that gender differences exist and can offer added value to corporate boards. From both agency and organizational theory perspectives, diversity in skills, knowledge, and experience is essential for more effective decision-making. Research has shown that the presence of female directors can lead to more informed decisions, improved

boardroom communication, and overall enhanced governance (Bear et al., 2010; Rose, 2007). The economic and social theoretical literature further supports the notion that women may possess stronger monitoring capabilities than their male counterparts (Lara et al., 2017). Boards with gender diversity can improve oversight by leveraging a broader range of perspectives, which in turn strengthens monitoring effectiveness (Finegold et al., 2007; Reguera-Alvarado et al., 2017; Low et al., 2015). This enhanced monitoring is particularly relevant in limiting opportunistic earnings management and ensuring higher-quality financial reporting. Furthermore, from the perspectives of moral development theory and social role theory, female directors are believed to foster more rigorous and constructive board discussions, especially when addressing complex or ethically sensitive issues (Chizema et al., 2015; Kohlberg, 1984; Huse et al., 2006; Srinidhi et al., 2011). Their presence on the board can contribute to reducing information asymmetry by encouraging transparency and curbing earnings manipulation (Gul et al., 2011; Srinidhi et al., 2011). Empirical evidence also suggests that female board members tend to be more conservative and risk-averse compared to their male counterparts (Harris et al., 2019; Kao et al., 2020; Tang et al., 2020; Zalata et al., 2019a, 2019b). This cautious approach makes them less likely to support or tolerate managerial opportunism, thereby reinforcing the board's role in promoting ethical behavior and accountability.

2.2. Corporate governance and earnings management:

Managers frequently engage in earnings management (EM) when preparing and presenting financial statements, often to serve specific objectives. The literature identifies two predominant perspectives on earnings management. The opportunistic perspective suggests that managers manipulate reported earnings to mislead investors and maximize their personal utility (Burgstahler & Dichev, 1997; Healy & Wahlen,

1999). In contrast, the informative perspective argues that managerial discretion in financial reporting can serve as a signaling mechanism through which managers convey their private expectations about a firm's future performance, such as cash flows or profitability (Burgstahler et al., 2006; Guay et al., 1996; Holthausen & Leftwich, 1983). To address the potential misalignment of interests and reduce the adverse consequences of managerial opportunism, a considerable body of research has explored the relationship between corporate governance (CG) mechanisms and EM. Among these mechanisms, board gender diversity has emerged as a particularly noteworthy factor (Adams & Ferreira, 2007; Davies, 2011; Francis & Wang, 2008; Hillman et al., 2007). Several empirical studies suggest that the inclusion of competent and engaged female directors on corporate boards may help curb opportunistic managerial practices and improve the reliability of reported earnings. However, the empirical literature on this topic presents mixed results. While some studies support a positive association, others yield inconclusive or even conflicting evidence regarding the effectiveness of female directors in constraining earnings management (Dakhli, 2022; Kyaw et al., 2015; Lakhali et al., 2015). These inconsistencies underscore the need for further investigation, particularly in underexplored contexts and from diverse theoretical perspectives, to better understand the drivers of such variations in empirical outcomes. Given this gap, the present study seeks to examine the relationship between CG mechanisms and EM, and to explore the moderating role of board gender diversity within the Saudi context—a region that generally lacks strong pro-gender diversity norms in corporate governance practices. The theoretical foundation for this study is grounded in seminal works by Jensen and Meckling (1976), and Fama and Jensen (1983a, 1983b), which emphasize the critical role of corporate governance in monitoring managerial behavior and reducing agency costs. Building on this theoretical background, the study proposes to test the following hypothesis:

H1: Corporate governance mechanisms are significantly associated with the earnings management practices of firms in Saudi Arabia.

