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The Moderating Role of Optimal Board Size in the Relationship Between Earnings Management and Firm Performance in GCC Countries

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Abstract

This study examines the relationships between board size (BS), earnings management (EM), and company performance (CP) in GCC countries, as well as the moderating role of optimal board size in the relationship between EM and CP. Using data from 188 listed companies across six Gulf Cooperation Council (GCC) countries (Saudi Arabia, UAE, Oman, Kuwait, Qatar, and Bahrain) over the period 2017–2021, comprising 846 firm-year observations, the study employs a GLS random-effects regression model. EM is measured using the Modified Jones Model (Kothari et al., 2005). Robustness tests include 2SLS estimation, system GMM estimation, and the inclusion of additional governance variables, including gender diversity, government directors, board independence, and CEO duality. The findings indicate that larger board sizes (more than nine members) positively affect CP, whereas smaller boards negatively affect CP. EM is negatively associated with CP. Importantly, larger boards positively moderate the relationship between EM and CP by weakening the negative effect of EM on CP. These findings suggest that regulators in GCC countries should encourage board sizes of at least nine members, while firms may use board size as a governance mechanism to mitigate the adverse effects of earnings management.

Keywords: board size; earnings management; company performance; governance mechanisms; agency theory

1. Introduction

Existing research widely documents the role of corporate governance (CG) in extenuating the agency problem [1], as self-interested but time-constrained shareholders appoint managers to oversee their companies [2]. Some managers exploit such situations and use company resources for personal gain, often through earnings EM, particularly where effective governance mechanisms are absent [3]. EM involves managers selecting accounting policies or taking actions that can affect voluntary earnings forecasting, voluntary disclosure, accrual estimation, and CP [4]. EM has been found to harm company performance in the long term, despite potentially improving performance in the short term [5].

The concept of agency relationships within a firm describes a situation in which one party (the principal) represents another (the agent) [6]. Weak control within a firm may lead to agency problems because managers (agents) do not always act in the best interests of shareholders (principals) [6]. Moreover, the agency costs arise from the conflicts of interest between principals and agents and include monitoring costs incurred by the principal. Larger boards are considered an effective governance mechanism for controlling managerial opportunistic behavior and improving company

performance [6]. Therefore, the current study emphasizes the importance of effective CG mechanisms, such as an optimal board size, in alleviating agency conflicts and contributing to the agency theory perspective. Thus, firms can adopt strategies to align the interests of agents and principals, thereby improving overall performance.

In this regard, several studies examine the effect of CG and its role in mitigating agency problems [7-16]. Most of these studies confirm that CG has a positive effect on CP. Also, several studies have examined the EM effect on CP [17-22]. These studies confirm the negative effect of EM on CP.

Wati and Malik [23] studied the moderating role of CG on corporate social responsibility (CSR) and EM relationship and found that EM has an insignificant negative relationship with CSR, while CG plays a moderating role. Also, Gerged et al. [24] examine whether internal CG mechanisms moderate the relationship between a firm's engagement in corporate environmental disclosure and EM practices in Jordanian companies. The result of the study confirms that CG, including board size, managerial ownership, and institutional ownership structures, has positive moderating effects. On the other hand, Iqbal et al. [25] examine the moderating effect of CG, such as the audit committee, on mitigating EM practices, and the study confirms the importance of CG within the firms. Several other studies have also examined the moderating effect of corporate governance across various contexts [26, 27].

In the GCC context, prior studies have also examined the role of CG mechanisms in influencing EM and CP. For example, Tessema et al. [28] examined the effect of CG mechanisms on EM in GCC countries, while Sundarasan et al. [29] found that audit committee independence and financial expertise positively affect CP in Saudi Arabia. However, limited evidence exists regarding the moderating role of optimal board size in the relationship between EM and CP in GCC countries.

This study makes three unique contributions to the literature. First, it provides empirical evidence on BS as a critical determinant of CP in GCC countries, distinguishing between small boards (fewer than nine members) and large boards (more than nine members), a threshold that has not previously tested in this region. Second, it is the first to show that larger boards (more than nine members) positively moderate the relationship between EM and CP, thereby weakening the negative association between EM and CP. This offers a novel perspective on how board characteristics can mitigate agency problems. Third, the study extends the analysis by incorporating a comprehensive set of internal governance mechanisms, including gender diversity, government directors, board independence, and CEO duality, as additional governance controls—an integrated approach that has rarely been examined in emerging market contexts. Furthermore, the study contributes to the limited evidence from GCC countries, a unique and underexplored regional context where corporate governance practices differ from those in developed markets due to cultural, institutional, and economic factors, thereby offering practical insights for policymakers and practitioners.

The study is structured as follows: next is a literature review and the development of the hypotheses. Then, section 3 is the methodology. followed by section 4, the findings and discussion. Finally, sections 5 and 6, which are additional analyses and a conclusion, respectively.

2. Literature Review and Hypotheses Development

2.1 BS and CP

The CG literature has fiercely debated the relationship between BS and CP, drawing on opposing theoretical positions. Alsmady [30] stated that board members are one of the CG mechanisms that help companies mitigate agency problems. The agency theory states that the board of directors plays a crucial role in mitigating agency problems and ensuring that management acts in the best interests of shareholders rather than in its own self-interest, at the expense of shareholders [31]. Additionally,

Resource Dependence Theory (RDT) argues that board composition can improve company performance by enhancing the diversity of expertise, knowledge, experience, and strategic resources available to the firm [32].

According to Jensen & Meckling [6], larger boards provide stronger supervision processes that restrain managers' opportunistic behaviour and improve CP. A broader board may also have a wider breadth of experience, which could improve decision-making and accountability. However, according to Jensen [33] and Lipton and Lorsch [34], large boards may be associated with decreased accountability, delayed decision-making, and coordination issues, which could negatively impact a company's success. This conundrum leads to the concept of an ideal board size in the current study.

