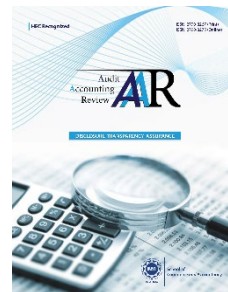
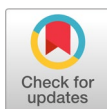


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- Author (s):** Qazi Muhammad Yasir Ayub¹, Shiraz Khan¹, and Shujahat Haider Hashmi²
- Affiliation (s):** ¹The University of Haripur, Haripur, Khyber Pakhtunkhwa, Pakistan
²National University of Sciences and Technology, Islamabad, Pakistan
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Role of Diversification in Earnings Management: An Evidence from Pakistan's Emerging Markets

Qazi Muhammad Yasir Ayub¹, Shiraz Khan^{1*}, and Shujahat Haider Hashmi² 

¹Institute of Management Sciences, The University of Haripur, Pakistan

²Department of International Business and Marketing, NUST Business School, National University of Sciences and Technology, Islamabad, Pakistan

Abstract

This study aimed to examine the nexus between corporate diversification and earnings manipulation. It considered how product and geographic diversifications (GDs) affect both types of earnings manipulations, such as accruals-based earnings manipulation and real-activities earnings manipulation in emerging markets. Agency theory, information asymmetry, and organizational complexity were utilized to explain the pivotal role of diversification in enhancing managerial discretion in financial reporting. The current study used panel data comprising 2,763 firm-year observations from non-financial firms that are listed on the Pakistan Stock Exchange (PSX). Fixed-effects regression analysis was employed to estimate the model. The results showed that both product and GD are positively related to earnings manipulation. The empirical evidence showed that diversified firms employ both accrual manipulation and real-activity manipulation, with GD having a more significant impact. The findings suggested that cross-border expansion is associated with greater organizational complexity and reporting opacity, which may reduce the effectiveness of monitoring mechanisms. This research added to the existing literature by incorporating all possible dimensions of diversification with both types of earnings manipulations in an emerging market. The empirical evidence also indicated that the complexities associated with diversification may be larger than its potential positive impacts on reporting quality. Therefore, these findings provided substantial implications for both investors and regulators. The policymakers should design additional mechanisms governing diversified firms to ensure higher levels of transparency in disclosures.

Keywords: accrual-earnings management, corporate diversification, geographic diversification, product diversification, real earnings management

*Corresponding Author: shirazkhan@uoh.edu.pk

School of Commerce and Accountancy

Introduction

Earnings management (EM) is an area of study that has garnered considerable attention among accounting and finance researchers due to its effect on the credibility of financial reports and the effective operation of capital markets. As such, financial statements should provide a fair representation of a firm's economic performance. Due to the inherent flexibility in accounting standards, managers can use discretion in reporting decisions to either disclose information about the company or report earnings in a way that distorts the true picture of earnings for personal or strategic reasons (Healy & Wahlen, [1999](#)). Therefore, identifying both the causes and mechanisms of EM continues to be a major issue facing researchers, regulators, and investors.

EM can be explained using agency theory which defines the problems with conflicting interests among owners and managers due to the separation of ownership and control (Jensen & Meckling, [1976](#); Jensen & Meckling, [2019](#)). Managers may utilize the knowledge that they possess about reporting performance to further expand their personal objectives. There are numerous reasons for the actions taken by management. The main reason is that it provides them with the opportunity to improve their compensation packages, reputations, and job security through accounting measures (Dechow et al., [2010](#); Healy, [1985](#)). Current empirical research has shown that the impact of both managerial incentives as well as the governance structure utilized by organizations around the world would have an influence on the utilization of EM.

EM can be classified in two categories: Real Earnings Management (REM) and Accrual-based Earnings Management (AEM) (El Mehdi & Seboui, [2011](#)). AEM involves the making of adjustments to accounting estimation or accounting policy which does not reflect a modification in company's operating activities. As a result of this definition, accrual-based EM takes place at the discretion of an accountant. Historically, most of the empirical research has focused on accrual-based EM. The development of many models, including the Modified Jones model by Dechow et al. ([1995](#)), has provided researchers with methods to measure discretionary accruals (DA). Recent studies have attempted to determine factors affecting accrual manipulation. Leverage, ownership structure, and corporate characteristics are the primary determinants of accrual behavior (Ghose et al., [2025](#)).

REM involves changing a company's basic business activity to alter financial results. Examples of REM include producing more than required to lower the Cost of Goods Sold (CGS), decreasing discretionary spending, or lowering prices to generate faster sales (Roychowdhury, [2006](#)). REM directly impacts cash flow and operational efficiency. Additionally, it is likely more expensive in the long-run compared to accrual-based manipulation. However, unlike accrual-based manipulation, it is more difficult to identify because it is part of normal business operations. Research suggests that companies increasingly replace accrual-based manipulation with real activities manipulation as government oversight becomes more intense and governance systems evolve (Attia & Mehafdi, [2023](#); Dechow et al., [2010](#); Ghandour, [2026](#)).

CSR engagements, leverage levels, and cultural or institutional variables are examples of variables that have been found to drive EM in emerging economies (Khanchel et al., [2025](#)). Industry-level characteristics and market structures also affect the degree to which companies utilize accrual-based manipulation. Such findings indicate that the way companies utilize EM varies across industries and economic settings (Sadowski et al., [2025](#)). Corporate diversification is a strategic characteristic that may be linked with EM behavior. Corporate diversification refers to an organization's decision to expand from its core product, industry, or geographical area. There are two types of corporate diversification: product diversification (PD) and geographic diversification (GD). A greater degree of PD is related with increased internal complexity, which allows management to shift assets from one business segment to another, and mask poorly performing segments of the businesses (Lang et al., [1994](#); Martin & Sayrak, [2003](#)).