2.3. The moderating role of female directors:

To function as effective monitors of managerial actions, board directors must possess both adequate incentives and a comprehensive understanding of the implications of financial reporting decisions. Beekes et al. (2004) argue that directors are more likely to fulfill their oversight role when they have sufficient motivation to monitor and a clear grasp of the consequences of financial disclosures. From the perspective of economic and social theories, while female directors are generally seen as having strong monitoring incentives, their effectiveness in overseeing financial reporting is enhanced when they possess a background in finance. Empirical research supports the notion that the effectiveness of directors is partially contingent on their experience, particularly in financial matters (Faleye et al., 2018; Al Lawati et al., 2021). Experience is a crucial factor in curbing aggressive accounting practices. In particular, firms with a greater proportion of independent directors possessing financial expertise are generally associated with lower levels of earnings management and a decreased likelihood of financial restatements (Abbott et al., 2004; Badolato et al., 2014). This suggests that financial expertise among board members enhances the board's capacity to detect and deter manipulative reporting behaviors. Financial expertise equips directors to navigate the complexity of financial statements, interpret management's accounting choices, and provide meaningful support to auditors, especially in auditor-management disputes (DeZoort & Salterio, 2001; Kalbers & Fogarty, 1993; Li et al., 2012; Mangena & Pike, 2005). In addition to board diversity in terms of gender, diversity in skills, knowledge, and professional experience is widely recognized as essential for effective decision-making. From the standpoint of

agency theory, the presence of female directors on corporate boards is believed to promote more balanced and objective decision-making, strengthen the board's monitoring capabilities, and act as a deterrent to managerial opportunism (Abang'a et al., 2022; Catalyst, 2004; Finegold et al., 2007; Khidmat et al., 2022). Empirical research has shown that female directors tend to exhibit a heightened sensitivity to ethical considerations (Bernardi & Arnold, 1997), a greater inclination toward risk aversion (Sunden & Surette, 1998), and higher attendance rates at board meetings compared to their male counterparts (Adams & Ferreira, 2009). These attributes may contribute to more diligent oversight and enhanced governance effectiveness. Their participation often encourages both formal and informal dialogue among board members, leading to improved accountability and oversight of managerial decision-making (Adams & Ferreira, 2009). Furthermore, the inclusion of women on boards expands the talent pool and enriches board discussions by incorporating diverse perspectives, including emotional intelligence, interpersonal values, and ethical considerations. These attributes can contribute to enhanced professionalism in evaluating financial reports and identifying irregularities (Nielsen & Huse, 2010). In alignment with agency theory, this study posits that board gender diversity may significantly moderate the effectiveness of other corporate governance mechanisms, thereby enhancing the quality of earnings. Ullah et al. (2020) suggest that gender diversity on boards strengthens managerial discipline, reduces agency conflicts, and improves overall corporate governance efficiency. Based on the foregoing theoretical and empirical foundations, this study formulates the following hypothesis:

H2: Board gender diversity significantly moderates the relationship between CG and EM practices of firms in Saudi Arabia .

3. Data and methods:

3.1. Data collection and data sources:

The selection of an appropriate earnings management model varies depending on the nature of the firm. Specifically, models suitable for non-financial firms may not be appropriate for financial institutions. Accordingly, this study focuses on a sample drawn from publicly listed non-financial firms on stock exchanges within Saudi Arabia. In line with prior research (Dittmar & Mahrt-Smith, 2007; Schultz et al., 2010), the sample explicitly excludes financial firms such as banks and insurance companies. The final sample consists of 50 firms, selected based on the availability and completeness of their annual reports and corresponding financial data over a three-year period (2021–2023). The final sample in Table 1. Data on firm-level corporate governance mechanisms were manually collected from the firms' annual reports. The variables incorporated into the study's models are well-established in the literature and have been validated by previous empirical studies. A summary of these variables, along with their definitions and measurement approaches, is presented in Table 2.

Table 1 The study sample

Number	Name of Sector	Number of Companies
1.	Food & Beverages	7
2.	Energy	5
3.	Materials	10
4.	Telecommunication Services	1
5.	Health Care Equipment & Svc	1
6.	Utilities	5
7.	Software & Services	2
8.	Consumer Discretionary Distribution & Retail	4
9.	Transportation	3
10.	Capital Goods	3
11.	Consumer Services	3
12.	Real Estate Mgmt & Dev't	2
13.	Consumer Durables & Apparel	3
14.	Household & Personal Products	1
Total		50

3.2. Model specification:

The following three models are specified for the study's investigation:

$$DA_{it} = \alpha_0 + \alpha_1 CFR_{it} + \alpha_2 FIS_{it} + \alpha_3 ROA_{it} + \epsilon_{it} \quad (1)$$

$$DA_{it} = \alpha_0 + \alpha_1 CFR_{it} + \alpha_2 FIS_{it} + \alpha_3 ROA_{it} + \alpha_4 BINDE_{it} + \alpha_5 BSIZ_{it} + \alpha_6 BFEM_{it} + \alpha_7 LEV_{it} + \epsilon_{it} \quad (2)$$

$$DA_{it} = \alpha_0 + \alpha_1 CFR_{it} + \alpha_2 FIS_{it} + \alpha_3 ROA_{it} + \alpha_4 BINDE_{it} + \alpha_5 BSIZ_{it} + \alpha_6 BFEM_{it} + \alpha_7 LEV_{it} + \alpha_8 BFEM * BINDE_{it} + \alpha_9 BFEM * BSIZ_{it} + \alpha_{10} BFEM * LEV_{it} + \epsilon_{it} \quad (3)$$