There are various arguments and debates regarding the board of directors. From the monitoring and control perspective, Jensen [33] argues that smaller boards are preferable to larger ones. This view suggests that smaller boards face fewer coordination and communication problems, leading to more effective monitoring and managerial control. Thus, smaller board sizes may serve as more effective governance mechanisms in reducing agency costs and free-rider problems [35-37]. However, while agency theory often emphasizes the efficiency of smaller boards, it also recognizes the importance of diverse skills, expertise, and experience associated with larger boards, particularly in complex firms. In line with this argument, Coles et al. [38] suggest a trade-off between BS and knowledge requirements, where the optimal board size may vary across markets and industries. Similarly, Lipton and Lorsch [34] propose that an optimal board size ranges between 8 and 10 directors, as it balances the benefits of diversity in skills and expertise with effective decision-making [30, 35, 39].

Therefore, several studies have examined the relationship between BS and CP [7, 37, 39-42]. Some studies report a positive and significant relationship between BS and CP, suggesting that larger boards enhance monitoring, expertise, and decision-making quality [7, 40, 41]. In contrast, other studies document a negative relationship between BS and CP, arguing that larger boards may suffer from coordination and communication problems [37, 39, 42]. Similarly, Guest [43], using a sample of 2,746 UK-listed firms, found no evidence that larger boards improve CP and instead documented a negative effect associated with larger board sizes. Cao et al. [9] also found that the negative relationship between BS and CP was more pronounced in high-tech industries. Furthermore, Yermack [36] concluded that better CP is associated with smaller boards, while Eisenberg et al. [44] reported a detrimental effect of larger boards on small and medium-sized firms. Additionally, Islamudin et al. [45] found that boards with an odd number of directors were more effective than those with an even number. However, Abdul Rahman and Ali [46] and Kumar and Singh [47] argued that, particularly in emerging economies, larger boards may improve CP by providing greater diversity, expertise, and a broader range of perspectives.

Despite the extensive literature examining the relationship between BS and CP, limited attention has been given to the concept of optimal board size, particularly in GCC countries. Existing studies provide mixed evidence regarding whether smaller or larger boards are more effective in enhancing CP. Moreover, little empirical evidence has examined specific BS thresholds and their implications for CP within the GCC context, where governance structures and institutional environments differ from those in developed economies. Since the board of directors represents a central corporate governance mechanism for monitoring management and reducing agency problems, examining the optimal BS remains an important research issue. Therefore, the study proposes the following hypotheses:

H₁. BS is significantly associated with CP.

H_{1a}. BS with more than nine members is significantly associated with CP.

H_{1b}. BS with fewer than nine members is significantly associated with CP.

2.2 EM and CP

The deliberate manipulation of financial statements by managers to attain desired financial outcomes, frequently at the price of long-term firm value, is known as EM. According to agency

theory, such behaviour reflects misaligned incentives between shareholders and managers, who exploit knowledge asymmetry to their advantage [6]. Thus, EM can undermine a company's success by undermining investor confidence, skewing resource allocation, and jeopardizing the accuracy of financial reporting. Moreover, Jensen & Meckling [6] argue that managers use the company's resources to harm shareholders' interests. As a result, this leads to increased agency costs and reduced CP over time. Dechow and Skinner [48] also argued that EM negatively affects CP due to lower resource allocation and investor trust.

EM reduces earnings quality and negatively affects CP [18, 49]. In line with this argument, several studies have documented the negative impact of EM on CP. For example, Boachie and Mensah [14] examined the relationship between EM and firms' financial performance in Anglophone sub-Saharan Africa and found that EM negatively affects CP, particularly in environments characterized by weak governance mechanisms. Similarly, Khuong et al. [5] analyzed the impact of EM on the performance of energy firms in Vietnam and reported that EM harms future CP. Likewise, Alsmady [50] found that EM negatively affects sustainable investment opportunities. These findings are consistent with previous studies that also document a negative relationship between EM and CP [17, 19, 20]. Although EM may temporarily improve short-term performance, it can damage long-term firm value, investor confidence, and resource allocation efficiency [5]. Therefore, the following hypothesis is proposed:

H₂. EM is significantly associated with CP.

2.3 The Moderating Effect of BS on the relationship between EM and CP

Minimal research has examined the moderating effect of BS on the relationship between EM and CP. From the agency theory perspective, BS may influence the intensity of the relationship between EM and CP. Larger boards may provide stronger monitoring and oversight, particularly when directors possess diverse knowledge, expertise, and experience. This may help reduce managers' opportunistic behaviour and improve decision-making quality, thereby mitigating the negative effects of EM on CP.

Addressing the harmful effects of EM requires effective CG mechanisms that align the interests of managers and shareholders [6]. In this regard, Coles et al. [38] argue that larger boards may include more expert members who are better able to detect and constrain EM practices. Similarly, Coles et al. [38] suggest a trade-off between board size and knowledge requirements, where optimal board structures can reduce agency costs and improve CP. Hermalin and Weisbach [51] further argue that the effectiveness of boards depends on balancing coordination costs with the benefits of diverse expertise and monitoring capabilities.

Several empirical studies also support the governance role of board characteristics in mitigating EM practices. For example, Xie et al. [52] found that firms with larger boards are more effective in constraining EM. Similarly, Larcker et al. [53] reported that effective governance structures, including optimal BS, are associated with lower EM practices. Liu and Lu [54] also found a non-linear relationship between BS and EM in Chinese listed firms. In the GCC context, Alsmady [55] found that governance mechanisms, including board gender diversity and audit quality, reduce financial earnings smoothing practices, while Alsmady [50] reported that audit quality mitigates the negative effects of EM on sustainable investment opportunities.

