Factors affecting earning managements of construction firms: Evidence from Vietnam

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Abstract: The objective of this study is to analyze the factors that influence earnings management behavior among listed construction companies in Vietnam. This study uses data from 29 listed construction firms from 2019 to 2023. To measure the extent of earnings management, the study employs the Modified Jones Model (1995) and further applies the Feasible Generalized Least Squares (FGLS) method to evaluate the impact of various factors on the level of such behavior. Regression results generated using STATA 17 indicate that four out of the six tested variables— firm size, profitability, board size, and audit quality—along with two control variables, operating cash flow and revenue growth–significantly influence the degree of earnings management within the sample. Specifically, firm size, profitability, board size, and revenue growth exhibit positive relationships with earnings management, whereas audit quality and operating cash flow have negative effects. Based on these findings, this study offers several policy implications for regulatory authorities, audit firms, construction enterprises, and investors to mitigate opportunistic earnings management practices and improve financial reporting reliability.

Keywords: earning management, construction firms, Vietnam

1. Introduction

Earnings management refers to firms deliberate use of accounting policies to manipulate financial indicators to maintain a favorable financial image and build investor and shareholder confidence (Davidson et al., 1987; Healy & Wahlen, 1999; Baralexis, 2004). Globally, numerous accounting scandals have had serious economic consequences. For instance, the telecommunications giant WorldCom was found to have capitalized operating expenses as investments, significantly inflating their reported earnings. Similarly, the UK-based retail conglomerate Tesco overstated its profits by USD 520 million under pressure from market competition (The Guardian, 2017).

In Vietnam, the capital market is still evolving and the accounting standards framework is undergoing gradual refinement. This has created loopholes that enable listed firms to engage in earnings management practices, often to attract investor attention. Such activities not only distort financial information and reduce the quality of financial reports but also undermine investor trust, adversely affect stock prices, and lead to tax revenue losses for the government. As a result, earnings management is not merely a corporate governance issue but a global concern. Investigating the determinants of earnings management is essential for improving corporate governance practices and supporting regulators, auditors, and investors to enhance financial information oversight and evaluation.

Although many international studies have sought to identify the determinants of earnings management, most have focused on a limited set of variables such as firm size, leverage, return on assets (ROA), or revenue growth. For example, Lopes (2018) examined the influence of audit quality, firm size, leverage, revenue growth, and ROA on earnings management. On the other hand, Pordea and Mates (2019) emphasized the relationship between leverage, firm size, and financial distress in shaping earnings manipulation behavior.

Existing studies on earnings management in Vietnam have largely focused on listed firms in the financial and non-financial sectors (Nguyen & Tran, 2017; Nguyen, 2018; Ho et al., 2024). However, the empirical findings on the impact of specific determinants remain inconclusive. For instance, while some studies (e.g., Nguyen & Tran, 2017;

Dao et al., 2021) report a positive relationship between firm size and earnings management, others (e.g., Bui & Ngo, 2017) argue for a negative association.

Moreover, few studies have explored earnings management behavior in the context of specific economic sectors, particularly in the construction industry. Pordea and Mates (2019) highlighted the importance of the construction sector in national economic development and noted the complexity of accounting practices within the industry. However, due to data limitations, they were unable to draw concrete conclusions regarding the influence of specific factors. More recently, Gajdosikova et al. (2022) found evidence suggesting that construction firms tend to understate earnings, although they did not examine the drivers of such behavior. Despite the extensive literature on earnings management, inconsistencies persist in empirical findings. Furthermore, many potentially influential variables, such as audit quality, firm age, and debt-to-asset ratio, are yet to be thoroughly examined. In addition, sector-specific analyses are scarce, particularly in the construction industry.