The geographic expansion of businesses into different nations means that there are many different regulatory agencies, accounting systems, and law enforcement mechanisms for those businesses to contend with. Research has shown that firms which have expanded their operations internationally often use both accrual-based manipulations (e.g., using the accrual method to reduce reported earnings) and REM (earnings management through revenue recognition). This is because they see appropriate relative to the institutional environment in which they operate; implying either that these methods of manipulating financial information can be alternatively used by firms or as a supplement to each other (Yang

et al., [2025](#)). While this is an area of increasing interest among researchers, there continues to be significant limitations within the body of research regarding GD. One limitation is that most of what we know about how GD affects the likelihood of firms engaging in financial statement fraud comes from research conducted in developed economies, rather than in developing economies. Secondly, prior studies have often examined accrual-based and REM separately, overlooking their joint dynamics. Thirdly, the distinct effects of product and GD on EM are not fully understood, particularly in emerging market contexts.

An essential factor contributing to these gaps is the fact that when companies pursue a diversified portfolio, they typically do so with the intention of pursuing growth and reducing their exposure to certain risks. However, in doing so, they create opportunities for financially-motivated reporting that can be used opportunistically. In many ways, this situation is particularly acute in emerging economies due to less effective corporate governance systems and less effective means of enforcing compliance. In order to address this issue, this research focused on how diversification across products affects EM in terms of both real and accrual-based forms of EM for companies listed on the PSX. The two primary goals of this research were to determine whether PD influences AEM, REM, and whether GD influences both REM and AEM.

This study proceeded as follows. Section 2 describes the review of literature and the formulation of study hypotheses. A description of the methodological framework (i.e., the data sources utilized, how variables were measured and defined, and how models were specified) is provided in section 3. The presentation of empirical results, along with a thorough analysis and discussion of those results, is presented in section 4. In the end, a summary of the major findings from the study and a discussion of policy implications are included in section 5.

Literature Review

Earnings Management (EM): Concept and Contemporary Perspectives

EM continues to be an area of great interest for accounting researchers because it reflects the degree of discretionary action taken by managers about financial reporting and operations. Scholars (such as Christensen et al., [2022](#); Dechow et al., [2010](#); Healy & Wahlen, [1999](#)) defined EM broadly

as the application of managerial judgment in financial reporting to alter the financial statements and influence how stakeholders perceive the company. The recent empirical work indicates that firms' managers may utilize AEM and REM as either substitutes or complements based upon regulatory pressure, monitoring intensity, and firm-specific incentives (Alghemary et al., [2024](#); Yang et al., [2025](#); Zang, [2012](#)).

Current studies have illustrated that EM is a phenomenon that extends beyond individual firms and is influenced by institutional and contextual factors at a higher level. Weak regulatory enforcement, concentrated ownership structures, and socio-cultural influences in emerging markets may greatly impact the extent to which managers manipulate earnings (Ado et al., [2020](#); Gokhale & Pillai, [2024](#)). These institutional factors can influence both the opportunities available to managers and the incentives they face. This indicates that EM practices are embedded within the broader governance/regulatory environment as opposed to being simply a function of firm-specific considerations.

Accrual-based Earnings Management (AEM)

AEM represents earnings manipulation through the application of managerially derived accounting estimates and policy choices (without changing an entity's underlying economics) by using managerially derived discretion over specific areas. This includes revenues recognized, allowances/provisions recorded, and depreciation/amortization recognized. Managerial use of discretion in these areas allows managers to affect reported earnings while remaining compliant with accounting standards. Dechow et al. ([1995](#)) and Christensen et al. ([2022](#)) remain the leading researchers who advanced the Modified Jones Model as the most common method to empirically identify DA.

The empirical literature has shown that AEM differs across various industries and firm-specific variables. Specifically, entities operating in less competitive/less regulated environments would likely show higher levels of DA than those in highly competitive/more heavily regulated environments. This is because there are fewer restrictions on managerial action and less monitoring of managerial behaviour (Ado et al., [2020](#); Sadowski et al., [2025](#)). However, due to increased regulations regarding accounting standards and disclosures, as well as improved auditing quality, the ability of companies to rely upon accrual-based manipulations of earnings is

decreasing (Mlawu et al., [2025](#)). Therefore, it is possible that managers may turn towards alternative methods of EM. These methods may specifically include real activity manipulation, which does not have many regulatory constraints like those associated with accrual-based manipulations and is also more difficult for external parties to recognize/detect (Bui, [2024](#); Zang, [2012](#)).

Real Earnings Management (REM)

REM refers to the changes made by management in normal business practices to alter the way the company's profits would be reported. According to Roychowdhury ([2006](#)), there are three primary types of REMs. Firms can produce at rates above demand to lower CGS; firms can decrease discretionary expenditures, such as advertising and research and development; and firms can alter pricing through offering deeper price cuts or longer payment periods. More recent empirical studies have also been conducted in regard to the use of REM in emerging economies. For instance, Amin et al. ([2021](#)) demonstrated that a stronger corporate governance structure and/or an effective institutional environment reduces the propensity for companies to engage in REM. Additionally, Ado et al. ([2020](#)) illustrated that high ownership concentration and independent boards of directors are negatively related to REM. Additionally, Zang ([2012](#)) and Bui ([2024](#)) demonstrated that managers may utilize alternative approaches towards managing earnings depending on how strictly they believe financial reporting regulations are enforced. Therefore, considering both accrual-based and real-based EM within a singular theoretical context is advisable.

Corporate Diversification and Earnings Management (EM)

Corporate diversification, as a strategic decision, significantly affects a firm's organizational structure, information environment, and managerial incentives. Firms expand their operational scope across multiple business segments or geographic markets. The expansion of scope and complexity may have significant implications for financial reporting behaviour (Alhadab & Nguyen, [2018](#)). From a theoretical perspective, diversification may both mitigate and exacerbate EM (Jiraporn et al., [2008](#)). In contrast, diversification may reduce earnings volatility through risk spreading (portfolio theory) (Markowitz, [1952](#)) which, in turn, may reduce pressure on managers to manipulate reported performance. On the other hand,

diversification is generally associated with greater organizational complexity. This increased complexity may weaken monitoring mechanisms. It may intensify information asymmetry between stakeholders and managers. Additionally, it provides managers with greater discretion over resource allocation and reporting practices (Jensen & Meckling, [1976](#); Jensen & Meckling, [2019](#)).

