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The moderating role of board diversity on the relationship between ownership structure and real earnings management

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Abstract

Purpose – This study aims to see the moderating effect of board diversity on the relationship between ownership structure and real earnings management.

Design/methodology/approach – This study uses unbalanced panel data of 75 listed energy firms (346 firm-year observations) from three South Asian emerging economies (Bangladesh, India, and Pakistan) from 2015 to 2019. The two-step system GMM estimation is used for data analysis. This study also uses fixed effect regression to obtain robust findings.

Findings – The findings show that firms with a greater ownership concentration and managerial ownership significantly reduce real earnings management. In contrast, the data refute the idea that institutional and foreign ownership affect real earnings management. We also find that board diversity interacts significantly with ownership concentration and managerial ownership, meaning that board diversity moderates the negative link of the primary relationship that reduces real earnings management. On the other hand, board diversity has no interaction with institutional and foreign ownership, implying no moderating effect exists on the primary relationship.

Originality/value – To the best of the authors' knowledge, this is unique research investigating how different ownership structures affect real earnings management in the emerging nations' energy sector, which the earlier studies overlook. More specifically, this research focuses on how board diversity moderates the relationships between ownership structure and real earnings management, which could be helpful for future investors.

Keywords Ownership structure, Real earnings management, Board diversity, Emerging economies

Paper type Research paper

1. Introduction

Earnings management (EM) is a financial reporting method that projects a good financial and economic picture. But, when earnings management obscures investors' fair judgments, the consequence is terrible since it may reduce the quality of profit information in financial statements. After several accounting scandals in the past, including Waste Management, Enron Corporation, WorldCom, Tyco International (Corporate Finance Institute, n.d.), etc., multiple revisions to the Corporate Governance Code have been made around the world

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throughout time, and the authorities have implemented numerous accounting regulations, policies, and laws that may have little or no effect. For instance, in recent years, there have been scandals involving Cronos Group Inc. (2019–2022), a cannabis business with headquarters in Toronto (US Securities and Exchange Commission, 2022); Luckin Coffee Shop in 2019 (BBC News, 2020); and Wirecard Company, based in Germany in 2020 (Browne, 2020), etc. all of the scandals and corporate failures are linked to earnings management and inadequate corporate governance standards that can erode the level of trust of investors and affect the economic condition. Nasir *et al.* (2019) argue that companies that are proven to have committed fraud from financial statements suffer several adverse effects, including backlash from the public, a loss of current and potential clients, falling stock prices, and strict regulatory scrutiny. Thus, earnings management has become a global problem, and it is pertinent nowadays.

Over the last two decades, firms have shifted their earning management practices from accrual earnings management (AEM) to Real earnings management (REM) because of changed accounting and tax legislation, the implementation of IFRS, higher accounting standards, and better audit quality (Cohen *et al.*, 2008). Li *et al.* (2021) also find that the REM method is more practical in assessing whether firms engage in earnings management. Moreover, the majority of REM research has been carried out in developed nations like the USA and Europe (Cohen and Zarowin, 2010), while little research has been carried out in developing or emerging nations. Thus, there is a growing interest in researching emerging markets on REM.

Earlier literature finds that corporate governance mechanisms (CGMs) and their impact on reducing earnings management have been studied extensively (El Diri *et al.*, 2020). Binaebi (2020) opines that ownership structure (OWNS) as a CGMs is crucial for corporate accounting behavior that substantially impacts EM. In this sense, emerging or developing nations play a crucial role because the majority of firms in these countries are governed mainly by shareholders with majority shareholdings (Masud *et al.*, 2018). Also, the market environments of such countries are more involved in earnings management practices (Fatima *et al.*, 2020). Furthermore, unlike other countries, for the high transparency of the standards, the listed firms need to disclose the ownership of the firms (Mishra, 2021); thus, these countries are the ideal place for monitoring the role of ownership structure in alleviating opportunistic managerial behavior that is detrimental for investors. However, the majority of previous research focused on the effects of ownership structure on AEM (Chen *et al.*, 2020; Saona *et al.*, 2020); only a few researchers have explored its connection to REM (AL-Duais *et al.*, 2022). Thus, this research addresses that gap by examining ownership structure's impacts on REM. So, the primary research question of this study is: What is the effect of ownership structure on REM?

Earlier literature indicates that the board of directors liaises between capital owners and managers to maximize shareholders' wealth (Githaiga *et al.*, 2022). According to the agency perspective, diversified boards with an acceptable proportion of female directors and board independence improve earnings quality (Githaiga *et al.*, 2022). Furthermore, the participation of foreign directors can also aid in reducing earnings management by enhancing the board of directors' independence (Kouaib and Almulhim, 2019). Following reading the preceding literature, we are inspired to investigate the second research question: How does board diversity moderate the impact of ownership structure on REM?

In answer to the research questions, the study aims to shed light on two specific research objectives: (1) To examine the effect of ownership structure on REM; (2) To examine moderating effect of board diversity on the relationship between ownership structure and REM. This study uses unbalanced panel data of 75 firms (346 firm-year observations) from three South Asian emerging economies (Bangladesh, India, and Pakistan) to achieve the research objectives.

This study contributes to empirical studies in several ways. Firstly, this is a unique study to look at a wide variety of ownership structures combining concentrated ownership, management, institutional, and foreign ownership with REM from energy sectors of South Asian emerging markets, whereas prior studies have focused on the impact of ownership structure on AEM in developed markets with other financial or non-financial sectors (Chen *et al.*, 2020; Saona *et al.*, 2020). Secondly, this paper examines whether board diversity moderates the relationship between ownership structure and REM, whereas other studies overlooked it. Finally, this work contributes by addressing unobservable heterogeneity and endogeneity resulting from the dynamic nature of earnings management by adopting a dynamic panel model with GMM, which is overlooked in the previous studies of earnings management research (Ashraf and Qian, 2021; Githaiga *et al.*, 2022; Nguyen *et al.*, 2020).