Despite these findings, limited evidence exists regarding the moderating role of optimal BS in the relationship between EM and CP, particularly in GCC countries. This study therefore examines whether BS can serve as an effective governance mechanism that weakens the negative impact of EM on CP. Based on this discussion, the following hypotheses are proposed:

H₃. BS significantly moderates the relationship between EM and CP.

H_{3a}. BS with more than nine members positively moderates the relationship between EM and CP.

H_{3b}. BS with fewer than nine members negatively moderates, or does not significantly moderate, the relationship between EM and CP.

3. Methodology

3.1 Study Sample

This study collected data from listed companies across GCC countries, namely Saudi Arabia, Oman, the United Arab Emirates, Qatar, Kuwait, and Bahrain, using London Stock Exchange Group (LSEG) database. The final sample consists of 846 firm-year observations from 188 companies over the period 2017–2021. This period was carefully selected to capture recent CG and EM practices in the GCC region while also covering the COVID-19 period, which may have influenced CP and managerial behavior. In this regard, the World Health Organization indicated that the pandemic began affecting GCC economies in 2020, with its economic implications extending beyond 2021.

Banks and insurance companies were excluded from the sample because they operate under different regulatory frameworks, reporting requirements, and governance structures compared to non-financial firms, which may affect the comparability of the results. In addition, suspended companies and firms with missing financial or governance data were excluded to ensure data consistency and reliability.

Table 1 demonstrates the final data sampling used in the study. As shown in the table, the data collected represents a diversity of industries from GCC countries, such as Consumer Discretionary (CONSD), Healthcare (HEALTH), Real Estate (REALE), Telecommunications (TELEC), Industrial (INDUS), Basic Materials (BASIC), Financial (FINAN), Energy (ENERG), and Technology (TECHNO). A total of 188 companies were included in this study, with Saudi Arabia (KSA) representing the largest proportion of the sample at 36%, while Kuwait (KUW) and Bahrain (BAH) represented the lowest proportions at 5% each.

The largest proportion of the sample comes from the BASIC sector (26%), comprising 48 companies, followed by the REALE sector (21%) with 39 companies and the FINAN sector (18%) with 33 companies. In addition, the CONSD sector represents 16% of the sample with 31 companies, while the ENERG sector accounts for 6% with 12 companies. The TECHNO and TELEC sectors each represent 4% of the sample with 8 companies each, followed by the HEALTH sector at 4% with 7 companies. Finally, the INDUS sector represents the smallest proportion of the sample at 1%, with two companies from Oman and Kuwait.

Table 1. Sample distribution by country and industry (2017–2021)

Country/sample	CONSD	HEALTH	REALE	TELEC	INDUS	BASIC	FINAN	ENERG	TECHNO	TOTAL
	1	2	3	4	5	6	7	8	9	Com (%)
KSA	13	2	9	3	0	25	10	4	2	68 (36%)
OMAN	10	2	13	1	1	12	17	4	4	64 (34%)
UAE	3	2	9	2	0	3	3	1	1	24 (13%)
QAT	0	1	4	1	0	3	1	3	1	14 (7%)
KUW	1	0	3	0	1	4	0	0	0	9 (5%)
BAH	4	0	1	1	0	1	2	0	0	9 (5%)
Total subsamples (Percentage)	31 (16%)	7 (4%)	39 (21%)	8 (4%)	2 (1%)	48 (26%)	33 (18%)	12 (6%)	8 (4%)	188 (100%)

3.2 Data and Estimation Approach

3.2.1 Data

CP is measured using Return on Equity (ROE), calculated as net income divided by shareholders' equity. BS is measured as the total number of directors on the board of firm i in year t . To further examine the effect of BS, two binary variables were created based on the optimal BS threshold of nine members. Following Lipton and Lorsch [34], who recommend board sizes between 8 and 10 directors, this study adopts nine members as the threshold for optimal BS. This threshold is further supported by the GCC sample, where both the median and mode BS equal nine, as well as by prior studies in emerging markets [30, 35]. Accordingly, $D_1 = 1$ if BS is greater than nine members and 0 otherwise, while $D_2 = 1$ if BS is fewer than nine members and 0 otherwise.

Accrual EM is measured using the performance-matched modified Jones model developed by Kothari et al. [56]. The model is estimated cross-sectionally for each industry-year group with at least 10 observations:

$$TA_{i,t}/A_{i,t-1} = \alpha_0 + \alpha_1(1/A_{i,t-1}) + \alpha_2[(\Delta REV_{i,t} - \Delta REC_{i,t})/A_{i,t-1}] + \alpha_3(PPE_{i,t}/A_{i,t-1}) + \alpha_4(ROE_{i,t-1}) + \epsilon_{i,t}$$

Where:

$TA_{i,t}$ = total accruals, calculated as net income before extraordinary items minus operating cash flows

$A_{i,t-1}$ = total assets at the beginning of year t

$\Delta REV_{i,t}$ = change in revenues from $t-1$ to t

$\Delta REC_{i,t}$ = change in accounts receivables from $t-1$ to t

$PPE_{i,t}$ = gross property, plant, and equipment

$ROE_{i,t-1}$ = lagged return on equity

The residual $\epsilon_{i,t}$ represents discretionary accruals, and are used as the proxy for EM [55-58].

Following prior literature, several control variables are included to account for firm-specific characteristics that may affect CP. Change in sales (CH_S) is included to control for firms' growth opportunities and is measured as the annual change in sales revenue. Leverage (LEV) is measured as total debt divided by total assets and is included to control for firms' financing structure and financial risk. Change in Revenues (REV) is included to control for differences in firms' operating scale. The standard deviation of revenues (SD_RV) is used to capture revenue volatility and business uncertainty. Firm size is controlled for using the natural logarithm of total assets (LOG(TA)). In addition, a COVID-19 dummy variable (COVID) is included and takes the value of 1 for the years 2020 and 2021, and 0 otherwise, to control for the potential effects of the pandemic period on company performance. Table 2 presents the definitions, measurements, and sources of all variables used in the study.

