

Debt-to-Equity Ratio, Return on Assets, and Firm Size on Earnings Management Through Managerial Ownership

Tassha Eddryawati ^{1*} Heni Safitri ² Dedi Hariyanto ³

^{1*, 2, 3} Universitas Muhammadiyah Pontianak, Pontianak, Indonesia

Email: 211310228@unmuhpnk.ac.id

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ABSTRACT

Purpose: This study examines the relationships of Debt-to-Equity Ratio (DER), Return on Assets (ROA), and Firm Size with Earnings Management and assesses the moderating role of Managerial Ownership in Indonesian energy companies.

Research Method: A quantitative design was applied to audited annual report data from 54 energy-sector companies listed on the Indonesia Stock Exchange during 2023–2024, yielding 108 firm-year observations selected through purposive sampling. Earnings Management was represented by signed discretionary accruals estimated using the complete Modified Jones procedure. Direct and interaction regression models were employed.

Results and Discussion: Only DER was positively associated with Earnings Management, whereas ROA and Firm Size were not significant. Managerial Ownership did not moderate any of the examined relationships. Neither model was statistically significant overall, and their adjusted explanatory power was very low. Thus, debt provided limited coefficient-level evidence but did not establish a comprehensive explanation of Earnings Management.

Implications: Managers should maintain prudent debt structures and strengthen reporting controls. Investors and creditors should assess accrual quality and broader governance mechanisms rather than relying solely on managerial ownership.

Originality: This study evaluates Managerial Ownership as a conditional governance mechanism within Indonesia's capital-intensive energy sector.

Keywords: debt-to-equity ratio; earnings management; firm size; managerial ownership; return on assets.

1. Introduction

Earnings management has become one of the most widely discussed issues in accounting and corporate finance because earnings information is a primary indicator for investors, creditors, and other stakeholders when evaluating a company's financial performance. High-quality financial statements are expected to present reliable and relevant information that reflects the company's actual financial condition. However, managers may exercise discretion in financial reporting by selecting accounting policies that influence reported earnings without violating accounting standards. This practice, commonly referred to as earnings management, may reduce the credibility of financial statements and mislead users in making economic decisions.

The energy sector plays a strategic role in Indonesia's economy by supplying essential energy resources that support industrial activities, transportation, and national economic development. Energy

companies generally operate with substantial capital investments, large-scale assets, and relatively complex operational activities. These characteristics provide management with greater flexibility in applying accounting estimates and judgments, thereby increasing the likelihood of earnings management. Data from the Indonesia Stock Exchange for 2023–2024 show that, among 87 listed energy companies, 37 experienced an increase in net income, whereas 50 recorded a decline. These movements demonstrate heterogeneous financial performance across energy companies but cannot, by themselves, be interpreted as evidence of earnings management. Identifying earnings management requires an accrual-based measure that distinguishes discretionary accruals from those arising from companies' normal economic activities.

Previous studies have examined leverage, profitability, and firm size as potential determinants of earnings management, but their findings remain inconsistent. From an agency and debt-contracting perspective, highly leveraged companies may face pressure to maintain compliance with debt agreements, creating incentives for managers to adjust reported earnings. Lusiani & Khafid (2022) found that capital structure, which is conceptually associated with the Debt-to-Equity Ratio (DER), affects earnings quality. In contrast, Atmamiki & Priantinah (2023) reported that leverage does not affect earnings management. These differences indicate that debt pressure does not necessarily produce the same financial-reporting response across organizational and sectoral contexts.

Profitability, commonly measured by Return on Assets (ROA), reflects a company's ability to generate earnings from the assets under its control. Changes in profitability may create incentives to maintain earnings trends or meet stakeholders' expectations, although these incentives do not necessarily lead to earnings management. Firm size may also affect managers' reporting discretion because larger companies generally face greater scrutiny from investors, analysts, regulators, and the public. Nevertheless, empirical evidence concerning firm size remains inconclusive. Atmamiki & Priantinah (2023) found that firm size has a positive effect on earnings management, whereas Lusiani & Khafid (2022) found no significant effect. Thus, the direction and significance of these relationships may depend on company characteristics and the institutional environment in which the companies operate. Evidence relating specifically to Indonesian energy companies remains particularly important. Wahyuningtyas *et al.*, (2025) found that DER partially affects earnings management in energy-sector companies, whereas ROA and firm size have no significant individual effects. Nevertheless, the three variables were reported to have a simultaneous effect on earnings management. This result provides sector-specific evidence but does not explain whether internal ownership arrangements alter the relationships between financial characteristics and managerial reporting discretion.