2. Literature review and hypotheses development

2.1 Ownership concentration and earnings management

Globalization has been coupled with market development and dynamism, as well as increased insecurity among large and well-known corporations, and recent worldwide financial scandals have raised concerns about the reliability of financial statements (Salehi *et al.*, 2022a, b). Again, it shows that there are conflicts of interest among owners, creditors, and managers and that when management has easier access to information, it seems that they put their own interests ahead of maximizing shareholder value (Adeneye and Kammoun, 2022). However, the effect of corporate governance mechanisms in ensuring the reliability and integrity of financial statements is incredible. In line with agency theory (Jensen and Meckling, 1976), Saona *et al.* (2020) claim ownership concentration as a governance mechanism that has a tremendous incentive to settle agency conflict through direct business control, therefore protecting shareholder interests in investment and thus increasing the reliability of the financial statement. Asian countries have concentrated ownership, whereas developed countries (US and UK) have decentralized ownership (Nguyen *et al.*, 2020). When capital is concentrated in the hands of a few large shareholders, they have the authority to supervise their investments and managers' opportunistic behavior, and vice versa when money is concentrated in the hands of a few small owners (minority) (Nguyen *et al.*, 2020). By following the agency theory, researchers have discovered negative connections between ownership concentration and earnings management, as high ownership concentration lowers EM (Saona *et al.*, 2020). In line with the agency, this study suggests the following hypothesis:

H1. Ownership concentration has a significant negative relation with REM.

2.2 Managerial ownership and earnings management

Earnings management is a technique used by management and insiders to conceal confidential information from stakeholders (Ghorbani and Salehi, 2021). At the same time, higher management ownership is a suitable option for dealing with agency issues since it helps align the interest between owners and managers (alignment effect agency theory). As a result, it anticipates that growing managerial shareholding has a detrimental impact on earnings management, meaning that a ratio of ownership by management reduces earnings management (Piosik and Genge, 2020). Based on these motives and by following agency theory, this study proposes the following hypothesis:

H2. Managerial ownership has a significant negative relation with REM.

2.3 Foreign ownership and earnings management

According to Jensen and Meckling (1976), if insiders' and outsiders' interests are well-aligned, firms will strive to maximize firm value by increasing financial openness, which will also help

foreign investors. As an appealing avenue for mobilizing money, foreign investment can potentially reduce earnings management (Nguyen *et al.*, 2020). Since Real earnings management fosters investment inefficiency and leads firms to overinvest, AL-Duais *et al.* (2022) argue that companies with a high level of foreign ownership are very effective in such a situation that monitoring management and limiting REM. Debnath *et al.* (2021) also provide similar evidence that sophisticated foreign ownership significantly affects REM restrictions. Based on the strong theoretical analysis described above, this study proposes the following hypothesis:

H3. The presence of foreign ownership significantly reduces REM.

2.4 Institutional ownership and earnings management

Global economic competitiveness is fierce due to rapid environmental changes, and competitiveness, which promotes economic success across industries, has garnered attention (Salehi *et al.*, 2022a, b). For sustained economic success, institutional ownership plays an important supervisory function in minimizing agency costs, controlling directors, and boosting present financial performance (Salehi *et al.*, 2022a, b). In line with agency theory, Institutional investors help to supervise and control managers' opportunistic activities. Several researchers investigated the effect of institutional ownership on EM and discovered that institutional owners' supervisory function mitigates EM. For example, AL-Duais *et al.* (2022) found that institutional owners' efficient monitoring results in an inverse link between EM and institutional share ownership, supported by Piosik and Genge (2020). Further, Saona *et al.* (2020) discovered that institutional investors' active monitoring limits corporate managers' opportunistic reporting behavior. From the above discussion, this study argues that institutional investors desiring stable shareholdings may not allow REM since it would lower the value of their investment. The current study thus proposes the following hypothesis:

H4. The relevant shareholdings of institutional investors decrease REM.

2.5 The moderating effect of board diversity

Our first four hypotheses argue that different forms of ownership structures have a negative impact on earnings management. However, firms also function in setting contractual conflicts of interest between the contractual partners due to their wide range of incentives (Jensen and Meckling, 1976). Managers within the firms often seek their own goals and direct their management to make profit adjustments in opposition to the owner's potential regarding maximizing their benefits in the company (Dang Ngoc and Tran Manh, 2020). This distinction between control and ownership leads to a possible divergence of interests between the owners and managers that increase agency costs in the firm (Jensen and Meckling, 1976). In this sense, Internal pressures that are typical in practice may additionally impact managers' propensity to engage in REM (Brink *et al.*, 2020). Corporate governance (CG) mechanisms, thus, are allegedly effective in reducing conflict between managers and owners by reducing information asymmetries (Widagdo *et al.*, 2023). In this situation, the board of directors is vital for CG and can effectively alleviate agency issues between owners and management (Fama and Jensen, 1983). In line with the agency theory, Ghaleb *et al.* (2021) claim that a diverse board of directors in the boardroom protects the interests of various owners by minimizing managers' opportunistic conduct (for example, earnings management). Similarly, Githaiga *et al.* (2022) find evidence that board independence and gender diversity have a detrimental and significant impact on EM since board independence is an effective way of handling agency issues (Shafeeq Nimr Al-Maliki *et al.*, 2023). Ashraf and Qian (2021) also noted in another study that foreign directors (i.e. national diversity) improve

boards' ability to supervise management, which reduces the need for corporate executives to manage earnings. Thus, the above discussion strengthens to propose board diversity as a moderator in the association between ownership structure and real earnings management. Accordingly, the following is the testable hypothesis:

H5a. Board diversity significantly moderates ownership concentration and REM.