Empirical evidence suggests that recent research increasingly supports the view that the negative effects of complexity due to diversification tend to dominate. Studies indicate that diversified firms exhibit higher levels of EM than non-diversified firms. Complex organizational structures make it difficult for stakeholders to evaluate performance and detect manipulation. Therefore, they facilitate both accrual-based and REM (Berrill et al., [2021](#); Yang et al., [2025](#)). These findings suggest that diversification creates an environment where managerial opportunism is more likely to occur, especially in settings with weak governance and monitoring mechanisms.

Product Diversification (PD) and Earnings Management (EM)

Diversification of products expands the number of product lines that a company operates from one to multiple products, creating additional complexity within a firm's organizational structure (Anggara et al., [2025](#)). Segment-level opacity creates informational asymmetry issues related to firm performance assessment for outside stakeholders. In other words, if a firm has multiple product lines that have little or no visibility as to their individual profitability/losses, then outside stakeholders have difficulty assessing the overall firm performance. Increased managerial discretion also results in the potential for managerial opportunistic behaviour (Jensen & Meckling, [1976](#)). Farooqi et al. ([2014](#)) reported that diversified firms engage more in real activities manipulation. They also determined that markets apply a value discount, which suggests that investors penalize opaque operating moves that trade long-term cash flows for short-term targets. In multi-country evidence, El Mehdi and Seboui ([2011](#)) showed similar patterns. Firms with broader product scope display abnormal production and shifts in discretionary expenditures, especially when internal reporting fails to keep pace with growing complexity.

Recent research has indicated that highly diversified firms may have a greater likelihood of exhibiting abnormal accrual behaviour as well as REM behaviour. This is likely to result from an increase in managerial discretion

and a decrease in transparency. Thus, it would be hypothesized that product diversity may provide management with additional discretionary authority than it would do for its reporting responsibilities, and that this type of diversification would have positive correlations with each form of EM.

Geographic Diversification (GD) and Earnings Management (EM)

GD adds another layer of complexity to the already complex process of managing a multi-product company, as there are many institutional, regulatory, and accounting differences when companies operate in different markets and countries (Vasilescu & Millo, [2016](#)). Due to these country-by-country complexities, firms can experience an increase in informational asymmetry among their manager(s) and other stakeholders (El Mehdi & Seboui, [2011](#)). Additionally, this cross-border complexity would decrease the effectiveness of both internal and external monitoring and control of the firms' financial reporting. Yang et al. ([2025](#)) found that multinational firms may utilize both AEM and REM strategies. He stated that the choice of which strategy would be used could depend upon how strong or weak a country's regulatory environment is, as well as how much investor protection exists within those regulatory environments. Similarly, Khuong et al. ([2022](#)) found that if a country has a weak institutional environment, it would provide managers with more opportunities for EM than if that country has a strong institutional environment.

When comparing GD to PD, GD may probably have a larger impact on a firm's ability to manipulate its financial statements (Vasilescu & Millo, [2016](#)). This is because GD presents numerous challenges related to monitoring and controlling the firm's operations across borders and institutions. The fact that multiple regulators monitor international business operations makes it harder for stakeholders to identify and report manipulated financial data, thus allowing for both AEM and REM manipulation. Therefore, it is reasonable to conclude that GD would have a more significant effect on a firm's financial reporting practices than PD (Adejumo & Ogburie, [2025](#)).

Hypothesis Development

Product Diversification (PD) and Earnings Management (EM)

PD increases a firm's organizational complexity because it adds more business segments to a single firm (Farooqi et al., [2014](#)). The greater number of segments weakens monitoring mechanisms and increases

information asymmetry, which allows managers much greater discretion over reporting financial results (El Mehdi & Seboui, [2011](#)). Additionally, capital markets within firms that are diversified allow for managerial decisions on resource reallocation across segments, potentially facilitating earnings smoothing and the concealment of underperformance. Since both accounting choices and operational decisions could be used to influence these mechanisms, it is expected that PD would have an impact on both AEM and REM (Yahaya, [2026](#)).

H₁: PD is directly associated with AEM.

H₂: PD is directly associated with REM.

Geographic Diversification (GD) and Earnings Management (EM)

Firms geographically diversified face an additional layer of complexity as they have been exposed to a variety of different institutional settings (as well as differing regulatory systems) and enforcement mechanisms. The increased heterogeneity due to differences in institutions and regulatory systems creates an environment with greater informational asymmetry. It limits the ability of monitors to effectively supervise managerial actions; therefore, it increases the amount of managerially influenced discretionary action (Vasilescu & Millo, [2016](#)). Accounting standards and varying levels of regulatory oversight among jurisdictions can allow managers to take advantage of "regulatory arbitrage", thus creating opportunities for earnings manipulation. As both reporting and operating activities are impacted, it is anticipated that the firm's use of AEM and REM could be positively affected by GD (Zhang, [2026](#)).

H₃: GD is directly associated with AEM.

H₄: GD is directly associated with REM.

Methodology

Sample and Data

The authors used a panel dataset for all nonfinancial companies listed on the PSX during the time period ranging from 2013 to 2023. This time frame started after the updated Code of CG 2012 was put into effect due to significant regulatory reforms, economic transitions, and corporate developments after this period (Wang et al., [2020](#)). They did not include financial companies in this research because financial companies have their

own specific regulatory framework and financial accounting standards that may or may not be the same as those of non-financial companies. The total listed companies on PSX were 524 out of which 465 firms were on-financial companies. The financial company data was obtained using annual reports of the companies directly from the PSX and SBP's website. While, the segment data and geographic data were both obtained by looking at each financial statement and the notes to the accounts of each company. So, data was obtained only for 275 firms. After eliminating companies with missing data, the final sample had a total of 2,763 firm-year observations remaining.