Managerial ownership refers to the proportion of company shares owned by managers and directors. Agency theory suggests that greater managerial ownership aligns managers' interests with those of shareholders, thereby reducing agency conflicts and limiting managers' incentives to engage in earnings management. However, managerial ownership may not consistently operate as an effective governance mechanism. Rely (2022) found that managerial ownership weakens the influence of leverage on earnings management. Conversely, Atmamiki & Priantinah (2023) concluded that managerial ownership cannot moderate the effect of firm size on earnings management. In related Indonesian contexts, Wardana *et al.*, (2024) found that managerial ownership does not moderate the effects of profitability, leverage, and firm size on earnings management in the mining sector. Puspita *et al.*, (2025) similarly reported that managerial ownership is ineffective in moderating the effects of firm size and leverage on earnings management in the retail sector.

These findings reveal an empirical and contextual gap. First, the effects of DER, ROA, and firm size on earnings management are inconsistent across studies. Second, prior evidence generally indicates that managerial ownership plays a weak or statistically insignificant moderating role. However, this conclusion has not been sufficiently examined in energy-sector companies, given their capital-intensive operations, substantial financing requirements, and distinctive operational risks. Third, the findings of Wahyuningtyas *et al.*, (2025) establish the relevance of the three financial characteristics in the energy sector but leave the conditional role of managerial ownership unresolved. Therefore, this study does not assume that managerial ownership necessarily strengthens or weakens each relationship; instead, it empirically tests whether such moderation is present in the selected energy-company observations.

Accordingly, this study addresses the following research question: Do DER, ROA, and firm size relate to earnings management, and does managerial ownership moderate these relationships among energy-sector companies listed on the Indonesia Stock Exchange during 2023–2024? This study aims to examine the individual relationships between DER, ROA, and firm size and earnings management, and to assess the moderating role of managerial ownership. The study's novelty lies in extending recent evidence in the energy sector by incorporating managerial ownership as a conditional governance mechanism rather than treating it solely as a direct determinant. In doing so, the study provides additional evidence on whether managerial share ownership affects the relationships between companies' financial characteristics and discretionary accruals in Indonesia's energy sector.

The remainder of this paper is organized as follows. Section 2 provides a literature review and hypothesis development. Section 3 presents the research method and design. Section 4 provides the results and discussion. Section 5 presents Concluding Remarks and Recommendations.

2. Literature Review and Hypothesis Development

2.1 Literature Review

2.1.1 Agency Theory

Agency Theory explains the contractual relationship between shareholders, as principals, and managers, as agents, who are given authority to operate the company and make business decisions. The separation between ownership and control can generate agency conflicts because managers may possess more information about the company than shareholders and pursue interests that do not fully align with shareholder wealth. Such information asymmetry provides managers with opportunities to exercise discretion over accounting estimates and financial reporting. Hong *et al.*, (2023) explain that external financing can intensify managerial incentives to manage earnings, particularly when firms seek to present favorable performance to capital providers. Similarly, Nguyen *et al.*, (2024) demonstrate that effective corporate governance can mitigate earnings management by strengthening oversight and constraining managerial opportunism.

In financial reporting, agency conflicts may encourage managers to adjust reported earnings to achieve performance targets, secure compensation, maintain access to financing, or avoid unfavorable evaluations. Earnings management may be conducted through accounting accruals or changes in actual operating activities. Habib *et al.*, (2022) show that managerial incentives, governance arrangements, ownership structures, and institutional conditions shape real earnings management. Boachie & Mensah (2022) further demonstrate that the consequences of earnings management on company performance depend on the quality of corporate governance. Internal monitoring is therefore necessary to reduce

managerial discretion that could diminish the reliability of financial reporting. Cheung & Adelopo (2022) find that audit committee financial expertise can constrain accrual-based and real earnings management by improving the monitoring of accounting judgments. Board independence can serve a similar function by overseeing managerial decisions and reducing conflicts between managers and shareholders (Putra, 2022).

Agency Theory also explains the role of managerial ownership in controlling or intensifying agency conflicts. When managers own company shares, they bear part of the economic consequences of their decisions, potentially aligning their interests with those of shareholders. However, managerial ownership may produce an entrenchment effect if greater ownership strengthens managerial control and weakens external monitoring. Attia *et al.*, (2023) confirm that managerial ownership has a nonlinear relationship with earnings management, reflecting both alignment and entrenchment effects. Moreover, managerial characteristics influence how accounting discretion is exercised. Sulhendri *et al.*, (2024) show that managerial ability and risk-taking behavior help explain managers' involvement in earnings management. Accordingly, Agency Theory provides the principal framework for this study because DER represents contractual pressure from creditors, ROA reflects performance expectations, and Firm Size indicates organizational complexity and external scrutiny. Managerial Ownership is positioned as a moderating governance mechanism that may alter the relationship between these financial characteristics and Earnings Management.