H5b. Board diversity significantly moderates managerial ownership and REM.

H5c. Board diversity significantly moderates foreign ownership and REM.

H5d. Board diversity significantly moderates institutional ownership and REM.

3. Research method

3.1 Sample and data collection procedure

This study chose the listed non-financial firms of the three South Asian emerging economies (i.e. Bangladesh, India, Pakistan) from a total of eight South Asian countries (Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka). This study restricts its scope to three South Asian developing markets because these countries have a considerable economic impact on the rest of the continent. For example, according to the World Bank Database [1], these three countries account for 95.94% of the region's GDP and 85.20% of its population. In addition, companies in these countries are governed mainly by shareholders with majority shareholdings (Masud *et al.*, 2018). We purposely selected a sample of the 75 energy firms from the listed non-financial firms from these three countries (i.e. Bangladesh, India, Pakistan) to contribute to this specific area as the energy sector's healthy development is essential strategically because it is a significant foundation for economic growth (AL-Duais *et al.*, 2022).

The research period includes five years, from 2015 to 2019. The study excludes finance-related companies and other firms with different regulations, disclosure requirements, accounting systems, capital structures, and governance structures compared to non-financial firms (Latif, 2018) to maintain data homogeneity. Companies that lacked financial information, incomplete governance structure data, or annual reports were also excluded. Data for the study have been manually gathered from annual reports of listed energy firms in three SA emerging countries: Bangladesh (listed on the Dhaka Stock Exchange [2], i.e. DSE), India (Nifty 500 index companies [3] listed on the National Stock Exchange [4], i.e. NSE), and Pakistan (listed on the Pakistan Stock Exchange [5], i.e. PSX). The annual reports have been gathered from the websites of the indicated stock exchanges and sample firms. Table 1 shows the sample selection procedure of the energy sectors.

Sample selection procedure (2015–2019)	No. of firms
Total number of firms	
Bangladesh (listed on DSE)	23
India (collected from Nifty 500 index companies listed on NSE)	28
Pakistan (listed on PSX)	33
Total firms	84
Less: firms not fulfilled the criteria mentioned above (Bangladesh: 4; Pakistan: 5; India: 0)	9
Total final sample (Bangladesh: 19; Pakistan: 28; India: 28)	75
Total of observations in five years (75 × 05) (Bangladesh: 19*5; Pakistan: 28*5; India: 28*5)	375
Less: Data missing in firm year observations (Bangladesh: 10; Pakistan: 14; India: 5)	29
Final sample firm-year observations (Bangladesh: 85; Pakistan: 126; India: 135)	346

Table 1.
Sample selection procedure

3.2 Measurement of variables

3.2.1 Dependent variable. 3.2.1.1 Real earnings management (REM). To estimate REM, this study employs three proxies, as defined by Roychowdhury's (2006) models of REM, such as (1) abnormal cash flow from operations ($ACFO_{it}$), (2) abnormal production costs (APC_{it}), and (3) abnormal discretionary expenses ($ADEXP_{it}$). The study calculates the proxies of REM using the cross-sectional ordinary least squares (OLS) regression by following Roychowdhury's (2006) models of REM. The first model indicates the actual cash flow from operations, which is the combination of normal and abnormal cash flow from operations as follows:

$$\frac{CFO_{it}}{TAS_{it-1}} = \beta_0 + \beta_1\left(\frac{1}{TAS_{it-1}}\right) + \beta_2\left(\frac{S_{it}}{TAS_{it-1}}\right) + \beta_3\left(\frac{\Delta S_{it}}{TAS_{it-1}}\right) + \varepsilon_{it} \quad (1)$$

The second model indicates the actual production costs, which are the combination of normal and abnormal production costs as follows:

$$\frac{PC_{it}}{TAS_{it-1}} = \beta_0 + \beta_1\left(\frac{1}{TAS_{it-1}}\right) + \beta_2\left(\frac{S_{it}}{TAS_{it-1}}\right) + \beta_3\left(\frac{\Delta S_{it}}{TAS_{it-1}}\right) + \beta_4\left(\frac{\Delta S_{it-1}}{TAS_{it-1}}\right) + \varepsilon_{it} \quad (2)$$

The third model indicates the actual discretionary expenses, which is the combination of normal and abnormal discretionary expenses as follows:

$$\frac{DEXP_{it}}{TAS_{it-1}} = \beta_0 + \beta_1\left(\frac{1}{TAS_{it-1}}\right) + \beta_2\left(\frac{S_{it}}{TAS_{it-1}}\right) + \varepsilon_{it} \quad (3)$$

In the three models, CFO_{it} = cash flow from operations of firm i in year t; TAS_{it} = total assets of firm i in year t−1; S_{it} = total sales revenue of firm i in year t; ΔS_{it} = changes in total sales revenue of firm i in year t; ΔS_{it-1} = changes in total sales revenue of firm i in year t−1; PC_{it} = production costs (sum of the cost of goods sold, i.e. $COGS_{it}$ and change in inventories, i.e. ΔINV_{it}. Thus, $PC_{it} = COGS_{it} + \Delta INV_{it}$); $DEXP_{it}$ = discretionary expenses (sum of selling, general, & administrative expenses, i.e. $SGAEXP_{it}$, advertising expenses, i.e. $ADEXP_{it}$, and research and development expenses, i.e. $RDEXP_{it}$. Thus, $DEXP_{it} = SGAEXP_{it} + ADEXP_{it} + RDEXP_{it}$.); β_0, β_1, β_2, β_3, and β_4 are the beta coefficients.