Measurement of Variables

Dependent Variables: Earnings Management (EM)

This study utilized both a single-period and multi-period-based method to examine how EM is measured: AEM) and REM. For this purpose, AEM was estimated using the Modified Jones Model as proposed by Dechow et al. (1995). Concerning the use of this model, DA can be estimated (or the residual portion of all accruals). EM was previously studied using two well-known models: the balance-sheet approach and the cash-flows statement approach. The cash-flows statement approach was selected when estimating AEM. This is because estimation of accruals under this method gives better results with lower degree of errors in estimation (Hribar & Collins 2002, Wimelda & Chandra, 2018):

$$TA_{it} = IBE_{it} - CFO_{it} \quad (1)$$

TA_{it} denotes total accrual of a company in year t ; IBE_{it} stands for income before extraordinary items in year t ; and CFO_{it} represents net operating cash flow in year t . Here, further non-discretionary accruals (NDA) were deducted from the total accruals calculated from the Equation (3) by using the Modified Jones Model (1995) to measure the DA. The residual terms of this model were used as proxy for AEM:

Modified Jones Model

$$\frac{TA_{it}}{Assets_{it-1}} = \beta_1 \frac{1}{Assets_{it-1}} + \beta_2 \frac{\Delta REV_{it}}{Assets_{it-1}} + \beta_3 \frac{\Delta PPE_{it}}{Assets_{it-1}} + \varepsilon_{it} \quad (2)$$

$$NDA_{it} = \beta_1 \frac{1}{Assets_{it-1}} + \beta_2 \frac{(\Delta REV_{it} - \Delta REC_{it})}{Assets_{it-1}} + \beta_3 \frac{\Delta PPE_{it}}{Assets_{it-1}} \quad (3)$$

$$DA_{it} = \frac{TA_{it}}{Assets_{it-1}} - \left\{ \beta_1 \frac{1}{Assets_{it-1}} + \beta_2 \frac{(\Delta REV_{it} - \Delta REC_{it})}{Assets_{it-1}} + \beta_3 \frac{\Delta PPE_{it}}{Assets_{it-1}} \right\} \quad (4)$$

where, TA_{it} represents total accrual of a company in year t ; ΔREV_{it} denotes changes in accounts receivable of a company in year t ; ΔPPE_{it} indicates gross property, plant, and equipment of a company in year t ; $Assets_{it-1}$ are total assets of a company in previous year; ΔREC_{it} is equal to changes in net revenue of a company in year t ; NDA_{it} measures non-discretionary accruals; DA_{it} is discretionary accruals; and ε_{it} is error term.

REM was measured using the same methods described by Roychowdhury (2006). The following three equations (respectively) were used to calculate abnormal operating cash flows, abnormal production costs, and abnormal discretionary spending from the residuals of these regressions.

$$\frac{CFO_{it}}{TA_{it-1}} = \alpha_0 + \beta_1 \frac{1}{TA_{it-1}} + \beta_2 \frac{SAL_{it}}{TA_{it-1}} + \beta_3 \frac{\Delta SAL_{it}}{TA_{it-1}} + \mu_{ACFO} \quad (5)$$

$$\frac{DISX_{it}}{TA_{it-1}} = \alpha_0 + \beta_1 \frac{1}{TA_{it-1}} + \beta_2 \frac{SAL_{it-1}}{TA_{it-1}} + \mu_{ADISP} \quad (6)$$

$$\frac{PCOS_{it}}{TA_{it-1}} = \alpha_0 + \beta_1 \frac{1}{TA_{it-1}} + \beta_2 \frac{SAL_{it-1}}{TA_{it-1}} + \beta_3 \frac{\Delta SAL_{it}}{TA_{it-1}} + \beta_4 \frac{\Delta SAL_{it-1}}{TA_{it-1}} + \mu_{APCOS} \quad (7)$$

Here, CFO_{it} denotes cash flows from operations, SAL_{it} represents sales, $DISX_{it}$ denotes discretionary expenditures, $PROD_{it}$ represents production costs, and TA_{it} denotes total assets of firm i in year t . Variables subscripted by $t-1$ represent lagged values. The residuals obtained from Equations (5)–(7) represent abnormal cash flow from operations (AbCFO), abnormal production costs (AbPROD), and abnormal discretionary expenditures (AbDISX), respectively. Consistent with Roychowdhury (2006) and Alhadab and Nguyen (2018), these abnormal components are not standardized prior to aggregation. Lower-than-normal operating cash flows (abCFO) arising from sales manipulation are multiplied by minus 1 to reflect the same interpretation. Accordingly, the composite REM measure is constructed as: $REM = AbPROD + AbDISX + (-1) AbCFO$. Under this construction, larger values of the composite REM index indicate higher levels of REM, whereas lower values indicate lower engagement in REM. The use of a composite measure captures managers' simultaneous use of multiple real operating decisions to influence reported earnings and is consistent with the methodology proposed by Roychowdhury (2006) and subsequently adopted by Alhadab and Nguyen (2018).

Table 1*Measurement of Key Variables*

Variables	Indicators	Operationalization
Corporate Diversification	Product Diversification (PD)	Herfindahl index, the sum of squares of each segment i's sales as a proportion of total sales for the firm $PD = 1 - \sum_{i=1} S_i$ Where PD denotes the degree of Product Diversification, and S_i is the proportion of the firm's sales in the i_{th} product category. The Herfindahl index value is a statistical measure that indicates the portfolio of one product
	Geographic Diversification (GD)	The ratio of foreign sales to total sales. Such a measure of GD was consistent with many previous studies (Grant et al., 1988; Qian, 2002; Schmid & Walter, 2012; Singh et al., 2010; Tallman & Li, 1996).
Earnings Management (EM)	Discretionary Accruals (DA) Real Earnings Management (REM)	Modified Jones model was used (Nguyen, 2026) Roychowdhury (2006) model
Board Size	The number of board of directors on company's board (BS)	The number of board of directors on company's board
CEO Duality	CEOD	CEO and chairman of the board of directors are same. The dummy assumes value 1 if one person performs these functions, or 0 otherwise.
Audit Committee Meetings	ACMs	Number of audit committee meetings (ACMs)
Board Gender Diversity	BGD	Number of female directors in the board
Size	FSIZE	Natural log of Total Assets
Age	FAGE	Number of years from the date of incorporation
Leverage (LEV)	LEV	Total debt/Total Equity
Cash Flow	CASHF	Ratio of operating cash flow and total assets
Return on Equity	ROE	Ratio of net income to total equity

Model Specification

Relationship with Discretionary Earnings Management (EM) and Product Diversification (PD)

$$DA_{i,t} = \beta_0 + \beta_1 PD_{i,t} + \beta_x X_{i,t} + \mu_i + \lambda_t + \delta_j + \varepsilon_{i,t} \quad (8)$$

Here, $DA_{i,t}$ is discretionary accruals of firm i at time t , β is coefficient, $\beta_1 PD_{i,t}$ is coefficient of product diversification, $X_{i,t}$ is set of control variables, μ_i is firm fixed effect, λ_t is year fixed effect, δ_j is industry fixed-effects, and $\varepsilon_{i,t}$ is error term.