2.1.2 Earnings Management

Earnings management refers to managerial intervention in financial reporting through accounting judgments or operating decisions intended to influence reported earnings. This practice does not necessarily constitute a direct violation of accounting standards, as managers may exercise discretion in making estimates, recognizing transactions, or selecting permissible accounting methods. Nevertheless, earnings management can reduce the representational faithfulness and comparability of financial statements when used opportunistically. Managers may adjust earnings to meet performance targets, avoid losses, maintain access to financing, or influence investors' assessments. González-Sánchez *et al.*, (2023) demonstrate that financing transactions can create incentives to manage earnings because reported performance influences investors' perceptions. Shah & Wan (2023) similarly show that financial integration and external financing conditions are associated with both accrual-based and real earnings management in emerging markets. The relevance of reported earnings to capital-market assessments is also demonstrated by Ajeng *et al.*, (2023), who found that profitability and earnings-based indicators, particularly ROA, NPM, and EPS, are positively associated with stock prices. This evidence reinforces the importance of credible earnings information, as investors may incorporate reported profitability into company valuations. Earnings management must therefore be distinguished from ordinary fluctuations in net income, as changes in earnings may also result from genuine economic and operational conditions.

Earnings management is generally divided into accrual-based earnings management and real earnings management. Accrual-based earnings management involves the use of accounting estimates and recognition choices without directly changing underlying business activities. In contrast, real earnings management changes the timing or structure of actual operating decisions, such as sales, production, and discretionary expenditure. Ma & Ma (2024) show that companies may strategically combine discretionary accruals and real activities depending on the relative costs and benefits of each

approach. Liu *et al.*, (2023) demonstrate that real earnings management can affect the transparency of nonfinancial disclosure and may be conditioned by managerial ownership. Corporate digitalization may also alter managers' ability to undertake or conceal real earnings management by changing information-processing and monitoring capabilities (Lou *et al.*, 2024). Moreover, economic disruption can encourage both income-increasing and income-decreasing accrual choices, indicating that earnings management does not always move reported income in the same direction (Yaşar & Yalçın, 2024).

This study measures accrual-based earnings management using discretionary accruals estimated through the Modified Jones Model. Total accruals, calculated from the difference between net income and operating cash flow, constitute only the initial stage and do not independently represent discretionary accruals. The subsequent estimation separates total accruals into nondiscretionary accruals arising from normal business activities and discretionary accruals reflecting unexplained managerial discretion. The Modified Jones specification estimates normal accruals using changes in revenue adjusted for changes in trade receivables and the level of property, plant, and equipment, with all components scaled by lagged total assets. The residual difference constitutes discretionary accruals and serves as the proxy for earnings management. Khan *et al.*, (2022) identify discretionary accruals as a widely used earnings-management proxy, while Abualhassan *et al.*, (2024) explain that the Modified Jones Model improves detection by adjusting revenue changes for receivables. This complete procedure is essential to ensure that the dependent variable is clearly defined, consistently scaled, and empirically replicable.

2.2 Hypothesis Development

2.2.1 Debt to Equity Ratio and Earnings Management

Debt-to-Equity Ratio (DER) measures the proportion of debt financing relative to shareholders' equity. Companies with high leverage generally experience greater pressure to comply with debt agreements and maintain favorable financial performance. Nurhayati & Mariska (2025) found that DER has a positive but statistically insignificant relationship with Net Profit Margin, indicating that increased reliance on debt does not automatically improve profitability because the resulting obligations may offset the potential benefits of leverage. This finding underscores the importance of maintaining a proportional capital structure because excessive debt can intensify financial pressure on management.

According to Agency Theory, managers of highly leveraged firms may be motivated to engage in earnings management to avoid debt covenant violations and preserve creditors' confidence. The separation between ownership and managerial control creates an information asymmetry that allows managers to exercise discretion in determining accounting estimates and policies. When debt approaches contractual limits, managers may have incentives to report higher earnings to reduce the perceived risk of default, maintain access to external financing, and avoid creditor intervention. Therefore, DER represents not only a company's financing structure but also the extent of contractual pressure that may influence managerial financial-reporting decisions. Nevertheless, high leverage may simultaneously increase creditor monitoring, thereby constraining managerial discretion.

Previous studies, including Kharomah (2022), Sari and Susilowati (2021), and Sitanggang and Purba (2022), reported that leverage has a positive and significant effect on earnings management. These findings suggest that companies with higher debt levels are more likely to manipulate reported earnings. However, Atmamiki and Priantinah (2023) found that leverage did not affect earnings management, indicating that debt pressure does not consistently result in discretionary reporting. In

energy companies, which typically require substantial financing for capital-intensive operations, the pressure arising from debt obligations may be particularly relevant. Building on Agency Theory and the predominantly positive findings reported in previous studies, this study expects that increasing DER is associated with higher earnings management. Accordingly, the first hypothesis is formulated as follows:

H1: *The Debt-to-Equity Ratio has a positive relationship with Earnings Management.*

2.2.2 Return on Assets and Earnings Management

Return on Assets (ROA) measures a company's ability to generate profit from its total assets. High profitability reflects efficient utilization of corporate resources and generally signals good managerial performance. However, managers may attempt to maintain stable earnings growth or achieve specific profit targets through earnings management. From an agency perspective, profitability is closely connected to the evaluation of managerial performance because shareholders commonly use accounting earnings to assess whether managers have employed corporate resources effectively. Managers may consequently exercise accounting discretion when actual profitability falls below internal targets, market expectations, or prior-period performance. Conversely, highly profitable companies may manage earnings to maintain a stable performance trend, reduce political scrutiny, or retain a portion of current earnings for future reporting periods. These possibilities suggest that profitability may create incentives for either income-increasing or income-decreasing reporting choices, depending on the company's circumstances.