To address these gaps, this study collected data from 29 construction firms listed on the Vietnamese stock market between 2019 and 2023. Earnings management is measured using the Modified Jones Model (Dechow et al., 1995), while the impact of various internal and external factors is assessed using a multivariate regression. The focus on the construction industry stems from its unique characteristics such as long project cycles, unstable cash flows, and heavy reliance on long-term contracts, all of which may contribute significantly to earnings management practices. Empirical findings indicate that all firms in the sample engaged in earnings management and that four out of the six proposed hypotheses were supported.

This study contributes to literature in several ways. First, it investigates both the internal and external factors influencing earnings management in construction firms, an area previously underexplored in earnings management research. Second, it incorporates two control variables, offering a more comprehensive model than previous studies. Third, it proposes practical recommendations for policymakers, auditors, firms, and investors to mitigate opportunistic earnings management practices in the construction sector.

The remainder of this paper is organized as follows. Section 2 presents the literature review and hypothesis development. Section 3 describes the data and the research methodology. Section 4 discusses the empirical findings and analysis. Finally, Section 5 concludes the paper and outlines the implications for future research.

2. Literature review

2.1. Theoretical framework

Signaling theory

Signaling theory, introduced by Spence (1973), addresses the information asymmetry between parties in the market by suggesting that informed individuals can send observable and credible signals to convey their true quality to uninformed parties. These signals, such as the educational background in the labor market or transparent financial practices in the corporate setting, help reduce uncertainty in decision-making. In the context of corporate finance, managers often possess private information about a firm's performance or investment potential that is not fully accessible to shareholders (Leland & Pyle, 1977). To mitigate this gap, managers may engage in signaling behaviors, such as maintaining relationships with reputable audit firms or disclosing clear strategic plans, thereby enhancing the perceived credibility of the firm. Because the cost of mimicking such signals is higher for low-quality firms, strong signals are more likely to reflect genuine firm value (Spence, 2002). Over time, firms that consistently send credible signals tend to gain investors' trust and benefit from improved access to capital (Bergh et al., 2014).

Agency theory

Agency theory, introduced by Jensen and Meckling (1976), explains conflicts of interest that arise when principals delegate authority to agents, particularly between shareholders and managers, and shareholders and creditors. Managers, acting on behalf of shareholders, may pursue personal or short-term benefits, which can diverge from stakeholders' long-term goals. This misalignment creates incentives for earnings management to provide more

favorable financial results. The theory also highlights tensions in the shareholder–creditor relationship, where managers may use borrowed funds in ways that increase risk, reinforcing the relevance of agency theory in explaining opportunistic financial reporting behavior.

Positive accounting theory

Positive accounting theory suggests that earnings management is primarily driven by managerial incentives to maximize personal benefits, reduce contractual costs, or meet stakeholder expectations. According to Watts and Zimmerman (1990), three key hypotheses explain this behavior: the bonus plan hypothesis, debt-equity hypothesis, and political cost hypothesis. The bonus plan hypothesis posits that managers manipulate earnings to achieve performance targets that are tied to compensation. The debt-equity hypothesis suggests that firms with high leverage are more likely to manage earnings to comply with debt covenants. Finally, the political cost hypothesis argues that firms may understate earnings to avoid regulatory scrutiny or reduce exposure to taxation and wealth redistribution policies imposed by the government.

2.2. Empirical evidence

Charfeddine et al.. (2013) conducted a study in developing countries, using Tunisia as a representative case, to investigate the impact of various factors on earnings management, distinguishing between incentive-driven and constraint-based motivations. The study employed the Modified Jones Model (1995) and found that leverage, firm size, and managerial ownership were positively associated with the degree of earnings management. In contrast, board size, firm performance, and CEO duality (i.e., the CEO simultaneously serving as board chair) were negatively associated with earnings management practices.

However, in contrast to these findings, Lopes (2018), in her study on unlisted companies in Portugal, reported that leverage had no significant impact on earnings management and that firm size was negatively associated with it. Moreover, her research revealed that firms audited by Big 4 accounting firms exhibited significantly lower levels of earnings management, which aligns with prior studies (Boone et al., 2010; Van Tendeloo & Vanstraelen, 2008). Additionally, Lopes (2018) incorporated ROA and revenue growth into the model and concluded that firms with higher revenue growth tend to engage more in earnings management, whereas those with higher ROA are less likely to do so.