Relationship of Real Earnings Management (REM) and Product Diversification (PD)

$$REM_{i,t} = \beta_0 + \beta_1 PD_{i,t} + \beta_x X_{i,t} + \mu_i + \lambda_t + \delta_j + \varepsilon_{i,t} \quad (9)$$

Here, $REM_{i,t}$ is REM of the firm i at time t , β is a coefficient, $\beta_1 PD_{i,t}$ is the coefficient of product diversification, $X_{i,t}$ is a set of control variables, μ_i is a firm fixed effect, λ_t is a year fixed effect, δ_j is an industry fixed effect, and $\varepsilon_{i,t}$ is the error term.

Relationship of Discretionary Earnings Management (EM) and Geographic Diversification (GD)

$$DA_{i,t} = \beta_0 + \beta_1 GD_{i,t} + \beta_x X_{i,t} + \mu_i + \lambda_t + \delta_j + \varepsilon_{i,t} \quad (10)$$

Here, $DA_{i,t}$ is DA of the firm i at time t , β is a coefficient, $\beta_1 GD_{i,t}$ is the coefficient of geographic diversification, $X_{i,t}$ is a set of control variables, μ_i is a firm fixed effect, λ_t is a year fixed effect, δ_j is an industry fixed effect, and $\varepsilon_{i,t}$ is the error term.

Relationship of Real Earnings Management (REM) and Geographic Diversification (GD)

$$REM_{i,t} = \beta_0 + \beta_1 GD_{i,t} + \beta_x X_{i,t} + \mu_i + \lambda_t + \delta_j + \varepsilon_{i,t} \quad (11)$$

Here, $REM_{i,t}$ is real earnings management of the firm i at time t , β is a coefficient, $\beta_1 GD_{i,t}$ is the coefficient of geographic diversification, $X_{i,t}$ is a set of control variables, μ_i is a firm fixed effect, λ_t is a year fixed effect, δ_j is an industry fixed effect, and $\varepsilon_{i,t}$ is the error term.

Addressing Endogeneity

The most significant problem when analysing the impact of diversification on EM could be endogeneity due to reverse causality, other unmeasured factors, and errors in measurements. To minimize reverse causality, a lagged value was used for all independent variables (PD and GD). This also helps control for time-invariant unobserved heterogeneity through the inclusion of firm-specific fixed effects. As an additional robustness test, the study applied GMM methodology. This methodology uses a dynamic panel data estimation approach (Arellano & Bover, [1995](#); Blundell & Bond, [1998](#)), to handle the potential endogeneity issues by utilizing internal instruments generated from lags of the observed factors.

Results and Discussion

Descriptive Statistics

Table 2 shows summary statistics for all of the factors deployed in this study. A firm-year sample of 2,763 observations provides a sufficiently large and balanced dataset to allow for a detailed and coherent empirical study using all of the variables presented. The average AEM (measured using discretionary accruals) is 0.009 with a standard deviation of 0.029. This indicates that non-negligible discretionary (accrual) EM exists in low levels of DA for all provisions in the dataset. This scale falls in the empirical range of mean DE reported in studies that utilized the Modified Jones ([1991](#)) and Kothari et al. ([2005](#)) methods. Typically, this is stated as being from 0.01 to 0.05 (Dechow et al., [2010](#); Jiraporn et al., [2008](#); Kothari et al., [2005](#)). Similarly, the average value for REM was found to be 0.008 with a standard deviation of .027. Thus, it appears that the use of real activity manipulation and DA are both present at very low levels of engagement. The similarity of these two levels of DA and REM is consistent with prior literature showing managers' usage of both accrual and REM channels to manage company performance (Roychowdhury, [2006](#); Zang, [2012](#)).

Table 2

Descriptive Analysis

Variables	N	Mean	Std Dev.	Min.	Max.
DA	2,763	0.009	0.029	0.000	0.255
REM	2,763	0.008	0.027	0.000	0.233
PD	2,763	0.120	0.176	0.000	1.000

Variables	N	Mean	Std Dev.	Min.	Max.
GD	2,763	0.148	0.261	0.000	1.000
BS	2,763	7.514	1.958	0.000	21.000
CEOD	2,763	0.083	0.276	0.000	1.000
ACM	2,763	3.135	1.046	0.000	7.000
BGD	2,763	0.101	0.125	0.000	0.758
FSIZE	2,763	15.131	3.333	0.000	21.077
FAGE	2,763	40.397	15.967	15.000	70.000
ROE	2,763	0.086	0.185	-0.372	0.452
CASHF	2,763	0.040	0.080	0.000	0.905
LEV	2,763	0.484	0.309	0.000	1.180
EPS	2,763	11.642	20.774	-11.280	72.230

Table 2 also summarizes corporate diversification, showing that the mean for PD is 0.120 with a standard deviation of 0.176 for PD using the Herfindahl Index as the measure of PD. The HI indicates that most firms in the sample remain relatively undiversified, while a minority of companies operate as diversified conglomerate businesses. These results are in line with the existing studies that found over 80% of firms showed low or moderate levels of diversification (El Mehdi & Seboui, [2011](#); Jiraporn et al., [2008](#)). The mean ratio of GD measured as a ratio of foreign sales to total sales, is 0.148, with a standard deviation of 0.261. This suggests that firms earn an estimated 15% of their revenues on average through foreign markets. Therefore, on average, the population consists of many firms that are predominantly domestic in focus, with a few firms that operate internationally. This distribution of GD for firms is similar to studies of globalization that have been reported (Qian, [2002](#); Schmid & Walter, [2012](#); Tallman & Li, [1996](#)).