The current study aggregates all the dimensions of REM (see in equation-4). Eng *et al.* (2019) noted that in capturing EM, the aggregate measure for REM is more effective than the individual measure for REM. When a firm engages in income-generating EM by manipulating sales, producing excessive quantities, or reducing discretionary expenses, it reports a low CFO, increased production costs, and low discretionary expenses. Thus, the standard residuals from discretionary expenses and the cash flow from operations are multiplied by −1 and added to the standard residuals of production costs to calculate REM, as shown in equation (4). The higher the value, the more REM is indicated.

$$REM_{it} = ACFO_{it}(-1) + APC_{it} + ADEXP_{it}(-1) \quad (4)$$

3.2.2 Independent and control variables. The measurement of all independent and control variables are shown in Table 2.

3.2.3 Moderating variable. This study uses board diversity (BDIV) as a moderating variable. Gender diversity (GDIV), national diversity (NDIV), and board structural diversity (BSDIV) are used to create an index that measures board diversity, as shown in Table 3.

3.3 Data analysis techniques and model specification

This study employs a dynamic panel model to account for the dynamic nature of earnings management. For example, earnings management in the current year is affected by

Variables	Acronyms	Operationalization	References
Real earnings management	REM	Roychowdhury (2006) models	
Ownership concentration	OWNCON	The percentage of shareholdings who own five percent or more in the firm by following prior literature	Dang Ngoc and Tran Manh (2020)
Managerial ownership	MANOWN	The proportion of the total shares held by executive directors to the total number of shares issued	Piosik and Genge (2020)
Institutional ownership	INSOWN	The number of shares held by the institutional shareholder as a percentage of the total number of shares outstanding	Alhadab *et al.* (2020)
Foreign ownership	FOROWN	The percentage of shares owned by foreign investors to the total number of shares issued	Dang Ngoc and Tran Manh (2020)
Firm size	FSIZE	The natural logarithm of the firm's total assets	Uddin *et al.* (2021)
Return on asset	ROA	It is the percentage of net income to total assets	Majumder *et al.* (2023)
Leverage	LEV	The proportion of total debt scaled by the total asset	Saona *et al.* (2020)
Firm age	FAGE	The natural logarithm of the number of years since the establishment year of the firm	Dang *et al.* (2020)
Country dummies	CDM	Dummy variables for the countries Bangladesh, India, and Pakistan	By following studies (AlHares, 2020)
Year dummies	YDM	Dummy variables for the years 2015, 2016, 2017, 2018, and 2019	By following studies (AlHares, 2020)

Table 2.
Summary of variables

Board diversity index Dimensions	Operationalization	References
Gender diversity (GDIV)	is an indicator variable of 1 if one or more females are on a board and "0" otherwise	Ullah *et al.* (2020)
National diversity (NDIV)	coded as "1" if at least one of the board of directors from the sample company of the sample country is foreign nationals and "0" otherwise	Kouaib and Almulhim (2019)
Board structural diversity (BSDIV)	If the independent ratio of the board is greater than the sample median of companies in the same industry and year, it is entered as "1," otherwise it is coded as "0." Board's Independent ratio is calculated as the percentage of independent directors on the board (Dang *et al.*, 2020)	Author development

Table 3.
Measurement of board diversity index

Note(s): Board diversity index: The sum of the three (3) dimensions ranging from 0 to 3, the higher score indicates the greater board diversity and vice-versa
Source(s): Author development

earnings management in the previous year (El Diri *et al.*, 2020). In this situation, the dynamic panel model (using GMM) will give better results as it can handle endogeneity problems (Majumder *et al.*, 2023; Uddin *et al.*, 2021) arising from the dynamic nature of earning management. However, the ordinary least square (OLS) estimator will not solve the dynamic panel model as OLS ignores individual firms' heterogeneity or the different endogeneity problems. Again, while the fixed effect can handle the unobservable

heterogeneity problem, it does not solve the endogeneity as it follows the strict exogeneity of the variables. This study uses a two-step system GMM to control endogeneity. The dynamic panel model using GMM, as proposed by Blundell and Bond (1998), will give a trustworthy solution to both problems by introducing instrumental variables (El Diri *et al.*, 2020). This study also uses the best panel regression technique (fixed effect) among Pooled OLS, fixed effect, and random effect regression (given in the part of tabulated regression results) for robust outcomes. Brahma *et al.* (2021) suggest that fixed effect regression is a useful complement to GMM for reliable findings. To test the hypotheses H1 to H4 (direct effect) and H5 (moderating effect), the following dynamic models are developed:

$$\begin{aligned} REM_{ikt} = {} & \beta_0 + \beta_1 REM_{ikt-1} + \beta_2 OWNCON_{ikt} + \beta_3 MANOWN_{ikt} + \beta_4 FOROWN_{ikt} \\ & + \beta_5 INSOWN_{ikt} + \beta_6 FSIZE_{ikt} + \beta_7 ROA_{ikt} + \beta_8 LEV_{ikt} + \beta_9 FAGE_{ikt} + \beta_{10} YDM_t \\ & + \beta_{11} CDM_k + \varepsilon_{ikt} \end{aligned} \tag{5}$$

$$\begin{aligned} REM_{ikt} = {} & \beta_0 + \beta_1 REM_{ikt-1} + \beta_2 OWNCON_{ikt} + \beta_3 MANOWN_{ikt} + \beta_4 FOROWN_{ikt} \\ & + \beta_5 INSOWN_{ikt} + \beta_6 BDIV_{ikt} + \beta_7 OWNCON_{ikt} \times BDIV_{ikt} \\ & + \beta_8 MANOWN_{ikt} \times BDIV_{ikt} + \beta_9 FOROWN_{ikt} \times BDIV_{ikt} + \beta_{10} INSOWN_{ikt} \times BDIV_{ikt} \\ & + \beta_{11} FSIZE_{ikt} + \beta_{12} ROA_{ikt} + \beta_{13} LEV_{ikt} + \beta_{14} FAGE_{ikt} + \beta_{15} YDM_t + \beta_{16} CDM_k + \varepsilon_{ikt} \end{aligned} \tag{6}$$