In the context of emerging markets, Saleh et al. (2020) examined the effect of financial factors on earnings management and earnings quality in 20 listed insurance companies on the Amman Stock Exchange. Their results indicated that all tested variables had significant impacts on earnings management. In particular, firm size, revenue growth, and ROA were positively associated with earnings management. Furthermore, the study highlighted that earnings management had a negative effect on earnings quality. The authors recommended that future studies expand the scope of research to include different regions and industries to enhance generalizability.

In Vietnam, Nguyen and Tran (2017) investigated the relationship between firm performance and earnings management among non-financial firms during the period 2010–2015. The results showed that firms tended to engage in downward earnings management rather than upward adjustments during the study period. Firms with increasing performance were also more likely to manage earnings, while firm size, revenue growth, and leverage were all positively associated with earnings management.

In a related study on listed firms, Bui and Ngo (2017) incorporated board characteristics into their analysis and presented findings that contradicted those of Nguyen and Tran (2017). Their study found that board-related variables were positively associated with earnings management, while firm size, financial leverage, and ROA were negatively associated. Among these, ROA exhibited the strongest inverse relationship, indicating that firms with higher profitability tend to engage less in earnings management.

Conversely, Dao et al. (2021), in a sector-specific study on port enterprises in Vietnam, found that both firm size and ROA were positively related to earnings management, a result that is inconsistent with earlier findings. The authors suggested that larger firms may be more inclined to engage in earnings management to preserve their reputation and maintain stakeholder confidence. Additionally, firms with a higher ROA may exploit discretionary

accruals to send positive signals to the capital market.

More recently, Ho et al. (2024) expanded the scope by examining the influence of corporate governance factors on earnings management in a sample of 250 listed firms on HOSE and HNX exchanges. Their findings showed that the presence of an audit committee had a positive effect on earnings management, whereas board size and engagement with Big Four auditors were negatively associated with it.

In summary, previous empirical evidence demonstrates the inconsistent impact of financial and corporate governance factors on earnings management across countries, industries, and institutional contexts. While some studies have identified positive relationships between firm size, leverage, or ROA and earnings management (Charfeddine et al., 2013; Saleh et al., 2020; Dao et al., 2021), others have reported inverse or statistically insignificant effects (Lopes, 2018; Bui & Ngo, 2017). Similarly, the role of governance mechanisms, such as board size, the presence of an audit committee, or engagement with Big Four auditors, yielded varying outcomes, depending on the sample and setting. These varied results highlight the complexity and contextual nature of earnings management behavior, suggesting the need for further empirical research across diverse regions, sectors, and periods to enhance the robustness and generalizability of existing theoretical models.

2.3. Research Hypotheses

Firm Age

Loderer and Waelchli (2011) concluded that firm age may negatively affect operational efficiency, suggesting that older firms often struggle to compete with newer or mid-aged firms in terms of profit margins. Consequently, various studies have argued that the longer a firm has been in operation, the more likely it is to engage in earnings management to maintain its reputation among stakeholders (Debnath, 2017; Kalbuana et al., 2022). Based on this reasoning, the following hypothesis is proposed:

H1: Firm age has a positive impact on earnings management behavior among construction firms.

Firm Size

Soesetio et al. (2023) suggested that large firms tend to possess greater bargaining power with auditors, potentially enabling them to negotiate in ways that reduce the effectiveness of the audit process. According to the positive accounting theory, large firms are also more likely to face substantial political costs, which incentivizes them to manage earnings to minimize these costs. Previous studies by Barton and Simko (2002) and Ali et al. (2015) similarly concluded that firm size is positively associated with earnings management. This association is typically attributed to the heightened external pressure large firms face from shareholders and regulatory bodies. Accordingly, we propose the following hypothesis:

H2: Firm size has a positive impact on earnings management behavior among construction firms.