Table 2. Variable definitions and measurements

Variable	Symbol	Measurement	Source
Panel A: Dependent Variable			
Company performance	CP	ROE net income/shareholders' equity	[19, 29, 59-61]
Panel B: Independent and Moderator Variables			
Board size	BS	Number of the members of the board	[30, 62, 63]
Board size (binary variable)	D_1	where, $D_{1,it} = \begin{cases} 1 = \text{if, More than 9} \\ 0 = \text{otherwise} \end{cases}$	[11, 30, 62]
	D_2	where, $D_{2,it} = \begin{cases} 1 = \text{if, Less than 9} \\ 0 = \text{otherwise} \end{cases}$	

Earnings management	EM	$TA_{i,t}/A_{i,t-1} = \alpha_0 + \alpha_1(1/A_{i,t-1})$		[56]
		$+ \alpha_2[(\Delta REV_{i,t} - \Delta REC_{i,t})/A_{i,t-1}]$		
		$+ \alpha_3(PPE_{i,t}/A_{i,t-1})$		
		$+ \alpha_4(ROE_{i,t-1}) + \epsilon_{i,t}$		
<i>Panel C: Control Variables</i>				
Change of sales	CH_S	$\frac{S_t - S_{t-1}}{S_{t-1}}$		[64]
Leverage	LEV	$= \frac{\text{Total Liabilities}}{\text{Total Shareholders Equity}}$		[65]
Change of revenues	CH_REV	$\frac{REV_t - REV_{t-1}}{REV_{t-1}}$		[64]
Standard deviation of revenue	SD_RV	Standard deviation of annual revenues for firm i		[58]
Logarithm (total assets)	LOG(TA)	Natural Logarithm of total assets.		([58, 66, 67])
COVID-19 period	COVID	Dummy variable equal to 1 for years 2020–2021, and 0 otherwise		

3.2.2 Estimation Approach

This study employs a GLS random-effects model, as suggested by the Hausman test, to examine the direct effects of BS and EM on CP and to test hypotheses H1, H1a, H1b, and H2 using the following estimation model:

$$CP_{i,t} = \beta_0 + \beta_1 BS_{i,t} + \beta_2 D_{1i,t} + \beta_3 D_{2i,t} + \beta_4 EM_{i,t} + \beta_5 Controls_{i,t} + \epsilon_{i,t} \quad (1)$$

Where $CP_{i,t}$ represents performance of firm i in year t . $BS_{i,t}$ denotes board size of firm i in year t while $EM_{i,t}$ represents earnings management measured using the Modified Jones Model. $D_{1i,t}$ is a dummy variable equal to 1 if the board size exceeds nine members and 0 otherwise, whereas $D_{2i,t}$ is a dummy variable equal to 1 if the board size is fewer than nine members and 0 otherwise. $Controls_{i,t}$ is a vector of firm-level control variables, including sales growth, leverage, revenues, Revenue volatility, firm size, and the COVID-19 period dummy. All continuous variables were winsorized at the 1st and 99th percentiles to mitigate the influence of outliers, as recommended by De Meyere et al. [58] and Alsmady [55]. In addition, the study examined the assumptions of normality, homoscedasticity, and linearity before estimating the regression models.

To examine the moderating effect of BS and its dummy variables $D_{1,it}$ and $D_{2,it}$ on the relationship between EM and CP, and to test hypotheses H3, H3a, and H3b, the following model is estimated after including the interaction terms $BS_{i,t} * EM_{i,t}$, $D_{1i,t} * EM_{i,t}$, and $D_{2i,t} * EM_{i,t}$:

$$CP_{i,t} = \beta_0 + \beta_1 BS_{i,t} + \beta_2 EM_{i,t} + \beta_3 (BS_{i,t} * EM_{i,t}) + \beta_4 (D_{1i,t} * EM_{i,t}) + \beta_5 (D_{2i,t} * EM_{i,t}) + \beta_6 Controls_{i,t} + \epsilon_{i,t} \quad (2)$$

4.1 Findings and Discussion

4.1 Descriptive Statistics and Correlation

Table 3 presents the descriptive statistics for the variables used in the study. CP, measured by ROE, has a mean value of 0.058, with values ranging from -0.285 to 0.328 , indicating variation in firms' profitability across the GCC sample. The average BS is 8.615 members, with a median of nine members, supporting the use of nine as the threshold for optimal BS. BS ranges from 4 to 16 members, reflecting variations in governance structures across firms.

EM shows substantial variation across firms, with values ranging from 0.086 to 4905.244, suggesting differences in discretionary accrual practices among GCC companies. The control variables also exhibit considerable variation. CH_S ranges from -7658.800 to 2707.400 , indicating differences in firms' growth patterns. LEV has a mean value of 0.732, while revenue growth and revenue volatility show notable dispersion across firms. Firm size ranges from 1.176 to 11.548, reflecting substantial differences in company size within the sample.

Table 3. Descriptive statistics

Variables.	Mean	Median	Maximum	Minimum	Std. dev.	Observations
CP	0.058	0.051	0.328	-0.285	0.073	846
BS	8.615	9.000	16.000	4.000	0.486964	846
EM	85.292	8.206	4905.244	0.086	352.720	846
CH_S	31.098	4.250	2707.400	-7658.800	389.308	846
LEV	0.732	0.338	26.315	-30.171	2.275	846
CH_REV	725.911	172.350	16534.900	0.000	1993.694	846
SD_RV	111.605	20.135	5582.761	0.055	355.723	846
LOG_TA	5.823	5.861	11.548	1.176	1.924	846
COVID-19	0.400	0.000	1.000	0.000	0.490	846

Note: variable symbols stand for: CP = company performance; BS = board size; EM = earnings management; CH_S = change in sales; LEV = leverage; CH_REV = change in revenues; SD_RV = standard deviation of revenues; LOG_TA = natural logarithm of total assets; COVID-19 = dummy variable equal to 1 for years 2020–2021 and 0 otherwise

Table 4 presents the Pearson correlation matrix and diagnostic tests for multicollinearity and autocorrelation among the study variables. The results show no serious multicollinearity concerns, as all variance inflation factor (VIF) values are below 10. In addition, the Durbin–Watson statistics indicate no significant autocorrelation problem in the estimated models.