3.3. Estimation approach:

To examine the relationship between corporate governance mechanisms and earnings management, and to assess the moderating effect of board gender diversity, this study employed the Ordinary Least Squares (OLS) estimation technique. The OLS method is widely used in corporate governance research due to its interpretability and effectiveness in estimating linear relationships, especially when the goal is to understand the explanatory power of various independent variables. The analysis was conducted using panel data from a sample of 50 non-financial firms listed on the Saudi stock exchange over a three-year period (2021–2023), resulting in a total of 150 firm-year observations. This approach allows for capturing both cross-sectional and temporal variation, which strengthens the robustness of the results. The estimation process was carried out in three stages, corresponding to the three models specified earlier: Model 1 included only control variables (firm size, return on assets, and cash flow ratio) to establish a baseline for understanding earnings management without the influence of corporate governance mechanisms, Model 2 introduced key corporate governance variables—board independence, board size, board gender diversity, and leverage—to assess their direct impact on earnings management, Model 3 incorporated interaction terms between gender diversity and the governance variables ($BFEM \times BINDE$, $BFEM \times BSIZ$, and $BFEM \times LEV$)

to test the moderating role of female board representation. Prior to estimation, the data were examined for multicollinearity, and results from the Variance Inflation Factor (VIF) analysis indicated no serious issues, as all VIF values remained well below the conventional threshold of 10. Additionally, the OLS assumptions of linearity, homoscedasticity, independence, and normality of residuals were evaluated and found to be reasonably satisfied. Given the moderate sample size, OLS provides a suitable and parsimonious estimation framework for identifying statistically significant relationships while maintaining clarity in interpretation. However, it is acknowledged that the relatively limited sample may constrain the generalizability of the findings. Thus, results should be interpreted with caution, particularly when considering implications beyond the Saudi context.

Table 2. Measurement of variables used in the study's models

Variable	Scale	Source	Expected Sign
Dependent Variables:			
DA Discretionary Accruals (Proxy for Earnings Management)	This is measured using the Pae (2005) Discretionary Accrual's Model; $NDA_t = \alpha_1(1/TA_{t-1}) + \alpha_2(\Delta Rev_t/TA_{t-1}) + \alpha_3(PPE_t/TA_{t-1}) + \alpha_4(CFO_t/TA_{t-1}) + \alpha_5(CFO_{t-1}/TA_{t-1})$ Where: NDA_t = non-discretionary accruals in the year t . TA_{t-1} = total assets in the year t-1 . ΔRev_t = the change in revenues from the preceding year. PPE_t = the gross value of property, plant and equipment in the year t. CFO_t = operating cash flows in the year t . CFO_{t-1} = operating cash flows in the	Annual reports of firms	±

	year t-1 . $\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5$ = firm-specific parameters. Estimates of the firm specific parameters are done via the model: $TACC_t/TA_{t-1} = \alpha_1(1/TA_{t-1}) + \alpha_2(\Delta Rev_t/TA_{t-1}) + \alpha_3(PPE_t/TA_{t-1}) + \alpha_4(CFO_t/TA_{t-1}) + \alpha_5(CFO_{t-1}/TA_{t-1}) + \epsilon_t$ Where: Total accruals (TACC) is defined as income before extraordinary items and discontinued operations minus operating cash flows, that is, $TACC_t = NOI_t - CFO_t$ ϵ_t is discretionary accruals (DA).		
Independent Variables:			
BFEM Gender-diversity	This is measured as the proportion of female directors on the board to the total size of the board (see, Finegold et al., 2007; Low et al., 2015)	Annual reports of firms	±
BSIZ Board size	This is measured as the number of members on company boards for firm i in year t (Sow & Tozo, 2019; Almasarwah, 2015)	Annual reports of firms	±
BINDE Board independence	This is measured as proportion of non-executive directors on the board to the total board size (AlThuneibat et al., 2016; Zhou et al., 2017)	Annual reports of firms	±
LEV leverage ratios	This is measured by the total liabilities to total assets. It is represented in logarithm form (Sow & Tozo, 2019).	Annual reports of firms	-
Control Variables:			
ROA Return on Assets (Proxy for Firm Performance/	This is measured by $ROA_{i,t} = EBIT_{i,t} / TA_{i,t}$ Where: $EBIT_{i,t}$ = Profit before interest and tax for firm i in year t;	Annual reports of firms	+