Leverage Ratio

A high leverage ratio indicates that a firm is heavily reliant on debt financing, which increases its financial risk. Consequently, firms with higher debt levels may attempt to inflate reported earnings to maintain a positive image in the eyes of creditors and investors, as such firms often encounter difficulties securing additional financing. Stakeholders may perceive highly leveraged firms as being at a greater risk of insolvency (Fandriani & Tunjung, 2019). Moreover, these firms are likely to face higher borrowing costs and risk-breaching debt covenants. Therefore, earnings management may be employed to avoid such violations (Bassiouny et al., 2016; Nguyen & Tran, 2017). Based on this rationale, we propose the following hypothesis:

H3: The leverage ratio has a positive impact on earnings management behavior among construction firms.

Profitability

Investors typically assess a firm's profitability over time when making their investment decisions. A high return on assets (ROA) indicates that a firm efficiently utilizes its assets and achieves strong profitability. As such, firms often aim to maintain a favorable level of ROA, even during periods of underperformance. Anagnostopoulou and Tsekrekos (2016) found that more profitable firms are more likely to engage in earnings management, as they are better positioned to control reported earnings and act opportunistically (Susanto et al., 2019). Accordingly, we propose the following hypothesis:

H4: Profitability has a positive impact on earnings management behavior among construction firms.

Board Size

According to Vietnam's Enterprise Law (2020), the board of directors should comprise three to 11 members, and this number must be clearly defined in the company's charter. In practice, a larger board may hinder coordination, supervision, and decision making due to conflicting viewpoints and dispersed responsibilities. This lack of cohesion may create opportunities for earnings management practices to remain undetected. Additionally, larger boards may be more likely to include members who lack adequate financial or accounting expertise, thereby weakening the board's monitoring function. These observations are supported by numerous studies both in Vietnam and internationally (Rahman & Ali, 2006; Jaggi et al., 2009; Bui & Ngo, 2017). Therefore, we propose the following hypothesis:

H5: Board size has a positive impact on earnings management behavior among construction firms.

Audit Quality

Highly skilled auditors are more capable of independently and accurately evaluating a firm's financial reports, enabling them to detect errors or manipulations promptly. Firms audited by Big Four accounting firms typically undergo more rigorous audit procedures, which can help limit earnings management opportunities. These stringent procedures enhance transparency and reduce information asymmetry among stakeholders (Soliman & Ragab, 2014). Empirical studies have also shown that firms audited by Big Four firms are generally less likely to engage in earnings management than are those audited by non-Big 4 firms (Kalbuana et al., 2020; Wijaya et al., 2020). Based on this, we propose the following hypothesis:

H6: Audit quality has a negative impact on earnings management behavior among construction firms.

3. Data and Methods

3.1. Data

The data used in this study were collected from financial statements, annual reports, and prospectuses of 29 listed Vietnamese construction companies over a five-year period from 2019 to 2023, yielding a total of 145 firm-year observations. The construction industry in Vietnam was examined in our study due to its strategic role in national economic development, sensitivity to macroeconomic changes, and dependence on long-term contracts and project-based accounting, which may incentivize earnings management activities. Furthermore, the 2019–2023 period encompasses major events, such as the COVID-19 pandemic and the government's post-pandemic infrastructure investment programs, which significantly affected the operational and financial dynamics of construction firms. These characteristics make the Vietnamese construction sector a unique and relevant setting for analyzing earnings management practices.

The regression analysis was conducted using three econometric models: the Pooled Ordinary Least Squares (Pooled OLS), the Fixed Effects Model (FEM), and the Random Effects Model (REM), to identify the most appropriate specification. Subsequently, diagnostic tests were performed to detect potential econometric issues. If such violations were identified, the study employed the Feasible Generalized Least Squares (FGLS) method to address these deficiencies and ensure the robustness of the results.