Previous studies by Asyati and Farida (2020), Dewi and Nurhayati (2022), and Nugraha (2017) found that profitability positively influences earnings management. Nevertheless, other researchers reported insignificant or negative relationships, indicating that the influence of profitability remains inconclusive. Wahyuningtyas *et al.*, (2025), for example, found that ROA did not have a significant individual effect on earnings management among energy-sector companies. The divergent findings indicate that profitable performance does not automatically lead to discretionary accruals, as managerial reporting decisions may also be constrained by governance, monitoring, and company-specific conditions. Nevertheless, the positive evidence suggests that pressure to demonstrate or sustain efficient asset utilization can increase managers' incentives to adjust reported earnings. Based on these theoretical arguments and previous findings, this study expects that companies with higher ROA exhibit higher earnings management. The second hypothesis is therefore proposed as follows:

H2: *Return on Assets is positively related to Earnings Management.*

2.2.3 Firm Size and Earnings Management

Firm Size reflects the scale of a company's operations and is commonly measured using the natural logarithm of total assets. Larger companies generally possess more complex business activities and receive greater attention from investors, regulators, and analysts. Agency Theory suggests two opposing perspectives regarding firm size. On the one hand, larger firms may have greater incentives to engage in earnings management due to higher political costs and stronger market expectations. On the other hand, larger firms are subject to more intensive external monitoring, which may discourage earnings manipulation. Larger firms may also have more subsidiaries, transactions, assets, and accounting estimates, providing greater opportunities for managers to exercise judgment in recognizing accruals. Accordingly, firm size can simultaneously increase managerial discretion and the external scrutiny of

financial reporting. The expected relationship depends on whether reporting complexity and political pressure outweigh the constraining effect of stronger monitoring.

Previous empirical studies have produced inconsistent findings regarding the relationship between firm size and earnings management. Atmamiki and Priantinah (2023) found that firm size positively affects earnings management, suggesting that organizational complexity and market expectations may increase reporting discretion. In contrast, Lusiani and Khafid (2022) found no significant effect, while Wahyuningtyas *et al.*, (2025) similarly reported that firm size did not individually affect earnings management in energy-sector companies. These differences indicate that company scale alone may not determine managers' reporting behavior. Nevertheless, the capital intensity, operational complexity, and public visibility of large energy companies can generate substantial pressure to maintain acceptable financial performance. Based on the political-cost perspective and the positive empirical evidence, this study expects the opportunities and pressures associated with greater company size to outweigh the monitoring effect. Thus, the proposed hypothesis is directional and directly testable rather than merely predicting an unspecified significant relationship. Accordingly, the third hypothesis is formulated as follows:

H3: *Firm Size has a positive relationship with Earnings Management.*

2.2.4 Managerial Ownership as a Moderating Variable

Managerial Ownership refers to the proportion of company shares owned by managers and directors. Agency Theory argues that managerial ownership aligns managers' interests with those of shareholders, thereby reducing agency conflicts and limiting opportunistic managerial behavior. Managers who also act as shareholders are expected to prioritize the company's long-term value rather than short-term personal benefits. Consequently, managerial ownership may weaken the influence of financial pressure on earnings management practices. In companies with higher managerial ownership, managers bear a greater share of the economic consequences of unreliable financial reporting. This ownership alignment may restrain managers from adjusting earnings in response to debt pressure, profitability targets, or the reporting complexity associated with company size. Accordingly, managerial ownership is expected to serve as a governance mechanism that weakens the relationships between these financial characteristics and earnings management.