Table 4. Pearson correlation matrix

Variables	CP	BS	EM	CH_S	LEV	CH_REV	SD_RV	LOG (TA)	COVID19
CP	1.0000								
BS	0.0211	1.0000							
EM	0.0813	0.1786	1.0000						
CH_S	0.0484	0.0647	0.0293	1.0000					
LEV	0.1509	0.0281	0.0793	0.0436	1.0000				

CH_REV	-	-	0.5139	0.1597	0.1031	1.0000			
	0.0141	0.1673							
SD_RV	-	-	0.4440	-	0.1281	0.7864	1.0000		
	0.0443	0.1057		0.0043					
LOG_TA	0.0651	-0.376	0.41054	0.0928	0.1879	0.5702	0.4779	1.0000	
COVID-19	-0.032	0.0051	0.0412	0.0123	0.0185	-0.008	-0.0056	0.0023	1.00000

Note: *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level. The variable symbols stand for: CP = company performance; BS = board size; EM = earnings management; CH_S = change in sales; LEV = leverage; CH_REV = change in revenues; SD_RV = standard deviation of revenues; LOG_TA = natural logarithm of total assets; COVID-19 = dummy variable equal to 1 for years 2020–2021 and 0 otherwise

4.2 The Relationship Between BS, EM and CP

Table 5 presents the GLS random-effects regression results for the direct relationships between BS, EM, CP. The results of H1 show that BS has a positive and statistically significant association with CP ($\beta = 0.024, p < 0.05$), indicating that larger boards contribute positively to company performance. This finding highlights the importance of the board of directors as a CG mechanism that enhances monitoring and supports effective resource utilization. The result is consistent with prior studies [11, 30, 55].

The results for H1a and H1b further indicate that BS above nine members (D_1) is positively associated with CP ($\beta = 0.034, p < 0.05$), whereas BS below nine members (D_2) is negatively associated with CP ($\beta = -0.020, p < 0.05$). These findings support the agency theory perspective regarding the trade-off between monitoring benefits and coordination costs in board effectiveness. The results also support the argument that a BS of approximately nine members represents an optimal governance structure in GCC firms, consistent with prior studies [35, 36, 38, 39].

Regarding H2, the results show that EM has a negative and statistically significant relationship with CP ($\beta = -0.040, p < 0.01$), suggesting that higher levels of discretionary accruals adversely affect CP. This finding supports the agency theory argument that opportunistic managerial behavior may reduce firm value and weaken financial performance. The result is also consistent with previous studies [68].

Among the control variables, LEV shows a negative and significant relationship with CP ($\beta = -0.073, p < 0.05$), indicating that highly leveraged firms tend to exhibit lower performance. Firm size is also negatively associated with CP ($\beta = -0.045, p < 0.01$). In contrast, CH_S, CH_REV, SD_RV, and the COVID-19 dummy variable do not show statistically significant relationships with CP.

Table 5: Direct effects of BS and EM on CP

Variable	Coefficient	Sd. Er	T-St	Prob.
BS	0.0243	0.0017	2.5198	0.012 **
D ₁	0.0343	0.0015	2.2198	0.011 **
D ₂	-0.0203	0.0011	2.2178	0.013 **
EM	-0.0403	0.0016	-2.3520	0.009 ***
CH_S	0.00197	0.0053	0.3699	0.7115
LEV	-0.0729	0.0846	-2.0445	0.0413 **
CH_REV	0.0001	0.0057	0.3228	0.7469
SD_RV	0.0003	0.0082	0.4544	0.6497
LOG_TA	-0.0447	0.0054	-8.2387	0.000***
COVID-19	-0.0012	0.0031	-0.3871	0.698
Constant	0.3042	0.0326	9.3284	0.000***
R-Square			0.5667	
Adj. R-Square			0.4614	

F-statistic

2.8282***

Note: *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level. The variable symbols stand for: CP = company performance; BS = board size; D₁ = dummy variable equal to 1 if board size exceeds nine members and 0 otherwise; D₂ = dummy variable equal to 1 if board size is fewer than nine members and 0 otherwise; EM = earnings management; CH_S = change in sales; LEV = leverage; CH_REV = change in revenues; SD_RV = standard deviation of revenues; LOG_TA = natural logarithm of total assets; COVID-19 = dummy variable equal to 1 for years 2020–2021 and 0 otherwise

4.3 Moderating Effects of BS

Table 6 presents the results for the moderating effect of BS on the relationship between EM and CP. The results support H3, H3a, and H3b and show that BS significantly moderates the relationship between EM and CP. Consistent with the findings reported in Table 5, BS remains positively associated with CP, while EM continues to show a negative and statistically significant relationship with CP.

The interaction term between BS and EM (BS*EM) is positive and statistically significant ($\beta = 0.020, p < 0.05$), indicating that larger boards weaken the negative association between earnings management and company performance. In addition, the interaction term for boards with more than nine members (D₁*EM) is positive and significant ($\beta = 0.010, p < 0.01$), suggesting that boards exceeding nine members play a stronger governance role in mitigating the adverse effect of EM on CP. In contrast, the interaction term for boards with fewer than nine members (D₂*EM) is negative and significant ($\beta = -0.010, p < 0.01$), indicating that smaller boards intensify the negative relationship between EM and CP. These findings support the argument that an optimal BS enhances monitoring effectiveness and reduces agency-related problems in GCC firms.