3.2. The model

3.2.1. Dependent variable

In this study, the Modified Jones Model (1995) is employed to measure discretionary accruals (DA), which serves as a proxy for the level of earnings management practiced by the construction firms in the sample. This model has been widely recognized as one of the most effective and commonly used approaches in accrual-based earnings management research (Tran, 2017; Saleh et al., 2020; Ho et al., 2024). The measurement process consisted of the following steps:

Step 1: Calculate the total accruals (TA) of firm i for each year in the sample period using the following formula:

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

Step 2: Calculate ΔREV_{it} , ΔREC_{it} , PPE_{it}, A_{it-1}

Step 3: Estimate the following regression model to determine the firm-specific parameters α_i, β_{1i}, β_{2i}:

$$\frac{TA_{it}}{A_{it-1}} = \alpha_i \left[\frac{1}{A_{it-1}}\right] + \beta_{1i} \left[\frac{\Delta REV_{it} - \Delta REC_{it}}{A_{it-1}}\right] + \beta_{2i} \left[\frac{PPE_{it}}{A_{it-1}}\right] + \varepsilon_{it} \quad (2)$$

Step 4: Substitute the estimated coefficients α_i, β_{1i}, β_{2i} for a_i, b_{1i}, b_{2i} into the following equation to calculate non-discretionary accruals (NDA):

$$NDA_{it} = a_i \left[\frac{1}{A_{it-1}}\right] + b_{1i} \left[\frac{\Delta REV_{it} - \Delta REC_{it}}{A_{it-1}}\right] + b_{2i} \left[\frac{PPE_{it}}{A_{it-1}}\right] \quad (3)$$

Step 5: After obtaining NDA_it in Step 4, the value is substituted into the following equation to calculate DA_{it}:

$$DA_{it} = \frac{TA_{it}}{A_{it-1}} - NDA_{it} \quad (4)$$

In the equations above, TA_{it} is total accruals of firm i in year t; NI_{it} is net income after tax in year t; CFO_{it} is net cash flow from operating activities in year t; ΔREV_{it} is the change in revenue from year t–1 to year t; ΔREC_{it} is the change in accounts receivable from year t–1 to year t; PPE_{it} is gross property, plant, and equipment at the end of year t; A_{it-1} is total assets of firm i at the end of year t–1; NDA_{it} is non-discretionary accruals; DA_{it} is discretionary accruals; a_i, b_{1i}, b_{2i} are parameters estimated using OLS for each firm i.

Accordingly, discretionary accruals (DA) serve as a proxy for earnings management behavior. A negative value of DA indicates downward earnings management, a positive value suggests upward earnings management, and a value close to zero implies no earnings management activity. The dependent variable, earnings management (EM), is represented by the value of DA.

3.2.2. Independent variables

The measurement of independent variables and dummy variables is summarized in Table 1.

3.2.3. Control variables

Two additional control variables were incorporated into the model: operating cash flow and revenue growth. Operating cash flow is included to control for firm performance and differences in operating contexts (Alves, 2012; Arun et al.., 2015; Alzoubi, 2018). Revenue growth is used to account for differences in firm growth levels across the sample (Alves, 2012; Lopes, 2018).

After measuring the value of EM and based on the previously developed research hypotheses, the author constructs a research model to examine the factors influencing earnings management behavior among firms in the construction sector, as specified in the following equation:

$$EM_{it} = \alpha_0 + \beta_1 AGE_{it} + \beta_2 SIZE_{it} + \beta_3 DEBT_{it} + \beta_4 ROA_{it} + \beta_5 BDSIZE_{it} + \beta_6 AUD_{it} + \beta_7 OCF_{it} + \beta_8 GROWTH_{it} + \varepsilon_{it} \quad (5)$$