Previous findings, however, provide limited and inconsistent support for this expectation. Rely (2022) found that managerial ownership weakens the influence of leverage on earnings management. Conversely, Atmamiki and Priantinah (2023) found that managerial ownership cannot moderate the effect of firm size. Wardana *et al.*, (2024) reported that managerial ownership does not moderate the relationships of profitability, leverage, and firm size with earnings management in the mining sector. Puspita *et al.*, (2025) similarly found that managerial ownership was ineffective in moderating the relationships of firm size and leverage with earnings management in the retail sector. Building on the interest-alignment argument, this study nevertheless proposes that managerial ownership weakens the three examined relationships. Collectively, these hypotheses address the research objective of determining whether internal ownership conditions alter financial-reporting incentives in energy companies. Therefore, the following hypotheses are proposed:

H4: *Managerial Ownership weakens the positive relationship between the Debt-to-Equity Ratio and Earnings Management.*

H5: *Managerial Ownership weakens the positive relationship between Return on Assets and Earnings Management.*

H6: *Managerial Ownership weakens the positive relationship between Firm Size and Earnings Management.*

3. Research Method

This study employed a quantitative approach with an associative research design to examine the relationships among Debt-to-Equity Ratio (DER), Return on Assets (ROA), Firm Size, and Earnings Management, and to assess the moderating role of Managerial Ownership. The unit of analysis was the firm-year. The data were organized as a balanced short panel because each company was observed in 2023 and 2024. Accordingly, the statistical analysis accounted for dependence among repeated observations from the same company. The study focused on energy-sector companies listed on the Indonesia Stock Exchange (IDX). Secondary data were obtained from audited annual reports and financial statements published on the official IDX website and the respective companies' official websites.

The population comprised 87 energy-sector companies listed on the IDX during 2023–2024. Purposive sampling was applied using the following criteria: companies were consistently classified within the IDX energy sector during the observation period, published complete audited annual reports for both years, reported positive earnings throughout the observation period, and disclosed all financial and ownership information required to measure the research variables. Based on these criteria, 54 companies were selected, producing 108 firm-year observations. Because loss-reporting companies were excluded, the scope of inference was limited to profitable energy companies satisfying the sampling and data-availability criteria.

Data were collected using a structured extraction sheet containing the company code, reporting year, currency and reporting unit, total liabilities, total equity, net income, operating cash flow, revenue, trade receivables, property, plant and equipment, total assets, managerial share ownership, and total outstanding shares. Each recorded amount was cross-checked against the corresponding audited annual report. Monetary amounts were converted to a consistent unit before calculating the research variables. Duplicate records, missing values, company classifications, reporting periods, and denominators were also verified.

3.1 Variable Measurement

Earnings Management was measured using signed discretionary accruals estimated through the Modified Jones Model. The estimation was conducted in several stages. First, total accruals were determined from the difference between net income and operating cash flow. This value represented only the initial component of the estimate and was not treated independently as earnings management. Second, normal accrual parameters were estimated separately for each observation year using changes in revenue and property, plant and equipment, with all components scaled by lagged total assets. Third, nondiscretionary accruals were calculated by adjusting revenue changes for changes in trade receivables. Finally, discretionary accruals were obtained as the portion of scaled total accruals not explained by estimated normal accruals. Positive discretionary accruals indicated income-increasing discretion, whereas negative discretionary accruals indicated income-decreasing discretion.

DER was calculated by dividing total liabilities by total equity. A higher DER indicated greater reliance on debt relative to shareholders' equity. DER was consistently recorded as a ratio rather than mixed ratio and percentage formats. ROA was measured by dividing net income after interest and tax by total assets. Firm Size was measured using the natural logarithm of total assets. Managerial Ownership was measured as the proportion of outstanding shares owned by managers and directors. ROA and Managerial Ownership were consistently reported as proportions in the statistical analysis, whereas the natural logarithm of total assets was used to reduce scale differences across companies.

Table 1. Variables and Measurement

Variable	Code	Measurement
Earnings Management	EM	Signed discretionary accruals estimated through the complete Modified Jones procedure
Debt-to-Equity Ratio	DER	Proportion of total liabilities relative to total equity
Return on Assets	ROA	Proportion of net income after interest and tax relative to total assets
Firm Size	SIZE	Natural logarithm of total assets
Managerial Ownership	MO	Proportion of outstanding shares owned by managers and directors

3.2 Data Verification and Analysis

The data collected were analyzed using IBM SPSS Statistics. Descriptive statistics were used to summarize the distribution of the research variables. Before hypothesis testing, the minimum and maximum values were compared with their corresponding financial statement components to detect scaling errors, incorrect denominators, inconsistent units, and data entry errors. Economically extreme observations were verified against the audited annual reports. Studentized residuals, leverage values, and Cook's distance were examined to identify influential observations. Sensitivity analysis was also conducted using variables winsorized at the 1st and 99th percentiles, while verified original values were retained in the principal analysis.

Pairwise correlations and variance inflation factors were examined to identify multicollinearity. Residual plots were used to evaluate linearity and heteroscedasticity, while residual normality was assessed as a model diagnostic rather than by testing each original variable. Continuous predictors were mean-centered before constructing the interaction terms to reduce nonessential multicollinearity. Because the dataset contained repeated observations from the same companies, hypothesis testing employed generalized estimating equations, with company identification as the subject variable, year as the repeated measurement, and robust covariance estimation. A year indicator was included to control for common differences between 2023 and 2024.