In models 5–6, i indicates firms, t indicates the time (in years), and k indicates countries. REM_{ikt} indicates real earnings management; REM_{ikt-1} indicates REM for the year t−1. $OWNCON_{ikt}$ = ownership concentration; $FAMOWN_{ikt}$ = family ownership; $MANOWN_{ikt}$ = managerial ownership; $INSOWN_{ikt}$ = institutional ownership; $FOROWN_{ikt}$ = foreign ownership; $FSIZE_{ikt}$ = firm size; ROA_{ikt} = return on assets or firm profitability; LEV_{ikt} = firm leverage; $FAGE_{ikt}$ = Firm age; TDM = Time dummies; CDM = Country dummies; $BDIV_{ikt}$ = Board diversity; all the multiples terms are interactions terms indicating a moderating relationship between dimensions of ownership structure and REM. ε_{ikt} is the error term, and β_1 to β_{16} shows the beta coefficients.

4. Empirical results and discussion

4.1 Descriptive statistics

Table 4 presents the descriptive analysis of the sample used in this study. The average REM value for all sample enterprises is 0.03, with India exhibiting the highest average earnings manipulation at 0.04, in comparison to Pakistan (0.02) and Bangladesh (0.01). With respect to the independent variables, the average concentration of ownership among the sample firms is 41.78%. Among the sample firms, India exhibits a higher concentration of ownership (62.77%) compared to Bangladesh (25.79%) and Pakistan (30.08%). The data indicates that the mean reported managerial shareholdings of 15.25% suggest that the sample firms own a mere 15.25% ownership attributed to management. Notably, Bangladeshi firms exhibit the largest proportion of managerial ownership (18.99%) when compared to Indian firms (15.56%) and Pakistani firms (12.39%). The institutional ownership percentage in Bangladesh is greater (25.76%) compared to India (19.27%) and Pakistan (10.88%). The sample firms indicate an average institutional ownership of 17.81%. The mean proportion of foreign ownership among the selected enterprises is 4.90%. Pakistan has a higher proportion of foreign ownership (5.90%) compared to both India (4.39%) and Bangladesh (4.21%). In relation to the moderating variable, the average

Table 4.
Descriptive analysis of variables

Variables	Combined sample				Bangladesh				India				Pakistan			
	Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max
REM	0.03	0.44	−4.44	8.80	0.01	0.14	−2.02	2.76	0.04	0.58	−4.44	8.80	0.02	0.40	−1.01	3.04
OWNCON (%)	41.78	19.10	13.75	82.25	25.79	8.99	13.75	70.20	62.77	6.33	33.00	82.25	30.08	11.09	17.25	79.55
MANOWN(%)	15.25	7.36	0.00	55.00	18.99	8.44	0.00	55.00	15.56	7.88	0.00	49.00	12.39	4.05	0.60	25.90
INSOWN(%)	17.81	10.72	0.00	70.56	25.76	10.89	0.00	70.56	19.27	9.98	0.00	68.71	10.88	5.98	0.06	43.22
FOROWN (%)	4.90	2.16	0.00	14.03	4.21	1.20	0.00	6.15	4.39	1.56	0.00	8.00	5.90	2.77	0.00	14.03
BDIV	1.24	0.26	0.00	3.00	1.21	0.19	0.00	3.00	1.39	0.28	0.00	3.00	1.09	0.16	0.00	3.00
FSIZE	12.11	3.21	4.79	26.00	9.68	2.01	4.79	14.65	10.33	1.21	16.22	18.66	15.66	2.01	12.65	26.00
ROA (%)	9.07	11.58	−17.00	87.00	5.33	6.80	−16.21	25.40	9.80	13.59	−0.30	72.00	10.80	11.23	−17.00	87.00
LEV	0.34	0.23	0.01	0.89	0.45	0.24	0.02	0.89	0.17	0.03	0.01	0.87	0.44	0.25	0.02	0.84
FAGE	2.33	1.46	0.71	5.89	2.50	1.04	1.02	3.70	3.65	0.57	1.07	5.89	0.80	0.72	0.71	4.69
Total firm year observations	346				85				135				126			

Note(s): SD = Standard deviation; Min = Minimum value; Max = Maximum value; The definitions of all variables are presented in Table 2

value of board diversity across various countries is 1.24. This value signifies that, on average, boards have experienced a limited level of diversification in terms of gender, nationality, and structure, with India exhibiting the highest mean value of diversified boards (1.39) compared to Pakistan (1.09) and Bangladesh (1.21). Details of descriptive statistics of the control variables are presented in Table 4.

4.2 Correlation analysis

Table 5 shows the Pearson correlation matrix. As a rule of thumb, a correlation coefficient of more than 0.80 indicates a problem with multicollinearity (Gujarati and Porter, 2009, p. 338). The table's highest correlation coefficient value between variables is 0.581, less than 0.80, indicating no multicollinearity difficulties between variables and hence no threat to the estimated variables.

4.3 Empirical results

The results of the system GMM model and the fixed effect model are summarized in Table 6. Table 5 shows that the coefficient on the one-year lagged REM is statistically positive at 1%. This suggests that the past earnings management of all listed firms (Bangladesh, India, Pakistan) significantly affects the current one. This finding aligns with recent research of El Diri *et al.* (2020), implying that past earnings management should be considered a key variable in controlling for the dynamic nature of the ownership structure and REM connection. OWNCON is significant and negative at the 1% level in the system GMM and fixed effect model, supporting the hypothesis that ownership concentration balances managers' and shareholders' interests and reduces REM usage. Thus, current research recommends H1 in line with recent studies (Alhmood *et al.*, 2023; Saona *et al.*, 2020). The GMM and Fixed effect models reveal that a firm's higher management ratio prevents manipulation of valid findings. Hence H2 is not rejected and is consistent with earlier research (Al-Haddad and Whittington, 2019; Piosik and Genge, 2020) and supports agency theory. Foreign and institutional ownership have insignificant impacts on REM under the GMM paradigm, thus disproving H3 and H4 as consistent with prior findings (Al-Haddad and Whittington, 2019; Lemma *et al.*, 2018). In contrast, Institutional ownership has a negative link with REM but none with foreign ownership under the fixed effect model. Further, both models show that ROA negatively affects REM, indicating that high-performing firms are less likely to engage in earnings management. FSIZE and REM have a strong positive correlation under both models, indicating that larger firms can control real earnings more effectively than smaller firms. System GMM does not show a significant relationship between REM and LEV, but a fixed effect model shows a meaningful positive relationship. Fixed effect model results show that firms with high leverage levels use REM more frequently to avoid defaulting on debt arrangements. Both models found no correlation between the Firm age and REM.