Table 1. Variable description

VARIABLE TYPE	NAME	SYMBOL	MEASUREMENT
Dependent variable	Earning Management	EM	Measured using the value of discretionary accruals estimated by the Modified Jones Model (1995).
Independent and Dummy Variables	Firm Age	AGE	Logarithm of (Observation Year – Year of Establishment)
	Firm Size	SIZE	Logarithm of Total Assets
	Leverage Ratio	DEBT	Total Liabilities / Total Assets
	Profitability	ROA	Net Income / Total Assets
	Board Size	BDSIZE	Logarithm of the Number of Board Members
	Audit Quality	AUD	1 if audited by a Big 4 firm 0 if audited by a non - Big 4 firm
Control Variables	Operating Cash Flow	OCF	Net cash flow from operating activities / Total assets at the end of the previous year
	Revenue Growth	GROWTH	(Current period revenue – Prior period revenue) / Prior period revenue

4. Results and discussion

4.1. Descriptive statistics

Table 2 presents descriptive statistics for the variables used in the research model. The results show that the dependent variable earnings management has a negative mean value of -0.0113, indicating that firms in the sample tend to engage in downward earnings management.

Table 2: Summary statistics

VARIABLE	OBS	MEAN	STD. DEV.	MIN	MAX
EM	145	-.011	.099	-.335	.237
AGE	145	1.517	.179	1.176	1.813
SIZE	145	6.629	.518	5.538	7.566
DEBT	145	.738	.23	.314	1.926
ROA	145	.018	.039	-.165	.096
BDSIZE	145	.747	.094	.602	1.041
AUD	145	.172	.379	0	1

OCF	145	.016	.102	-.246	.347
GROWTH	145	.112	.483	-.761	2.1

Source: Authors' calcualtion

However, the range of variation is relatively wide, with a minimum value of -33.5% and a maximum value of 23.7% of the initial total assets. Regarding firm characteristics, the average firm age is 1.52 (log-transformed), equivalent to over ten years of operation. Firm size ranges from 5.53 to 7.57 (log-transformed), with an average of 6.63. The average debt ratio was 73.8%, reflecting a relatively high level of debt financing among the sampled firms. The average profitability, measured by ROA, is 1.8%, although it fluctuates considerably from a minimum of -16.5% to a maximum of 9.6%. Other variables, such as board size, audit quality, operating cash flow, and revenue growth also exhibit substantial variation across firms in the sample.

4.2. Correlation analysis

Table 3 presents the Pearson correlation matrix for the variables used in the research model. The results indicate a strong negative correlation between operating cash flow and earnings management (-0.831). Additionally, the correlation coefficients among the remaining variable pairs ranged from low to moderate.

Table 3. Matrix of correlations

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) EM	.000								
(2) AGE	0.059	.000							
(3) SIZE	.165	.062	.000						
(4) DEBT	0.355	.371	0.065	.000					
(5) ROA	.300	0.172	.072	0.571	.000				
(6) BDSIZE	.113	.093	.442	0.043	.003	.000			
(7) AUD	.076	0.145	.377	0.133	.050	.025	.000		
(8) OCF	0.831	.064	.101	.152	.122	.027	0.001	.000	
(9) GROWTH	.076	0.039	.034	0.224	.219	.154	.015	.046	.000

Source: Authors' calcualtion

4.3. Regression results

Table 4 presents the regression results of these models, based on which the most appropriate model is selected.

Table 4. The Impact of Determinants on Earnings Management

VARIABLES	OLS	FEM	REM
AGE	0.0243 (0.0157)	-0.169 (0.143)	0.0243 (0.0157)
SIZE	0.0417*** (0.00613)	0.127*** (0.0355)	0.0417*** (0.00613)
DEBT	0.00805 (0.0152)	-0.0404 (0.0494)	0.00805 (0.0152)
ROA	1.049*** (0.0841)	0.894*** (0.121)	1.049*** (0.0841)
BDSIZE	0.0357 (0.0313)	0.0654 (0.0560)	0.0357 (0.0313)
AUD	-0.00526 (0.00755)	-0.0208 (0.0166)	-0.00526 (0.00755)

OCF	-0.885***	-0.894***	-0.885***
	(0.0264)	(0.0310)	(0.0264)
GROWTH	0.00452	0.00475	0.00452
	(0.00556)	(0.00630)	(0.00556)
Observations	145	145	145

*Standard errors in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01*

To assess the extent to which various factors influence earnings management behavior, we conduct regression analysis using three models: Pooled Ordinary Least Squares (Pooled OLS), Fixed Effects Model (FEM), and Random Effects Model (REM), implemented in STATA software.