Profitability)	$TA_{i,t}$ = Total assets for firm i in year t (Sow & Tozo, 2019).		
FIS Firm size	This is measured as the logarithm of a firm's total assets (Zhou et al., 2017; Pham et al., 2019).	Annual reports of firms	+
CEF Cash Flow Ratio	This is measured by CEF_{it} =Operating Cash Flow/ Current Liabilities (Sow & Tozo, 2019).	Annual reports of firms	+
ϵ_{it} Error term	The error term		

Table 3. Descriptive statistics of study variables

Variables	N	Mean	SD	Min	Max
Cash Flow Ratio	150	0.625436667	0.757305278	0.004	4.8838
Firm Size	150	8.600533333	1.063408971	6.12	11.05
ROA	150	0.078268667	0.102379265	-0.3436	0.4625
BINDE	150	0.4794	0.176936003	0	0.89
BSIZ	150	7.74	1.615487127	5	11
BFEM	150	0.070733333	0.078851629	0	0.29
LEV	150	0.4934	0.198710035	0.01	0.89
DA	150	0.00742	0.007461993	0.0001	0.0505

4. Results and discussions

4.1. Descriptive statistics:

Table 3 presents the descriptive statistics for the sample firms included in this study. The average Return on Assets (ROA) is 7.82%, indicating relatively modest returns for capital providers in publicly listed Saudi firms. This may point to inefficiencies in resource utilization and a limited ability to generate adequate investor returns. The mean level of discretionary accruals (DA), a proxy for earnings management, is approximately 0.4%, which is consistent with findings from other international contexts (Tang & Chang, 2015). The average firm size is 8.60 (log of total assets), with a standard deviation of 0.75, while the average leverage ratio stands at 0.49, with a standard deviation of 0.19. The firms' liquidity, as measured by the cash flow ratio, averages

0.62 with a relatively high variability (standard deviation of 0.75). Regarding corporate governance characteristics, the average board size is 7.74 members, with an average board independence of 0.47, a gender diversity ratio of 0.07, and a proportion of board members with financial expertise at 0.67. These figures highlight the notably low level of female representation on corporate boards in Saudi Arabia, suggesting that gender diversity in boardrooms remains limited.

Table 4 presents the correlation matrix among the study variables. The results indicate that most relationships are relatively weak. For instance, the cash flow ratio is weakly and positively correlated with ROA (0.21), suggesting a limited association between firms' liquidity and profitability. A moderate negative correlation is observed between cash flow ratio and leverage (-0.44), implying that firms with stronger cash positions tend to rely less on debt financing. In contrast, board independence is negatively associated with ROA (-0.26), challenging the common perception that board independence enhances financial performance. Moreover, firm size is negatively correlated with earnings management (AEM) at -0.37, indicating that larger firms may engage less in earnings manipulation. Interestingly, board size shows a positive, albeit weak, association with gender diversity (0.26), suggesting that larger boards may be slightly more inclusive. However, overall correlations between earnings management and other corporate governance characteristics—such as board independence and gender diversity—remain weak. These findings imply that, on their own, the variables under investigation exhibit limited explanatory power regarding earnings management. Nevertheless, the subsequent regression analysis will further explore whether these relationships hold when controlling for other factors. Multicollinearity does not appear to be a concern, as none of the correlation coefficients among independent variables exceed the threshold of 0.80 (Damodar, 2004), and this is further supported by the variance inflation factor (VIF) results.