Table 7 shows a substantial interaction between ownership concentration and board diversity, showing that board diversity moderates the association between ownership concentration and REM, thereby supporting H5a. The interaction between managerial ownership and board diversity is significant and unfavorable in both models, supporting (H5b) the negative link between managerial ownership and REM. As there is no interaction between foreign ownership and board diversity in the GMM system, H5c is not supported. Under the fixed-effect model, however, a significant association is found, which moderates the relationship between foreign ownership and REM. There is no moderating effect between institutional ownership and REM because its interaction does not significantly influence REM; thus, H5d is not supported.

Table 5.
Correlation matrix

Variable	REM	OWNCON	MANOWN	INSOWN	FOROWN	BDIV	FSIZE	ROA	LEV	FAGE
REM	1									
OWNCON	−0.241***	1								
MANOWN	−0.447***	0.412***	1							
INSOWN	−0.231***	0.316***	0.032	1						
FOROWN	−0.191	0.012**	−0.113**	0.061	1					
BDIV	−0.211***	0.462***	−0.312**	0.282***	0.252***	1				
FSIZE	0.301***	0.082**	0.212***	0.073	0.031	0.212**	1			
ROA	−0.271***	0.231***	0.112**	0.131***	0.139***	0.137***	0.226***	1		
LEV	0.323***	0.061	0.218***	−0.042	0.321**	−0.332***	0.043	0.581***	1	
FAGE	0.414	0.212*	0.091	0.181*	0.141	0.123	0.403***	0.342**	0.415***	1

Note(s): ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$

Variable	Dependent variable: REM Fixed effect	System GMM
REM_{ikt-1}		0.044*** (5.645)
OWNCON	−0.084*** (−7.631)	−0.024*** (−4.665)
MANOWN	−0.037** (−2.572)	−0.031* (−2.201)
FOROWN	−0.022** (−2.301)	−0.031 (−1.008)
INSOWN	−0.082 (−1.002)	−0.031 (−1.941)
FSIZE	0.021*** (5.636)	0.014*** (3.616)
ROA	−0.057*** (−3.665)	−0.021** (−2.401)
LEV	0.125** (2.261)	0.064 (1.024)
FAGE	0.022 (1.114)	0.002 (1.071)
YDM	Yes	Yes
CDM	Yes	Yes
Constant	−0.148*** (−5.636)	−0.117*** (−4.438)
R^2	0.434	
F-statistic	68.981***	55.004***
Chow test (*p*-value)	0.001	
Breusch-Pagan LM test (*p*-value)	0.000	
Hausman F/R test (*p*-value)	0.004	
Durbin-Wu-Hausman test for endogeneity (*p*-value)		0.000
Hansen J-statistic (*p*-value)		0.523
AR(1) *p*-value		0.023
AR(2) *p*-value		0.412
No. of observations	346	346

Note(s): Asterisks denotes significance level at 10% (*), 5% (**) and 1% (***). The numbers in parenthesis indicate t-statistics. In this study, we used the two-step system GMM as our baseline model. We conduct the Durbin-Wu-Hausman test for the endogeneity test of all regressors as a group. Endogeneity testing via Durbin-Wu-Hausman implies a rejection of the null hypothesis that the regressors are exogeneous; hence the system GMM necessarily be used. In addition, Hansen's J-statistic results show that we cannot reject the null hypothesis that the instrumental variables used in the system GMM model are valid, which supports the validity of over-identifying restrictions and the arguments for using the system GMM. The *F*-statistic value is significant, indicating that the model has predictive power. AR(1) shows the presence of first-order autocorrelation of residuals, whereas AR(2) indicates that there is no second-order autocorrelation. The *p*-values of both Chow and Breusch-Pagan LM tests indicate that either fixed-effect or random-effect regression procedures should be used, based on the results. The Hausman fixed, or random (F/R) test findings confirm that the fixed effect is the optimal approach. Year dummies and country dummies are unreported

Table 6.
Impact of ownership structure on REM

4.4 Robustness checks

4.4.1 Alternative regression method (Fixed effect). We ran a two-step system GMM since our study models include endogeneity issues, as previously described (Section 3.3). Prior researchers highlight the fixed effect model as the complement of GMM (Brahma *et al.*, 2021; Piosik and Genge, 2020). Thus, the fixed-effect model is also used in this study to confirm the robustness of the findings. The findings are reported in Tables 6 and 7

4.4.2 Alternative measurement of REM. The idea that adding APC cost to ADEXP and ACFO results in duplication because these statistics are obtained from the same activities is the basis for the alternate measures of REM (Cohen and Zarowin, 2010). As a result, we construct REM by combining the three residuals by two: REM1 is the addition of ACFO and ADEXP, and REM2 equals the addition of ADEXP and APC (Cohen and Zarowin, 2010; Ghaleb *et al.*, 2021). Thus, we re-investigated REM1 and REM2 using alternate system GMM and fixed-effect model estimations. The findings of REM1 and REM2 under system GMM and fixed effect models are shown in Table 8.