The Board Size (BS) has a distribution average of 7.514 directors, representing a governance structure common in both emerging and developed markets (Larcker et al., [2007](#); Liu et al., [2015](#)). In addition, CEOs are dual role incumbents for approximately 8.3% of the identified firm-year observations. This indicates a widespread separation of a CEO and chairperson, and being consistent with prevailing governance practices. The Audit Committee (AC) has a membership of 3.135 total members and operates at a numerical average in compliance with established regulatory requirements. The Board Gender Diversity (BGD) is estimated to be just 10.1%, indicating a low representation of female board members. Many

studies have documented similar findings in terms of low female board representation, particularly in non-OECD and emerging market contexts. FSIZE makes logical sense, given that the average of the natural logarithm of total assets was 15.131, which is close to the average FSIZE reported in studies of corporate finance and accounting (Fama & French [1992](#); Dechow et al. [2010](#)). The mean age for firms (FAGE) in the data is approximately 40 years, which indicates that the data is representative of established and mature companies. ROE's (8.6%) reported levels of profitability correspond to the benchmarks in the relevant literature, while the average amount of leverage (LEV) was found to be 48.4% in the data sample and represents a moderate use of debt.

Regression Results

Table 3 presents regression estimates of the association between corporate diversification and EM using a high-dimensional fixed effects model with heterogeneity at the firm, year, and industry levels. Regression analysis indicates a positive association between corporate diversification and each type of EM - accrual-based and real EM. In columns (1) and (2), the coefficients of PD are positive and significant for both DA and REM. This indicates that firms operating multiple product lines tend to exhibit higher level of EM than firms operating single product lines (Ajay, [2024](#), El Mehdi & Seboui, [2011](#)). It is likely due to the over-complication of organizations through diversification, which causes more information asymmetry between managers and outside stakeholders, giving managers more discretion when reporting and making operational decisions. Previous research has also indicated that diversified companies often have an incentive to hide performance and use opportunistic reporting practices because they face challenges in monitoring their own internal allocation of capital across segments (Berger & Ofek, 1995; Denis et al., [1997](#)). Greater organizational complexity may reduce transparency and limit the effectiveness of monitoring managerial actions, resulting in an increase in managerial discretion from an agency theory perspective. The R^2 values in Table 3 are comparable to other similar studies in which R^2 values match because the variation in DA and REM is explained by PD and GD and other control variables (Alhadab & Nguyen, [2018](#)). These results are in line with prior research in corporate diversification where EM is affected by variety of firm-specific, managerial, institutional, and market-related factors that are difficult to capture fully within a single empirical model (Alhadab &

Nguyen, [2018](#), Farooqi et al., [2014](#)).

Table 3

HDFE (High-Dimensional Fixed-Effect) Regression Results: Impact of PD, GD on DA and REM

	(1) DA	(2) REM	(3) DA	(4) REM
PD	0.015* (1.83)	0.006* (1.71)		
GD			0.020*** (2.84)	0.019*** (2.81)
BS	0.001 (0.88)	0.001 (1.28)	0.001 (1.02)	0.001* (1.83)
CEOD	-0.007** (-2.34)	-0.005** (-2.32)	-0.007** (-2.32)	-0.007** (-2.48)
ACM	-0.001 (-1.24)	-0.001 (-1.45)	-0.001 (-1.28)	-0.001 (0.99)
BGD	0.008 (1.11)	0.003 (0.56)	0.008 (1.04)	0.009 (1.31)
FSIZE	-0.003 (-1.40)	0.001 (0.70)	-0.002 (-1.17)	-0.003 (-1.42)
AGE	-0.001** (-2.28)	-0.001 (-0.70)	-0.001** (-2.41)	-0.001** (-2.50)
ROE	-0.007 (-1.26)	-0.007 (-1.55)	-0.008 (-1.49)	-0.006 (-1.02)
CASHF	-0.017 (-1.36)	-0.002 (-0.24)	-0.015 (-1.27)	-0.017 (-1.41)
LEV	-0.004 (-1.54)	-0.000 (-0.16)	-0.005* (-1.94)	-0.001 (-0.43)
Constant	0.036 (1.14)	-0.010 (-1.37)	0.025 (0.85)	0.029 (0.97)
N	2763	2763	2763	2763
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
R ²	0.1626	0.1432	0.1642	0.1456
F-Stats	7.49***	2.50**	8.36***	2.40**

Note. Column 2-5 (1-4) represent EM, measured through accrual and REM, respectively. Here, *t*-statistics are reported in parentheses. *, **, and ***

denote significance at the 10%, 5%, and 1% levels, respectively.

Columns (3) and (4) show a robust pattern. The positive and statistically significant coefficient for GD indicates that companies expanding into geographic markets are likely to face additional coordination costs and/or be subject to diverse regulatory environments that increase their potential for EM. While it is expected that companies expanding internationally would experience increased scrutiny in developed markets, it is also anticipated that companies expanding into emerging markets might become even more opaque due to operational complexities. Furthermore, these may have less effective monitoring mechanisms due to differing enforcement quality (Doidge et al., [2007](#); Leuz et al., [2003](#)).

Compared with PD, GD exhibits a stronger positive association with both AEM and REM, which is consistent with the theoretical arguments developed earlier in this study. While PD primarily increases organizational complexity through multiple business segments, GD introduces additional institutional, regulatory, legal, and reporting complexities across different jurisdictions. These cross-border differences increase information asymmetry and make effective monitoring more difficult, thereby creating greater opportunities for managerial discretion in financial reporting. The findings therefore support the expectation that GD is associated with a higher propensity for EM than PD. For multinational firms operating in emerging markets, these results highlight the importance of strengthening internal controls, governance mechanisms, and cross-border monitoring systems to mitigate the reporting risks associated with increasingly complex international operations.