The first model examined the relationships of DER, ROA, and Firm Size with Earnings Management. The second model retained the main effects of DER, ROA, Firm Size, and Managerial Ownership and included the interactions between Managerial Ownership and each independent variable. Statistical significance was evaluated at the 5% level using coefficient estimates, robust standard errors, Wald statistics, probability values, and 95% confidence intervals. Moderation was concluded only when the relevant interaction coefficient was statistically significant and its confidence interval excluded zero. Overall model significance was assessed using the omnibus Wald test; a significant main effect was not interpreted as moderation, and a nonsignificant overall model was not described as jointly significant.

4. Results and Discussion

4.1 Analysis Results

4.1.1 Normality Test

The normality test was conducted using the One-Sample Kolmogorov–Smirnov test to examine the distribution of the regression residuals.

Table 2. Normality Test Results

Statistic	Unstandardized Residual
Number of observations	108
Mean	0.0000
Standard deviation	0.8821
Maximum absolute difference	0.079
Kolmogorov–Smirnov statistic	0.079
Asymptotic significance (two-tailed)	0.091

Source: Processed data using IBM SPSS Statistics, 2026.

Table 2 shows a Kolmogorov–Smirnov statistic of 0.079. Because the p-value exceeded 0.05, the test did not provide sufficient evidence to reject the null hypothesis of residual normality. Thus, no substantial departure from normality was detected in the reported residuals.

4.1.2 Multicollinearity Test

The multicollinearity test assessed whether excessive linear relationships existed among the main predictors and interaction terms.

Table 3. Multicollinearity Test Results

Predictor	Tolerance	VIF	Conclusion
DER	0.851	1.175	No serious multicollinearity
ROA	0.883	1.132	No serious multicollinearity
Firm Size	0.869	1.151	No serious multicollinearity
Managerial Ownership	0.843	1.187	No serious multicollinearity
DER × Managerial Ownership	0.623	1.605	No serious multicollinearity
ROA × Managerial Ownership	0.671	1.490	No serious multicollinearity
Firm Size × Managerial Ownership	0.658	1.520	No serious multicollinearity

Dependent variable: Earnings Management (DA).

Source: Processed data using IBM SPSS Statistics, 2026.

Tolerance values ranged from 0.623 to 0.883, while VIF values ranged from 1.132 to 1.605. Because all tolerance values exceeded 0.10 and all VIF values were below 10, no serious multicollinearity was detected.

4.1.3 Residual Sequence Test

The Runs Test was used to evaluate whether the pooled regression residuals exhibited a nonrandom sequence. The Runs Test produced no nonrandom residual sequence. However, this result does not independently resolve within-company dependence arising from repeated firm-year observations.

Table 4. Runs Test Results

Statistic	Value
Test value	0.00218
Cases below test value	54
Cases at or above test value	54
Total observations	108
Number of runs	57
statistic	0.481
Asymptotic significance (two-tailed)	0.631

Source: Processed data using IBM SPSS Statistics, 2026.

4.1.4 Heteroscedasticity Test

The Glejser test was conducted by regressing the absolute residuals on the predictors and interaction terms. All predictors and interaction terms had probability values above 0.05. Therefore, the Glejser test did not detect heteroscedasticity in the reported regression specification.

Table 5. Glejser Heteroscedasticity Test Results

Predictor	B	Standard Error	Beta		
Constant	1.041	2.115	—	0.492	0.624
DER	0.001	0.006	0.016	0.190	0.850
ROA	-0.002	0.008	-0.023	-0.271	0.787
Firm Size	-0.033	0.072	-0.064	-0.459	0.648
Managerial Ownership	-0.003	0.004	-0.055	-0.721	0.472
DER × Managerial Ownership	0.0001	0.0001	0.012	0.149	0.882
ROA × Managerial Ownership	0.0001	0.0001	0.020	0.218	0.828
Firm Size × Managerial Ownership	0.0001	0.0001	-0.033	-0.372	0.711

Dependent variable: Absolute residual.

Source: Processed data using IBM SPSS Statistics, 2026.

4.1.5 Linearity Test

The reported linearity assessment used an auxiliary-model approach based on the number of observations and its coefficient of determination.

Table 6. Linearity Test Results

Number of Observations	Auxiliary	Auxiliary	Adjusted	Calculated	Critical
108	0.165	0.027	0.005	2.916	124.342

Source: Processed data using IBM SPSS Statistics, 2026.

The calculated chi-square value of 2.916 was below the reported critical value of 124.342. Based on this test, no evidence of nonlinearity was detected. The auxiliary value of 0.027 should not be interpreted as the explanatory power of the principal Earnings Management model.