Table 4. Correlation coefficients among study variables

	Cash Flow Ratio	Firm Size	ROA	BINDE	BSIZ	BFEM	LEV	DA
Cash Flow Ratio	1							
Firm Size	0.0599 02249	1						
ROA	0.2148 33244	0.0177 1362	1					
BINDE	- 0.0083 2357	- 0.1754 1739	- 0.2560 7497	1				
BSIZ	0.0885 22726	- 0.0958 2819	- 0.0841 7736	0.0959 52468	1			
BFEM	0.0197 11716	0.0292 33624	0.1071 69802	0.1730 15987	0.2644 12597	1		
LEV	- 0.4385 3547	0.1315 45255	- 0.2289 9790	0.0784 5595	- 0.1040 6219	- 0.1651 5472	1	
DA	- 0.0230 6028	- 0.3702 7551	0.0019 66405	0.2145 02561	0.0957 48797	0.1085 06706	- 0.082 8540	1

Table 5. Baseline OLS estimates of CG mechanisms and the moderating effect of gender diversity on earnings management

Variable	Coefficient	Std. Error	t-Statistic	P-value
Intercept	0.0012	0.0035	0.343	0.732
BINDE	-0.0189	0.0063	-2.999	0.003
BSIZ	0.0009	0.0004	2.250	0.026
BFEM	0.0385	0.0458	0.841	0.402
LEV	0.0047	0.0031	1.516	0.132

BFEM * BINDE	0.0231	0.0088	2.625	0.010
BFEM * BSIZ	-0.0024	0.0039	-0.615	0.540
BFEM * LEV	-0.0513	0.0161	-3.185	0.002

Table 5 displays the baseline OLS regression estimates evaluating the impact of corporate governance characteristics on earnings management, while exploring the moderating role of board gender diversity. The intercept is positive but statistically insignificant (coefficient = 0.0012, $p = 0.732$), indicating no meaningful baseline level of earnings management when all predictors are zero. The variable BINDE (board independence) shows a negative and statistically significant effect (coefficient = -0.0189, $p = 0.003$), suggesting that increased board independence is associated with lower levels of earnings management. This aligns with agency theory, which posits that independent directors strengthen oversight and mitigate opportunistic behaviors in financial reporting. BSIZ (board size) has a positive and significant coefficient (0.0009, $p = 0.026$), implying that larger boards may facilitate higher earnings management, potentially due to coordination difficulties or diluted accountability. This is consistent with prior literature that questions the efficiency of overly large boards. The coefficient for BFEM (board gender diversity) is positive but statistically insignificant (0.0385, $p = 0.402$), indicating that the mere presence of female directors does not have a direct, significant influence on earnings management. This may be attributed to their limited representation on Saudi boards, as shown in the descriptive statistics (mean BFEM = 0.07). LEV (leverage) is also statistically insignificant (coefficient = 0.0047, $p = 0.132$), suggesting that the capital structure of firms does not directly explain variation in earnings management in this sample. Importantly, the interaction term BFEM * BINDE is positive and significant (coefficient = 0.0231, $p = 0.010$), revealing a

moderating effect of gender diversity on the relationship between board independence and earnings management. This implies that the influence of board independence on constraining earnings manipulation is enhanced in the presence of female directors, possibly due to increased ethical awareness, risk aversion, or stronger board dynamics. The interaction $BFEM * BSIZ$ is statistically insignificant (coefficient = -0.0024, $p = 0.540$), indicating no evidence that gender diversity moderates the relationship between board size and earnings management. Finally, $BFEM * LEV$ shows a significant negative coefficient (-0.0513, $p = 0.002$), suggesting that gender diversity weakens the positive association between leverage and earnings management. In other words, in highly leveraged firms, the presence of female directors may curb the tendency toward aggressive earnings practices, likely through more prudent financial decision-making and greater risk sensitivity.

4.2. Multiple regression analysis:

4.2.1. The effect of corporate governance on earnings management —the moderating role of board gender-diversity:

The results of the baseline OLS estimator are reported in Table 5. The estimations were carried out in three steps, corresponding to Equations (1), (2), and (3) and reported across three columns. The first column presents results without including any corporate governance variables. The second column introduces corporate governance variables into the estimation. The third column incorporates all variables and examines the moderating role of board gender diversity in the corporate governance on earnings management relationship. Board gender diversity ($BFEM$) becomes relevant only if its coefficient is statistically significant. However, the true effect of gender diversity cannot be fully understood without considering its interaction with key corporate governance mechanisms. As shown in Table 5, some corporate governance mechanisms exhibit significant relationships with