To identify the most appropriate model, the author conducted the Lagrange Multiplier (LM) test. The result yielded a p-value of 1.0000, which exceeds the 0.05 threshold, indicating that the Pooled OLS model is the preferred specification. Subsequently, diagnostic tests were performed to examine potential econometric issues. The variance inflation factor (VIF) values for all independent variables were below 2, suggesting the absence of multicollinearity. The Breusch–Pagan test and the Wooldridge test were then applied to detect heteroskedasticity and autocorrelation, respectively. Both tests produced p-values of 0.000, which are below the 0.05 significance level, indicating the presence of these two violations. As a result, the Feasible Generalized Least Squares (FGLS) method was employed to address the heteroskedasticity and autocorrelation problems and to ensure the robustness of the regression estimates.

Table 5. Model estimating the impact of factors on earnings management using the FGLS method

VARIABLES	COEFFICIENTS	T-STATISTICS
AGE	0.00529	0.89
SIZE	0.0384***	14.34
DEBT	0.00282	0.44
ROA	1.051***	32.60
BDSIZE	0.0203*	2.13
AUD	-0.0101**	-3.17
OCF	-0.949***	-71.81
GROWTH	0.00514**	2.80
Observations	145	

** p < 0.10, ** p < 0.05, *** p < 0.01*

The results presented in Table 5 show that except for audit quality and operating cash flow, which exhibit a negative relationship with earnings management (EM), all other variables are positively associated with earnings management. Furthermore, no significant effect was found for firm age or leverage ratio on EM.

Firm Size (SIZE) has a positive and statistically significant impact on earnings management at the 1% level, indicating that larger firms tend to engage in more earnings management. This finding is consistent with those of previous studies by Barton and Simko (2002), Ali et al. (2015), and Soesetio et al. (2023), who argue that larger firms face greater pressure from shareholders and regulatory authorities. Consequently, managers may be incentivized to manipulate earnings to meet external expectations and maintain stability in their financial indicators.

Profitability (ROA) also shows a positive association with EM, in line with the findings of Anagnostopoulou and Tsekrekos (2016), Saleh et al. (2020), Dao et al. (2021), and Kalbuana et al. (2022). In practice, high ROA levels are often accompanied by heightened expectations from investors and business partners, especially in the construction industry, where strong financial performance is a key criterion for participating in bidding processes and securing project approval. As a result, firms may be more motivated to engage in earnings management.

Board Size (BDSIZE) is positively associated with EM at the 5% significance level. In many listed construction firms, ownership structures are often dispersed with the involvement of large shareholders or state ownership.

This can lead to ineffective decision-making and oversight due to potential conflicts of interest, lack of coordination, and difficulties in reaching a consensus among board members. In such contexts, managers may exploit oversight gaps to implement earnings management practices (Bui & Ngo , 2017; Jaggi et al., 2009; Rahman & Ali, 2006).

Audit Quality (AUD) demonstrates a negative relationship with EM and is significant at the 1% level. The findings suggest that firms audited by Big Four accounting firms are less likely to engage in earnings management. This can be attributed to the rigorous and independent audit processes adopted by these firms, which are less susceptible to managerial influence. Consequently, high-quality audits may serve as an effective mechanism to constrain opportunistic earnings manipulations. This result is consistent with those of Wijaya et al. (2020) and Kalbuana et al. (2022).