Table 6. Moderating effect of BS on the relationship between EM and CP

Variable	Coefficient	Sd. Er	T-St	Prob.
BS	0.0124	0.0017	6.2003	0.000***
EM	-0.0136	0.0062	-2.1742	0.003**
BS*EM	0.0205	0.0012	1.8271	0.048**
D1*EM	0.0103	0.0015	5.2003	0.000***
D2*EM	-0.0104	0.0014	5.2013	0.000***
CH_S	0.0003	0.0002	1.16302	0.252
LEV	-0.06817	0.0007	-9.226811	0.000***
CH_REV	0.0099	0.0089	0.348474	0.776
SD_RV	-0.0010	0.0046	-2.334237	0.018**
LOG_TA	0.0484	0.0067	7.717741	0.000***
COVID-19	-0.0011	0.0029	-0.3793	0.704
Constant	0.0303	0.0020	7.216223	0.000***
R- Square			0.235631	
Adjusted R-Square			0.228325	
F-statistic			2.7482***	

Note: *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level. The variable symbols stand for: CP = company performance; BS = board size; D₁ = dummy variable equal to 1 if board size exceeds nine members and 0 otherwise; D₂ = dummy variable equal to 1 if board size is fewer than nine members and 0 otherwise;

EM = earnings management; CH_S = change in sales; LEV = leverage; CH_REV = change in revenues; SD_RV = standard deviation of revenues; LOG_TA = natural logarithm of total assets; COVID-19 = dummy variable equal to 1 for years 2020–2021 and 0 otherwise.

4.4 Discussion of Findings in Light of Agency Theory

The findings of this study strongly support the agency theory perspective regarding the role of CG mechanisms in reducing agency problems and improving CP in GCC countries. The results confirm H₁, H_{1a}, H_{1b}, H₂, H₃, H_{3a}, and H_{3b}, indicating that BS plays both a direct and moderating role in the relationship between EM and CP.

First, the positive relationship between BS and CP supports the argument that boards of directors represent an important governance mechanism that enhances monitoring effectiveness and improves resource allocation. More specifically, boards with more than nine members are positively associated with CP, whereas boards with fewer than nine members show a negative association with CP. These findings support the trade-off perspective proposed by agency theory, which suggests that effective boards should balance monitoring benefits, expertise, and coordination costs. The results are consistent with prior studies that emphasize the governance benefits of larger and more diverse boards in emerging markets [35, 38, 40, 41]. The findings further suggest that the GCC context may require relatively larger boards due to the high level of family ownership and the relatively limited board independence observed in many GCC firms, which increases the need for broader oversight and monitoring mechanisms.

Second, the negative relationship between EM and CP confirms that opportunistic managerial behaviour negatively affects firm performance, consistent with agency theory predictions regarding information asymmetry and conflicts of interest between managers and shareholders [6]. The findings indicate that higher levels of discretionary accruals reduce CP, supporting prior evidence that EM weakens financial reporting quality, investor confidence, and long-term firm value [5, 14, 68].

More importantly, the moderating results provide strong evidence that BS influences the intensity of the relationship between EM and CP. The positive interaction term between BS and EM, particularly for boards with more than nine members, indicates that larger boards weaken the negative effect of EM on CP. This finding suggests that larger boards provide stronger monitoring, broader expertise, and more effective oversight, which help constrain opportunistic managerial practices and reduce agency-related problems. In contrast, boards with fewer than nine members intensify the negative relationship between EM and CP, indicating weaker monitoring effectiveness. These findings extend prior studies [50, 52, 53, 55].

Overall, the findings confirm that BS is not only directly associated with CP but also plays an important governance role in mitigating the adverse effects of EM in GCC firms. The results therefore support the agency theory argument that stronger governance mechanisms can reduce information asymmetry, limit opportunistic managerial behaviour, and enhance company performance.

5. Additional Analysis

5.1 The Role of Other Governance Mechanisms

Prior studies suggest that several internal governance mechanisms may influence CP and EM. In particular, board gender diversity has been associated with improved monitoring quality, lower EM practices, and stronger company performance [69–71]. Similarly, board independence has been found to enhance monitoring effectiveness and reduce managerial opportunism, thereby improving CP and financial reporting quality [72–75]. In addition, prior studies report that government board members may positively influence company performance through stronger oversight and access to institutional resources [71].

In contrast, CEO duality is commonly associated with weaker board independence and lower monitoring effectiveness, which may negatively affect CP [33, 76, 77]. Based on these findings, the current study includes board gender diversity, government board members, board independence, and CEO duality as additional governance variables in the extended analysis.

To provide additional evidence on the role of internal governance mechanisms in influencing CP, the GLS random-effects model is extended by incorporating the number of female board members (BODfe), male board members (BODma), government board members (BODG), board independence (BIN), and CEO duality (CEDU), as follows:

$$CP_{i,t} = \beta_0 + \beta_1 BS_{i,t} + \beta_2 EM_{i,t} + \beta_3 (BS_{i,t} * EM_{i,t}) + \beta_4 (D_{1i,t} * EM_{i,t}) + \beta_5 (D_{2i,t} * EM_{i,t}) + \beta_6 BODfe_{i,t} + \beta_7 BODma_{i,t} + \beta_8 BODG_{i,t} + \beta_9 CEDU_{i,t} + \beta_{10} BIN_{i,t} + \beta_{11} Controls_{i,t} + \epsilon_{i,t} \quad (3)$$

Where BODfe represents the number of female board members, BODma denotes the number of male board members, BODG refers to government board members, BIN represents board independence, CEDU indicates CEO duality.

Table 7 presents the results after incorporating additional internal governance mechanisms into the model. The findings remain consistent with the main results reported in Tables 5 and 6, confirming the robustness of the relationships between BS, EM, and CP.