Although the estimated coefficients are modest in magnitude, they are economically meaningful given that EM measures are scaled variables that typically exhibit limited variation across firms. The coefficient on GD is larger than that on PD. This suggests that expansion across national borders is associated with a relatively stronger increase in EM than expansion across product segments. From a practical perspective, even modest increases in EM may reduce earnings quality and financial reporting transparency. Thereby, it affects investors' valuation decisions, auditors' risk assessments, and regulators' monitoring efforts. These findings also highlight the importance for corporate boards to strengthen internal controls and oversight as firms become more organizationally and geographically complex.

In terms of governance characteristics, CEO duality is negatively associated with both AEM and REM. While this finding may reflect improved coordination, faster decision-making, and reduced internal conflict within the leadership structure (Wu & Zhou, [2022](#)), it should be interpreted with caution. Alternative explanations are also plausible, particularly in the context of emerging markets, such as Pakistan. For instance, concentrated ownership, family-controlled firms, and monitoring by dominant shareholders may substitute for formal governance mechanisms and reduce managers' incentives or opportunities to engage in EM (Claessens et al., [2000](#); Fan et al., [2007](#)). Consequently, the observed negative association may reflect the combined influence of leadership structure and ownership characteristics rather than CEO duality alone.

BS has little effect on DA but a weak positive relationship with REM in certain specifications. Therefore, larger boards do not necessarily increase the effectiveness of monitoring due to coordination problems that may limit board effectiveness. The frequency of audit committee meetings (ACMs) and gender diversity on the board remains statistically insignificant across the different models used. This suggests that formal governance structures alone may not constrain EM in environments with differing degrees of enforcement and expertise among companies (Larcker et al., [2007](#); Wintoki et al., [2012](#)).

In addition to other control variables, a negative relationship was observed between firm age and DA. This suggests that older companies (mature) are generally less likely to use accounting-based EM in relation to their concern for maintaining a good reputation and/or using alternative, more stable means of reporting. No consistency in the statistical significance of the other control variables (profitability, cash flows, and leverage) was identified across the various model specifications. While the models' overall explanatory power remains constant with respect to varying forms of diversification, adding the firm, industry, and year fixed effect increases the credibility of the empirical findings. These empirical findings suggest that corporate diversification is associated with greater managerial discretion in financial reporting in preparing financial statements. Thus, it increases the complexity in which financial reports are produced, thereby providing incentives for managers to engage in EM. Overall, these empirical findings can help identify ways to accomplish EM in developing countries, such as Pakistan.

Endogeneity Analysis: Two Step System GMM- PD, GD and DA, REM

The dynamic panel bias and endogeneity issues were evaluated using the two-step system GMM estimator developed by both Arellano and Bover (1995), as well as Blundell and Bond (1998). System GMM provides an economically robust statistical model for overcoming the potential issues of dynamic endogeneity, omitted variable bias from unobserved heterogeneity, and simultaneity bias in analyzing models with short panels that have high levels of cross-sectional variation but low time-series variation.

Table 4

Endogeneity Analysis-Two Step System-GMM PD-DA, GD-DA, PD-REM and GD-REM

	(1) DA	(2) REM	(3) DA	(4) REM
PD	0.008** (2.01)	2.173** (2.08)		
GD			0.008* (1.65)	2.251* (1.87)
BS	0.001 (1.04)	0.145 (1.16)	0.000 (0.51)	0.262* (1.73)
CEOD	-0.004 (-1.39)	-1.774 (-0.67)	-0.003 (-1.34)	-2.819 (-0.56)
ACM	-0.002 (1.07)	1.115* (1.72)	-0.001 (-0.87)	0.902 (1.12)
BGD	0.003 (0.58)	1.272 (0.97)	0.000 (0.08)	0.874 (0.57)
FSIZE	0.001 (1.08)	-0.904* (-1.87)	0.000 (-0.57)	-0.881 (-1.43)
FAGE	-0.000 (-0.97)	0.005 (0.52)	0.000 (-1.3)	-0.004 (-0.36)
ROE	-0.001 (-0.53)	0.042 (1.07)	0.004** (2.53)	0.031 (0.64)
CASHF	0.006 (0.13)	2.329 (0.75)	0.105* (1.9)	6.523* (1.78)
LEV	0.012 (1.32)	-7.357*** (-2.64)	-0.006 (-0.6)	-5.79 (-1.56)
Intercept	-0.027 (-1.28)	14.924* (1.8)	0.005 (0.25)	12.132 (1.28)

	(1)	(2)	(3)	(4)
	DA	REM	DA	REM
Year Fixed Effect	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes
Observation	2230	2230	2230	2230
AR(1)	-4.91(0.000)	-8.78(0.000)	-4.96(0.000)	-8.53(0.000)
AR(2)	-0.43(0.668)	-1.16(0.248)	0.80(0.422)	-1.13(0.258)
Sargan-Overid. restrictions: χ^2	28.01 (0.215)	35.92(0.211)	21.39(0.497)	25.42(0.704)
Hansen-Overid. restrictions: χ^2	13.99 (0.927)	33.67(0.294)	15.35(0.847)	26.69(0.482)
Wald- χ^2	53276.40***	726.69***	9.56***	599.18***
Number of Instruments	37	45	36	45

Note. The coefficient magnitudes for DA and REM should not be directly compared because the two dependent variables are measured using different estimation procedures and scales.

The results of estimating the GMM two-step system with DA, REM, and year and industry fixed effects were being used as a means of addressing concerns about dynamic endogeneity using internal instrumentation for the results.