Variables	Dependent variable: REM Fixed effect	System GMM
REM_{ikt-1}		0.021*** (4.952)
OWNCON	−0.042*** (−5.315)	−0.033*** (−3.631)
MANOWN	−0.017* (−1.892)	−0.003* (−1.951)
FOROWN	−0.032** (−2.001))	−0.005 (−1.208)
INSOWN	−0.075 (−1.045)	−0.021 (−1.012)
BDIV	−0.142*** (−6.315)	−0.047*** (−4.346)
OWNCON × BDIV	−0.282*** (−7.215)	−0.282*** (−4.235)
MANOWN × BDIV	−0.092** (−2.351)	−0.042* (−1.761)
FOROWN × BDIV	−0.057 (−1.037)	−0.037 (−1.091)
INSOWN × BDIV	−0.082*** (−3.255)	−0.098 (−0.029)
FSIZE	0.035** (2.281)	0.061*** (3.361)
ROA	−0.087*** (−6.684)	−0.007* (−1.674)
LEV	0.029* (1.761)	0.012 (1.124)
FAGE	0.008 (1.214)	0.002 (1.013)
YDM	Yes	Yes
CDM	Yes	Yes
Constant	−0.124*** (−3.438)	−0.161*** (−4.538)
R^2	0.322	
F-statistic	59.092***	66.004***
Chow test (*p*-value)	0.000	
Breusch-Pagan LM test (*p*-value)	0.000	
Hausman F/R test (*p*-value)	0.009	
Durbin-Wu-Hausman test for endogeneity (*p*-value)		0.000
Hansen J-statistic (*p*-value)		0.589
AR(1) *p*-value		0.012
AR(2) *p*-value		0.367
No. of observations	346	346

Note(s): Asterisks denotes significance level at 10% (*), 5% (**) and 1% (***). The numbers in parenthesis indicate t-statistics. In this study, we used the two-step system GMM as our baseline model. We conduct the Durbin-Wu-Hausman test for the endogeneity test of all regressors as a group. Endogeneity testing via Durbin-Wu-Hausman implies a rejection of the null hypothesis that the regressors are exogeneous; hence the system GMM necessarily be used. In addition, Hansen's J-statistic results show that we cannot reject the null hypothesis that the instrumental variables used in the system GMM model are valid, which supports the validity of over-identifying restrictions and the arguments for using the system GMM. The *F*-statistic value is significant, indicating that the model has predictive power. AR(1) shows the presence of first-order autocorrelation of residuals, whereas AR(2) indicates that there is no second-order autocorrelation. The *p*-values of both Chow and Breusch-Pagan LM tests indicate that either fixed-effect or random-effect regression procedures should be used, based on the results. The Hausman fixed, or random (F/R) test findings confirm that the fixed effect is the optimal approach. Year dummies and country dummies are unreported

Table 7.
Moderating impacts of board diversity on the relationship between ownership structure and REM

5. Conclusion

The study examined the relationship between ownership structure, board diversity, and real earnings management in South Asian emerging economies' energy firms. Two-step GMM estimates demonstrate that the past year's REM has significantly impacted the current year's REM. Firms with a high degree of ownership concentration are exceptionally effective at monitoring management and restricting REM are consistent with prior findings (Alhmood *et al.*, 2023; Saona *et al.*, 2020). Managerial ownership, on the other hand, is also effective in restricting REM that is consistent with prior studies (Al-Haddad and Whittington, 2019; Piosik and Genge, 2020). The results, however, do not support the hypotheses H3 and H4, which are consistent with earlier findings (Al-Haddad and Whittington, 2019; Lemma *et al.*, 2018), respectively, that foreign and institutional ownership reduces REM. The moderating effects of board diversity are also investigated. We discover a significant interaction of board

Table 8. Ownership structure and real earnings management (Alternative measurements of REM)