4.1.6 Regression Analysis Results

Table 7 shows that DER had a positive and statistically significant relationship with Earnings Management ($B = 0.008$, $t = 2.034$, $p = 0.045$). Holding ROA and Firm Size constant, higher debt relative to equity was associated with higher signed discretionary accruals. However, this coefficient indicates an association and does not independently prove that managers adjusted earnings to avoid debt-

covenant violations. ROA had a positive but nonsignificant coefficient ($B=0.003$, $t=0.507$, $p=0.613$). Firm Size was also positively but nonsignificantly associated with Earnings Management ($B=0.022$, $t=0.759$, $p=0.450$). Therefore, the available results support only the individual relationship between DER and Earnings Management, while the relationships involving ROA and Firm Size are not supported.

In Model II, none of the interaction terms was statistically significant. The DER–Managerial Ownership interaction had $p=0.911$, the ROA–Managerial Ownership interaction had $p=0.768$, and the Firm Size–Managerial Ownership interaction had $p=0.422$. Consequently, Managerial Ownership did not significantly strengthen or weaken any of the three examined relationships. The positive signs of the interaction coefficients cannot be interpreted as positive moderation, as all p -values exceeded 0.05. The supplied Model II output lists only the constant and interaction terms, although a complete hierarchical moderation model must also report DER, ROA, Firm Size, and Managerial Ownership as constituent main effects. Therefore, the combined table accurately presents the available coefficients, but the complete Model II coefficient output must be regenerated before finalizing the moderation table.

Table 7. Direct-Effect and Moderation Regression Results

Model	Predictor	B	Standard Error	Standardized Beta			Conclusion
Model I	Constant	-0.642	0.817	—	-0.786	0.434	Not significant
Model I	DER	0.008	0.004	0.194	2.034	0.045	Positive and significant
Model I	ROA	0.003	0.006	0.047	0.507	0.613	Not significant
Model I	Firm Size	0.022	0.029	0.073	0.759	0.450	Not significant
Model II	Constant	-1.214	0.894	—	-1.358	0.177	Not significant
Model II	DER × Managerial Ownership	0.0001	0.0001	0.009	0.112	0.911	No moderation
Model II	ROA × Managerial Ownership	0.0001	0.0001	0.025	0.296	0.768	No moderation
Model II	Firm Size × Managerial Ownership	0.001	0.001	0.078	0.807	0.422	No moderation

Dependent variable: Earnings Management measured using signed discretionary accruals (DA).

Source: Processed data using IBM SPSS Statistics, 2026.

Table 8. Model Summary and Coefficient of Determination

Model	Predictors	Adjusted	Standard Error of Estimate
Model I	DER, ROA, and Firm Size	0.214 0.046 0.019	0.9098
Model II	DER, ROA, Firm Size, Managerial Ownership, and three interaction terms	0.237 0.056 0.001	0.9111

Dependent variable: Earnings Management measured using signed discretionary accruals (DA).

Source: Processed data using IBM SPSS Statistics, 2026.

Table 8 shows that Model I had an R value of 0.214, indicating a weak overall relationship between DER, ROA, Firm Size, and Earnings Management. Its R^2 of 0.046 indicates that the predictors accounted for 4.6% of the observed variation in Earnings Management before adjustment. After considering the number of predictors, adjusted R^2 declined to 0.019. Thus, DER, ROA, and Firm Size

explained only 1.9% of the variation in Earnings Management, demonstrating that Model I had very limited explanatory power.

Model II had an R value of 0.237 and an R² of 0.056. The addition of Managerial Ownership and the three interaction terms increased the unadjusted R² by only 0.010, from 0.046 to 0.056. However, the adjusted R² declined from 0.019 to 0.001 after accounting for the additional predictors. Therefore, Model II explained only 0.1% of the variation in Earnings Management on an adjusted basis.

The decline in adjusted R², together with the increase in the standard error of estimate from 0.9098 to 0.9111, indicates that adding Managerial Ownership and the interaction terms did not meaningfully improve model performance. The small increase in unadjusted R² primarily reflects the mechanical addition of predictors rather than substantive moderating power. These findings are consistent with the nonsignificant interaction coefficients and provide no evidence that Managerial Ownership improved the explanation of Earnings Management.

4.1.7 F-Test

Table 9. F-Test Results for Regression Models I and II

Model	Source	Sum of Squares		Mean Square		
Model I	Regression	4.374	3	1.458	1.760	0.160
	Residual	86.202	104	0.829	—	—
	Total	90.576	107	—	—	—
Model II	Regression	5.095	7	0.728	0.870	0.534
	Residual	83.581	100	0.836	—	—
	Total	88.676	107	—	—	—

Model I predictors: DER, ROA, and Firm Size.

Model II predictors: DER, ROA, Firm Size, Managerial Ownership, and the three interaction terms. Dependent variable: Earnings Management measured using signed discretionary accruals (DA).

Source: Processed data using IBM SPSS Statistics, 2026.