The two-step system GMM estimation used in this study tested whether PD or GD had an impact on DA and REM. The results confirmed that the estimates were consistent with a valid model and the potential endogeneity problems were addressed as well. As it would have been expected in Table 4 columns (1), (2), (3), and (4) with first-differenced estimations, the AR (1) statistic was negative and significant at -4.91, -4.96, -8.78 and -8.53; p -value = 0.000, respectively, indicating significant levels of first-order serial correlation. Whereas, the AR (2) statistic was -0.43, 0.80, -1.16, and -1.13 and was insignificant, indicating no second-order serial correlation thus, validating the use of internal instruments (Arellano & Bond, 1995). Moreover, the failure to reject H_0 with both the Sargan (Sargan test statistic = 28.02; p =0.215, = 21.39; p = 0.497, 35.92; p = 0.211, and = 25.42; p = 0.704 respectively) and Hansen (χ^2 = 13.99; p =0.927, = 15.35; p = 0.847, =33.67; p =0.294 and =26.69; p = 0.482 respectively) tests confirmed the validity of the instruments utilized in this research (Roodman, 2009). The number of

instruments used in this model (37, 36, 45, and 45 respectively) was consistent with the size of the sample (2,230), and the Wald statistic ($\chi^2 = 53.276.30^{***}$, $= 9.56^{***}$, $= 726.69^{***}$, and $= 599.18^{***}$; $p < 0.01$ respectively) indicated that the overall model was statistically significant.

EM was directly and statistically significantly associated with PD ($\beta=0.008$; $t=2.01$ and $\beta=2.173$; $t=2.08$ respectively in columns (1 and 2), indicating that firms with diverse product offerings are more likely to actively manipulate their earnings. It is important to note that the coefficient magnitudes reported for DA and REM were not directly comparable. This is because the two dependent variables were constructed using different measurement procedures and scales. AEM was measured using DAs derived from the Modified Jones Model, and expressed as a relatively small accrual-based ratio. Whereas, REM was derived from abnormal real operating activities following Roychowdhury (2006) and exhibited a different distribution and variance. As a result, the larger numerical coefficients observed for REM (2.173 and 2.251) primarily reflected differences in the dependent variable rather than indicating that diversification has a stronger economic effect on REM than on DA. Therefore, interpretation should focus on the sign and statistical significance of the coefficient rather than its absolute magnitude across the two EM measures. These results suggest that greater diversification is related with increased managerial discretion in respect to estimating accruals and providing firms with greater opportunity to operationally manipulate through real activities, such as excess production or reductions in discretionary expenses (Roychowdhury, 2006). From the perspective of agency theory, the increased complexity and reduced transparency associated with diversified firms would allow managers to act opportunistically (Jensen & Meckling, 1976; Leuz et al., 2003).

GD is also positively and marginally significantly related to DA and REM, respectively ($\beta = 0.008$; $t = 1.65$ and $\beta = 2.251$; $t = 1.87$ in columns 3 and 4). This suggests that firms with increased international operations have a higher probability of engaging in earnings manipulation. This supports the position that geographic expansion increases complexity for firms and information asymmetry about them due to vast differences in institutions across countries. This, in turn, reduces the ability to effectively monitor firms' activities (Bushman et al., 2004; Leuz et al., 2003). Consistent with agency theory, this increased complexity may create

additional opportunities for managerial discretion (Jensen & Meckling, [1976](#)).

In addition to PD and GD, all the remaining variables, that is, BS, CEO duality (CEOD), BGD, and the frequency at which an AC holds meetings, were found to be statistically irrelevant. This supports the idea that monitoring abilities are limited in GD firms. Furthermore, all of the other control variables, such as Return on Equity (ROE) had a positive impact ($\beta=0.105$; $p < 0.05$); cash flow had a positive effect ($\beta=0.105$; $p < 0.10$) on EM. These findings suggest that when a company is financially stable, it would have greater opportunity to create its own internal incentive structure as well as increased ability to take advantage of accounting opportunities for manipulating financial reports (Barton, [2001](#)). Overall, the findings support the claim that both PD and GD increase the quantity of EM by increasing the degree of informational opacity and decreasing the level of effective monitoring.

Conclusion

This research demonstrated that both PD and GD are positively associated with higher levels of EM in non-financial companies listed at the PSX. The results of this analysis showed the relevance of the reporting consequences of a firm's diversification strategy; especially in developing countries with changing governance practices. In addition to providing an expansive empirical investigation into the association between corporate diversification (and therefore earnings manipulation behavior) and the governing structure within an emerging country environment, this research also contributed to a better understanding of how corporate diversification is associated with increased levels of EM. Using a high-dimensional fixed effects approach, the authors developed a model that synthesized the literature from a reduced form to a mechanism-based explanation of how the strategic structure of a firm enables its financial reporting behaviour. Furthermore, the study conceptualized diversification in terms of an organizational characteristic that reshapes the manager's incentive structure, internal monitoring, and agency relationships. As a result, the propensity for EM is directly affected by organizational diversification characteristics.

The empirical findings provided consistent evidence that both PD and GD are positively associated with AEM and REM. These results remained robust across both the high-dimensional fixed-effects estimates and the

dynamic System-GMM specifications, indicating that the observed relationships are not driven by endogeneity concerns. The findings supported agency theory and the organizational complexity perspective developed throughout this study. As firms expand across multiple business segments and geographic markets, organizational structures become more complex, information asymmetry between managers and stakeholders increases, and effective monitoring becomes more difficult. These conditions provide managers with greater discretion over both accounting choices and operational decisions, thereby increasing opportunities for EM. Although the estimated effects were moderate in magnitude, they were economically meaningful because even relatively small increases in EM can reduce the quality and credibility of financial reporting. The findings have important implications for regulators, investors, auditors, and corporate boards. Regulators may consider strengthening disclosure requirements for diversified firms, particularly with respect to segment reporting and foreign operations. Investors and auditors should exercise greater professional skepticism when evaluating diversified firms, as increased organizational complexity may obscure opportunistic reporting practices. Corporate boards should also strengthen internal governance and monitoring mechanisms to mitigate the reporting risks associated with greater PD and GD.

Author Contributions

Qazi Muhammad Yasir Ayub: conceptualization; data curation; formal analysis; investigation; and writing -original draft. **Shiraz Khan:** Supervision, methodology, validation. **Shujahat Haider Hashmi:** methodology, software, writing – review & editing.

Conflict of Interest

The authors of the manuscript have no financial or non-financial conflict of interest in the subject matter or materials discussed in this manuscript.

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