	Direct effects				Moderating effects			
	Fixed effect		System GMM		Fixed effect		System GMM	
Variables	REM1	REM2	REM1	REM2	REM1	REM2	REM1	REM2
REM_{ikt-1}			0.034*** (4.221)	0.014*** (3.244)			0.027*** (5.902)	0.015*** (3.062)
OWNCON	−0.041*** (−5.433)	−0.031*** (−3.631)	−0.013*** (−5.532)	−0.020*** (−4.231)	−0.062*** (−3.115)	−0.032*** (−4.212)	−0.002** (−2.185)	−0.023*** (−5.311)
MANOWN	−0.017** (−2.022)	−0.021** (−2.213)	−0.007* (−1.522)	−0.027** (−2.022)	−0.015** (−2.315)	−0.047* (−1.793)	−0.089* (−1.893)	−0.043*** (−5.961)
FOROWN	−0.032 (−1.012)	−0.002 (−1.031)	−0.022 (−1.203)	−0.001 (−1.081)	−0.022 (−1.001)	−0.082** (−2.581))	−0.084 (−1.091)	−0.025 (−1.358)
INSOWN	−0.052 (−1.211)	−0.022 (−1.071)	−0.031 (−1.004)	−0.031 (−1.321)	−0.042 (−1.221)	−0.028 (−1.301)	−0.019 (−1.024)	−0.042 (−1.235)
BDIV					−0.123*** (−3.015)	−0.112*** (−4.415)	−0.112*** (−3.115)	−0.034*** (−5.143)
OWNCON × BDIV					−0.122*** (−4.315)	−0.145** (−2.091)	−0.102*** (−3.220)	−0.162** (−2.042)
MANOWN × BDIV					−0.192** (−2.403)	−0.131* (−1.754)	−0.084* (−1.801)	−0.092* (−1.703)
FOROWN × BDIV					−0.077 (−1.237)	−0.081 (−1.092)	−0.033 (−1.097)	−0.027 (−1.051)
INSOWN × BDIV					−0.058 (−0.029)	−0.044* (−1.681)	−0.038 (−1.009)	−0.071 (−1.024)
FSIZE	0.011*** (4.436)	0.025*** (5.186)	0.001** (2.234)	0.031** (2.656)	0.045*** (4.221)	0.033** (2.211)	0.042** (2.281)	0.048*** (3.581)
ROA	−0.043*** (−4.636)	−0.021*** (−3.802)	−0.001* (−1.783)	−0.031** (−2.331)	−0.035*** (−3.314)	−0.057*** (−4.124)	−0.087 (−1.057)	−0.103 (−1.214)
LEV	0.521** (2.441)	0.626** (2.452)	0.032 (1.024)	0.028* (1.866)	0.023* (1.871)	0.521** (2.591)	0.041** (2.424)	0.432** (2.532)
FAGE	0.029* (1.831)	0.029** (2.204)	0.022 (1.133)	0.008 (1.071)	0.053* (1.034)	0.095** (2.434)	0.028 (1.034)	0.019 (1.054)
YDM	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CDM	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	−0.124*** (−3.232)	−0.138*** (−3.006)	−0.131*** (−4.196)	−0.153*** (−3.623)	−0.115*** (−4.531)	−0.151*** (−5.038)	−0.126*** (−5.234)	−0.153*** (−4.033)
R^2	0.381	0.452			0.421	0.324		
F-statistic	58.383***	54.125**	63.002***	53.721***	49.719**	51.221**	55.291**	59.201***
Chow test (*p*-value)	0.002	0.001			0.000	0.000		
Breusch-Pagan LM test (*p*-value)	0.000	0.000			0.000	0.000		
Hausman F/R test (*p*-value)	0.003	0.005			0.007	0.019		
Durbin-Wu-Hausman test for endogeneity (*p*-value)			0.000	0.000			0.000	0.000
Hansen J-statistic (*p*-value)			0.321	0.432			0.382	0.431
AR(1) *p*-value			0.012	0.042			0.054	0.035
AR(2) *p*-value			0.321	0.442			0.445	0.383
No. of observations	346	346	346	346	346	346	346	346

Note(s): Asterisks denotes significance level at 10% (*), 5% (**) and 1% (***). The numbers in parenthesis indicate t-statistics. In this study, we used the two-step system GMM as our baseline model. We conduct the Durbin-Wu-Hausman test for the endogeneity test of all regressors as a group. Endogeneity testing via Durbin-Wu-Hausman implies a rejection of the null hypothesis that the regressors are exogeneous; hence the system GMM necessarily be used. In addition, Hansen's J-statistic results show that we cannot reject the null hypothesis that the instrumental variables used in the system GMM model are valid, which supports the validity of over-identifying restrictions and the arguments for using the system GMM. The *F*-statistic value is significant, indicating that the model has predictive power. AR(1) shows the presence of first-order autocorrelation of residuals, whereas AR(2) indicates that there is no second-order autocorrelation. The *p*-values of both Chow and Breusch-Pagan LM tests indicate that either fixed-effect or random-effect regression procedures should be used, based on the results. The Hausman fixed, or random (F/R) test findings confirm that the fixed effect is the optimal approach. Year dummies and country dummies are unreported

diversity with ownership concentration and managerial ownership. However, there is no significant interaction between institutional and foreign ownership with board diversity, implying no moderating effect on the relationship between ownership structure and earnings management. Our findings are particularly robust under different REM measurements and regression models.

5.1 Implications

The findings have implications for policymakers, investors, management and other stakeholders. Our results are consistent with the idea that energy companies with concentrated ownership and management in developing South Asian emerging countries are less likely to manipulate earnings. Policymakers can consider the study's findings, which show that firms with managerial ownership and concentrated ownership are more driven to self-monitor their operations and refrain from engaging in earnings manipulation. In line with the agency theory view, linking the manager's interests to the company's benefit decreases ownership and control. Thus, firms should increase manager-company alignment to reduce managerial self-interest and earnings management. Managers should be given preferential stock options or rewards to encourage company capital ownership. These results may also encourage investors to invest in firms with concentrated ownership and management ownership, as these firms generate earnings that accurately reflect the results of their actual business activities. The management of firms in South Asian emerging economies is recommended to develop and implement policies that will ensure the presence of a diverse board, particularly in terms of gender, nationality, and structural directors on the board because it is linked to a reduction in earnings management. This will make it easier for management and ownership-concentrated firms to direct earnings management measures in a way that will favor market value. This study will inform investors and other stakeholders of energy firms about the role that diverse boards play in decreasing agency conflict between owners and management in concentrated ownership firms by reducing information asymmetry, resulting in a reduction in earnings manipulation.

5.2 Limitation and future research direction

The current investigation exhibits specific constraints that could potentially offer avenues for future scholarly investigations. The current investigation refrains from classifying institutional ownership as either dedicated or transient due to insufficient data availability, which may lead to fluctuations in institutional ownership. If data becomes readily available, scholars in the future may engage in the endeavor of categorizing institutional ownership in less developed nations. Moreover, it is important to acknowledge that the topic of state ownership has not been discussed within this particular framework. Therefore, future research endeavors may focus on investigating this specific area. This study exclusively examines the phenomenon of real earnings management. Consequently, future researchers may consider exploring the realm of accruals earnings management. This study utilizes pre-Covid-19 data, and future research could provide a comparison analysis encompassing the periods before, during, and after the Covid-19 pandemic. Ultimately, the prospective researcher has the opportunity to do a comparative analysis across other nations by selecting samples from economies that share similar characteristics.

Notes

1. World Bank Data, 2019 (available at https://data.worldbank.org/country)
2. https://www.dsebd.org
3. Top 500 companies in India based on full market capitalization

4. https://www.nseindia.com
5. https://www.psx.com.pk

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