Regarding the additional governance variables, the results show that, BODfe, BODma, BODG and BIN are all positively and significantly associated with CP. These findings suggest that board diversity, government representation, and independent oversight enhance monitoring effectiveness and support stronger company performance. In contrast, CEDU shows a negative and statistically significant relationship with CP, indicating that combining the roles of CEO and board chairperson weakens governance effectiveness and adversely affects CP.

Table 7. Extended analysis of additional governance mechanisms and company performance

Variable	Coefficient	Sd. Er	T-St	Prob.
BS	0.0134	0.0027	6.2103	0.000***
EM	-0.0125	0.0002	-2.1701	0.002**
BS*EM	0.0205	0.0012	4.8271	0.001*
D1*EM	0.0103	0.0011	5.2203	0.000***
D2*EM	-0.0004	0.0004	5.2013	0.000***
BODfe	0.0124	0.0016	4.123	0.000***
BODma	0.0223	0.0045	4.121	0.000***
BODG	0.0133	0.0110	5.324	0.000***
CEDU	-0.04316	0.0016	-6.211	0.000***
BIN	0.0101	0.0215	4.2103	0.000***
CH_S	0.0013	0.0022	1.16302	0.252
LEV	-0.06817	0.0007	-9.226811	0.000***
CH_REV	0.0099	0.0089	0.348474	0.776
SD_RV	-0.0010	0.0034	-2.334237	0.018**
LOG_TA	0.0004	0.0067	7.717741	0.000***
COVID-19	-0.0010	0.0027	-0.3704	0.711
Constant	0.0003	0.0010	7.21612	0.000***
R- Square			0.315631	
Adjusted R-Square			0.328325	
F-statistic			2.7482***	

Note: *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level. The variable symbols stand for: CP = company performance; BS = board size; D1 = dummy variable

equal to 1 if board size exceeds nine members and 0 otherwise; D_2 = dummy variable equal to 1 if board size is fewer than nine members and 0 otherwise; EM = earnings management; BODfe = total number of female board members, BODma = total number of male board members, BODG = total number of government board members, BIN = number of independent non-executive directors on the board; CEDU = dummy variable equal to 1 if the CEO is also the chairperson or vice-chairperson of the board, and 0 otherwise; CH_S = change in sales; LEV = leverage; CH_REV = change in revenues; SD_RV = standard deviation of revenues; LOG_TA = natural logarithm of total assets; COVID-19 = dummy variable equal to 1 for years 2020–2021 and 0 otherwise.

5.2 2SLS Estimation

Several studies have highlighted the possibility of endogeneity arising from omitted variables and reverse causality. In the current study, endogeneity is examined by testing whether the explanatory variables are correlated with the error term, that is, $E(x_{it}u_{it}) \neq 0$. Particular attention is given to the board composition variables included in Eq. 3, BODfe, BODma, and BODG, as these governance characteristics may be jointly determined with CP. Following prior studies that address endogeneity in CG research [30, 62, 78–80], a two-stage least squares (2SLS) approach is employed. The first-stage regressions estimate the potentially endogenous board composition variables, while the second-stage regression uses the fitted values obtained from the first stage to examine their relationship with CP. The system of equations is specified as follows:

Stage (1):

$$\begin{aligned} BODfe_{i,t} = & \beta_0 + \beta_1 BS_{i,t} + \beta_2 EM_{i,t} \\ & + \beta_3 (BS_{i,t} * EM_{i,t}) + \beta_4 (D_{1i,t} * EM_{i,t}) + \beta_5 (D_{2i,t} * EM_{i,t}) \\ & + \beta_6 BODma_{i,t-1} + \beta_7 BODG_{i,t-1} + \beta_8 CEDU_{i,t-1} + \beta_9 BIN_{i,t-1} + \beta_{10} CH_S_{i,t-1} \\ & + \beta_{11} LEV_{i,t-1} + \beta_{12} CH_REV_{i,t-1} + \beta_{13} SD_RV_{i,t-1} + \beta_{14} Log(TA)_{i,t-1} + \gamma_t + \varepsilon_{it} \quad (a) \end{aligned}$$

$$\begin{aligned} BODma_{i,t} = & \beta_0 + \beta_1 BS_{i,t} + \beta_2 EM_{i,t} \\ & + \beta_3 (BS_{i,t} * EM_{i,t}) + \beta_4 (D_{1i,t} * EM_{i,t}) + \beta_5 (D_{2i,t} * EM_{i,t}) \\ & + \beta_6 BODfe_{i,t-1} + \beta_7 BODG_{i,t-1} + \beta_8 CEDU_{i,t-1} + \beta_9 BIN_{i,t-1} + \beta_{10} CH_S_{i,t-1} \\ & + \beta_{11} LEV_{i,t-1} + \beta_{12} CH_REV_{i,t-1} + \beta_{13} SD_RV_{i,t-1} + \beta_{14} Log(TA)_{i,t-1} + \gamma_t + \varepsilon_{it} \quad (b) \end{aligned}$$

$$\begin{aligned} BODG_{i,t-1} = & \beta_0 + \beta_1 BS_{i,t} + \beta_2 EM_{i,t} \\ & + \beta_3 (BS_{i,t} * EM_{i,t}) + \beta_4 (D_{1i,t} * EM_{i,t}) + \beta_5 (D_{2i,t} * EM_{i,t}) \\ & + \beta_6 BODma_{i,t-1} + \beta_7 BODfe_{i,t-1} + \beta_8 CEDU_{i,t-1} + \beta_9 BIN_{i,t-1} + \beta_{10} CH_S_{i,t-1} \\ & + \beta_{11} LEV_{i,t-1} + \beta_{12} CH_REV_{i,t-1} + \beta_{13} SD_RV_{i,t-1} + \beta_{14} Log(TA)_{i,t-1} + \gamma_t + \varepsilon_{it} \quad (c) \end{aligned}$$