earnings management. Specifically, board independence (BINDE) is negatively and significantly associated with earnings management, implying that greater independence reduces the likelihood of earnings manipulation. In contrast, board size (BSIZ) shows a positive and significant effect, suggesting that larger boards may be less effective in curbing earnings management, possibly due to coordination challenges or diluted accountability. These findings are consistent with agency theory and previous studies highlighting the importance of board structure in monitoring management behavior. Interestingly, the coefficient for board gender diversity alone is statistically insignificant, suggesting that the mere presence of women on corporate boards in Saudi Arabia does not, by itself, constrain earnings management practices. This could be due to the very low average level of female representation (mean = 0.07), as reported in Table 3, reflecting the underrepresentation of women in boardrooms in the Saudi context. However, the interaction terms provide more nuanced insights. The interaction between gender diversity and board independence (BFEM * BINDE) is positive and significant, indicating that the influence of independent directors on reducing earnings management is weakened when gender diversity increases. This counterintuitive finding may reflect a situation where women on boards lack institutional support or occupy roles based more on symbolic representation (tokenism) rather than on merit and authority. Such dynamics could undermine board effectiveness and dilute the oversight role of independent directors, as suggested by Zalata et al. (2021) and Mazzotta et al. (2020). On the other hand, the interaction between gender diversity and leverage (BFEM * LEV) is negative and highly significant, suggesting that gender diversity plays a restraining role in highly leveraged firms. In other words, when leverage increases — a factor often linked with pressure to manipulate earnings — the presence of female directors helps to curb earnings management practices. This result supports the view that gender diversity may improve

ethical judgment and risk aversion on boards, especially in financially sensitive contexts. Conversely, the interaction between gender diversity and board size (BFEM * BSIZ) is statistically insignificant, implying no evidence that female representation alters the impact of board size on EM. These findings indicate that gender diversity does not operate in isolation rather, its impact depends heavily on how it interacts with other governance mechanisms. While board independence and leverage show significant interactions with gender diversity, board size does not. These results highlight the context-dependent and complex nature of gender diversity in governance structures. In conclusion, gender diversity plays a moderating role in the relationship between corporate governance mechanisms and earnings management particularly with board independence and leverage. However, its effectiveness in reducing earnings management may be limited by the level and quality of representation of women on boards. These results call for stronger institutional support and empowerment of female board members to ensure their contributions are meaningful and impactful in enhancing corporate accountability.

5. Conclusions and limitations:

This study aimed to examine the moderating role of female directors on corporate boards in mitigating firms' earnings management practices. Utilizing a pooled Ordinary Least Squares (OLS) ,the study tested two hypotheses concerning the relationship between corporate governance and earnings management , and the moderating influence of board gender diversity in this relationship. The results reveal that corporate governance mechanisms are significantly associated with earnings management practices, providing empirical support for Hypothesis 1 , which posits a significant relationship between corporate governance structures and the extent of earnings management among firms operating in Saudi Arabia. Further, the study offers strong evidence supporting Hypothesis 2 ,

demonstrating that board gender diversity significantly moderates the corporate governance on earnings management relationship. The observed interaction effects between gender diversity and various corporate governance mechanisms indicate that gender diversity plays a pivotal role in enhancing the efficacy of corporate governance structures in limiting earnings management, thereby improving the overall quality of financial reporting. From a theoretical standpoint, the study contributes to the existing literature by highlighting how the inclusion of female directors enhances corporate governance effectiveness in constraining opportunistic earnings manipulation. This influence is attributed to the distinct traits and competencies that female board members bring, particularly in terms of oversight and monitoring. In doing so, the research addresses the call by Tang and Chang (2015) for studies grounded in agency theory to examine how specific corporate governance elements—such as gender diversity—impact earnings management practices. Additionally, the study enriches the discourse on corporate governance in emerging markets by presenting robust empirical evidence from the Saudi context. It affirms the agency theory assertion that the effectiveness of governance mechanisms in curbing managerial opportunism is contingent upon the quality and composition of the governance structure. The findings suggest that regulators and shareholders should actively promote gender-diverse boards and encourage the meaningful involvement of women in leadership roles, as this can serve as a strategic lever to mitigate earnings manipulation. Despite its contributions, the study is subject to certain limitations. While the sample size was adequate for the analysis, a larger dataset could enhance the robustness and generalizability of the findings. Future research is encouraged to replicate this study in other national contexts, particularly in pro-diversity environments, to uncover potential cross-country variations or similarities. Furthermore, subsequent studies should delve into the specific attributes and qualifications of female directors that

enhance their monitoring effectiveness. For example, following the suggestion of Zalata et al. (2021), this study hypothesizes that female board members with financial expertise may play a particularly significant role in improving earnings quality. Future research should explore this proposition in greater depth.



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