Operating Cash Flow (OCF) is negatively associated with earnings management, which can be explained by the characteristics of the construction industry, specifically, the long cash conversion cycles and risks of delayed payments. A positive operating cash flow indicates a healthy financial position, suggesting that the firm is capable of sustaining operations and meeting its debt obligations on time. This finding is consistent with those of Alves (2012) and Arun et al. (2015).

Revenue Growth (GROWTH) is positively associated with EM, supporting the findings of Lopes (2018) and Tran (2019). This result can be explained by the fact that high-growth firms are often motivated to maintain a strong public image and sustain momentum to attract investor interests.

5. Conclusion

Earnings management is a common phenomenon in corporate practice, often employed by firms to achieve favorable financial objectives or maintain a positive corporate image. However, such behavior can undermine the quality and reliability of financial reporting. Notably, the construction industry possesses unique characteristics such as unstable cash flows and revenue streams that are primarily derived from long-term contracts, which create opportunities for managers to manipulate earnings timing and recognition.

This study examines the determinants of earnings management in firms in the construction industry from 2019 to 2023. To measure the level of earnings management, we employed the Modified Jones Model (1995) and assessed the impact of each factor using the Feasible Generalized Least Squares (FGLS) estimation method. The results reveal that four out of the six hypothesized variables significantly influence the extent of earnings management: firm size, profitability, board size, and audit quality. Audit quality had a negative relationship with the dependent variable. Firm age and leverage have no statistically significant effects on earnings management. Regarding the control variables, operating cash flow is negatively associated with earnings management behavior, whereas revenue growth shows a positive association.

These results are consistent with those of prior studies and reinforce the critical role of corporate governance factors in shaping financial reporting behavior. Based on these findings, this study offers several policy recommendations for regulatory authorities, audit firms, corporate managers, and investors to mitigate opportunistic earnings management and improve the transparency and credibility of financial disclosure.

Recommendations

For Regulatory Authorities in the context of an increasingly sophisticated economy and capital market, transparency and reliability in financial reporting have become imperative. To enhance reporting quality, the Ministry of Finance is promoting phased adoption of International Financial Reporting Standards (IFRS), aiming to standardize disclosures, increase stakeholder trust, and reduce opportunities for earnings manipulation. Simultaneously, authorities should introduce clearer legal provisions governing the consistency of accounting policies, especially in areas prone to managerial discretion. Strengthening post-audit inspections and implementing penalties, including the temporary suspension of audit privileges for firms with violations, is also necessary to reinforce compliance and deter misconduct.

For Independent Audit Firms, they play a critical role in ensuring the credibility of financial information. To fulfill this role effectively, auditors should invest in capacity building through training aligned with international standards, and adopt modern audit technologies to detect irregularities. Establishing a robust internal review system that includes periodic cross-functional reviews and pre-disclosure evaluations is vital for audit quality control. Enhancing transparency by disclosing accounting adjustments before and after audits further improves investor confidence and accountability.

Investors should develop the capacity to analyze financial statements independently rather than relying solely on profitability indicators. The findings suggest that even highly profitable or large-scale firms may engage in earnings management to meet strategic targets. Therefore, a comprehensive evaluation should include both the income statement figures and cash flow information. Special attention should be paid to items such as construction-in-progress, provisions, and post-audit earnings adjustments. Furthermore, investors are encouraged to favor firms audited by reputable institutions, particularly the Big Four auditors (PwC, Deloitte, EY, and KPMG).

Limitations and further research

This study has some limitations. First, it focuses solely on 29 listed construction firms, which may not fully capture earnings management practices across the entire industry, particularly among unlisted or smaller-scale enterprises. Additionally, the research model examines only eight explanatory variables and employs an accrual-based measurement approach using the Modified Jones Model (1995), without considering other potentially influential factors, such as board meeting frequency or real activities-based earnings management. Future studies are encouraged to broaden the sample to include unlisted firms and state-owned enterprises, categorize firms according to specific construction subsectors, and adopt alternative measurement models to better understand the motivations, forms, and techniques of earnings management employed by firms.

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