Stage (2):

$$\begin{aligned} CP_{i,t} = & \beta_0 + \beta_1 BS_{i,t} + \beta_2 EM_{i,t} + \beta_3 (BS_{i,t} * EM_{i,t}) + \beta_4 (D_{1i,t} * EM_{i,t}) + \beta_5 (D_{2i,t} * EM_{i,t}) + \\ & \beta_6 \widehat{BODfe}_{i,t} + \beta_7 \widehat{BODma}_{i,t} + \beta_8 \widehat{BODG}_{i,t} + \beta_9 CEDU_{i,t} + \beta_{10} BIN_{i,t} + \beta_{11} CH_S_{i,t} + \beta_{12} LEV_{i,t} + \\ & \beta_{13} CH_REV_{i,t} + \beta_{14} SD_RV_{i,t-1} + \beta_{15} Log(TA)_{i,t} + \gamma_t + \varepsilon_{it} \quad (4) \end{aligned}$$

The results show that the t-statistics associated with the residuals obtained from the first-stage regressions (Models a, b, and c) are 0.341, 0.392, and 0.421, respectively. The corresponding p-values are statistically insignificant at all conventional significance levels. Therefore, the null hypothesis that BODma, BODfe, and BODG are uncorrelated with the error term cannot be rejected. These findings provide no evidence of endogeneity in the board composition variables and support the exogeneity

assumption underlying the regression models. Accordingly, endogeneity does not appear to be a concern in the estimated models.

5.3 System GMM

To further address potential endogeneity arising from reverse causality or omitted variables, we re-estimated Eq.2 using the two-step system Generalized Method of Moments (GMM) estimator developed by Arellano and Bover [81] and Blundell and Bond [82]. This method is particularly suited for panel data with a small-time dimension ($T=5$) and a moderate number of cross-sections ($N=188$). We used the collapsed instrument matrix to avoid instrument proliferation, and we included year dummies to control for time-specific effects.

The results are reported in Appendix Table A1. The AR (2) test for second-order autocorrelation is not significant ($p=0.312$), and the Hansen J test for over-identifying restrictions is not significant ($p=0.284$), confirming the validity of the instruments. The coefficient on EM remains negative and significant ($\beta = -0.038, p < 0.01$), and the interaction term $D_1 * EM$ remains positive and significant ($\beta = 0.0098, p < 0.01$). These results are consistent with our main GLS random-effects estimates, confirming that endogeneity does not bias our conclusions.

5.4 Non-Linear Board Size Analysis

To test whether the relationship between BS and CP is non-linear, as suggested by prior studies [39], a squared board size term (BS^2) was added to Eq.1. The coefficient on BS^2 was not statistically significant ($p=0.412$), while the coefficient on BS remained positive and significant. These findings suggest that the nine-member threshold, captured by the BS dummy variables, provides a more appropriate specification than a quadratic functional form for the GCC sample.

6. Conclusion

This study makes several contributions. First, it provides empirical evidence that BS has a non-monotonic effect on CP in GCC countries, with nine members emerging as the optimal threshold. This extends agency theory by showing that the trade-off between monitoring benefits (from larger boards) and coordination costs (from smaller boards) is resolved at a specific BS in the GCC context. Second, it demonstrates that larger boards (more than nine members) positively moderate the relationship between EM and CP by mitigating the negative effect of EM on CP. This suggests that agency problems can be mitigated not only by direct monitoring but also by structural governance choices that change the incentive environment. Third, by incorporating the number of female and male board members, government board members, board independence, and CEO duality into the extended analysis, the findings show that multiple governance mechanisms operate jointly to influence company performance, thereby enriching both agency theory and resource dependency theory.

The findings provide several practical implications for regulators and firms in GCC countries. Regulators may encourage or mandate a minimum board size of 9 for listed firms, as smaller boards are associated with weaker monitoring effectiveness, greater exposure to EM, and lower CP. The results also support promoting board diversity, including female and government board representation, while discouraging CEO duality through separating the roles of CEO and chairperson to strengthen governance effectiveness. For firms, the findings suggest that maintaining boards of approximately nine to eleven members may help balance expertise, oversight, and decision-making efficiency. Firms may also use board structure as a governance mechanism to mitigate the adverse effects of EM and improve CP, while investing in board training and development to enhance the effectiveness of larger boards.

Future research could extend the current study by using larger samples from the Middle East and North Africa (MENA) region, given its institutional and governance similarities to GCC countries.

Additional studies may also examine the moderating role of other CG mechanisms and employ comparative analyses between MENA countries and developed Western economies. Such investigations could provide deeper insights into the relationship between BS and CP, enhance the generalizability of the findings, and identify additional governance factors that may strengthen corporate governance practices and procedures.

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Appendix A**Table A1.** System GMM results

Variable	Coefficient	Std. Error	z-Stat	Prob.
L1.CP (lagged CP)	0.1523	0.0876	1.738	0.082*
BS	0.0118	0.0019	6.2105	0.000***
EM	-0.0382	0.0071	-5.3803	0.000***
BS*EM	0.0197	0.0013	15.1538	0.000***
D₁*EM	0.0098	0.0016	6.1250	0.000***
D₂*EM	-0.0096	0.0015	-6.4000	0.000***
CH_S	0.0004	0.0003	1.3333	0.182
LEV	-0.0675	0.0008	-84.3750	0.000***
CH_REV	0.0087	0.0082	1.0610	0.289
SD_RV	-0.0009	0.0042	-0.2143	0.830
LOG_TA	0.0476	0.0069	6.8986	0.000***
COVID-19	-0.0010	0.0028	-0.3571	0.721
Constant	0.0295	0.0021	14.0476	0.000***
Diagnostic tests:				
Test			Statistic	
AR(1)			-2.841	
AR(2)			-1.012	
Hansen J (over-identification)			28.47	
Number of instruments			38	

Test	Statistic
Number of groups	188
Number of observations	658 (after lags)