Table 9 shows that Model I yielded $F(3,104) = 1.760$ with $p = 0.160$. Because the probability value exceeded 0.05, Model I was not statistically significant. Therefore, DER, ROA, and Firm Size did not jointly provide a statistically significant explanation of Earnings Management among the sampled energy-sector companies during 2023–2024. This overall result must be distinguished from the individual DER coefficient, which was significant at the 5% level. Model II produced $F(7,100) = 0.870$ with $p = 0.534$. Because $p > 0.05$, the model incorporating Managerial Ownership and the three interaction terms was also not statistically significant. Thus, the direct predictors, Managerial Ownership, and their interactions did not jointly provide a statistically significant explanation of Earnings Management. This result is consistent with the nonsignificant interaction coefficients and provides no evidence that Managerial Ownership functioned as a moderator.

The previous interpretation was incorrect because 0.534 is the probability value, not the calculated F-statistic. The correct F-statistic for Model II is 0.870, while the correct probability value is 0.534—not 0.000. References to Firm Value, PBV, and Firm Size as the moderator were removed because the dependent variable was Earnings Management and the moderating variable was Managerial Ownership. The reported ANOVA outputs nevertheless contain an unresolved inconsistency: the total sum of squares is 90.576 in Model I but 88.676 in Model II, even though both models are said to use the same dependent variable, sample size, and 108 observations. With the same outcome and analytic

sample, the total sum of squares should remain identical. The ANOVA output must therefore be regenerated from the verified dataset before these values are treated as final.

4.1.8 Partial Significance and Moderation Tests

The partial significance test examined the individual relationships of DER, ROA, and Firm Size with Earnings Management. The significance of the interaction terms was used to determine whether Managerial Ownership moderated the respective relationships. Hypotheses were evaluated at the 5% significance level.

Table 10. Partial Significance and Moderation Test Results

Hypothesis	Tested Relationship	B	Standard Error	Standardized Beta			Decision
H1	DER → Earnings Management	0.008	0.004	0.194	2.034	0.045	Supported
H2	ROA → Earnings Management	0.003	0.006	0.047	0.507	0.613	Rejected
H3	Firm Size → Earnings Management	0.022	0.029	0.073	0.759	0.450	Rejected
H4	DER × Managerial Ownership → Earnings Management	0.0001	0.0001	0.009	0.112	0.911	Rejected
H5	ROA × Managerial Ownership → Earnings Management	0.0001	0.0001	0.025	0.296	0.768	Rejected
H6	Firm Size × Managerial Ownership → Earnings Management	0.001	0.001	0.078	0.807	0.422	Rejected

Dependent variable: Earnings Management measured using signed discretionary accruals (DA).

Source: Processed data using IBM SPSS Statistics, 2026.

DER had a positive and statistically significant relationship with Earnings Management ($B=0.008$, $t=2.034$, $p=0.045$). Holding ROA and Firm Size constant, higher debt relative to equity was associated with higher signed discretionary accruals. Therefore, H1 was supported at the individual-coefficient level. However, this result should be interpreted cautiously because the overall direct-effect model was not statistically significant. It also does not independently prove that managers adjusted earnings specifically to avoid debt-covenant violations.

ROA had a positive but nonsignificant coefficient ($B = 0.003$, $t = 0.507$, $p = 0.613$); therefore, H2 was rejected. Firm Size was also positively but nonsignificantly associated with Earnings Management ($B=0.022$, $t=0.759$, $p=0.450$), resulting in the rejection of H3. Thus, the available observations did not provide sufficient evidence that profitability or company scale was associated with signed discretionary accruals.

The interaction between DER and Managerial Ownership was not statistically significant ($B = 0.0001$, $t = 0.112$, $p = 0.911$); therefore, H4 was rejected. Managerial Ownership did not significantly strengthen or weaken the relationship between DER and Earnings Management. The significant direct DER coefficient must not be interpreted as evidence of moderation because moderation depends on the significance of the interaction term.

The interaction between ROA and Managerial Ownership was nonsignificant ($B=0.0001$, $t=0.296$, $p=0.768$), leading to the rejection of H5. Similarly, the interaction between Firm Size and Managerial Ownership was not statistically significant ($B=0.001$, $t=0.807$, $p=0.422$); therefore, H6 was rejected. Overall, none of the interaction terms provided evidence that Managerial Ownership moderated the examined relationships.

4.2 Discussion

The findings provide limited evidence of a positive relationship between the Debt-to-Equity Ratio and Earnings Management. This result indicates that energy companies that rely more heavily on debt may face greater financial reporting pressure because managers must maintain creditor confidence, satisfy contractual requirements, and demonstrate an acceptable financial position. From the perspective of Agency Theory, information asymmetry allows managers to exercise accounting discretion when their interests differ from those of creditors and shareholders. Nevertheless, the finding should not be interpreted as proof that managers deliberately manipulated earnings to avoid debt-covenant violations. The direct DER coefficient was supported only at the individual level, whereas the direct-effect model was not significant overall and had very weak explanatory power. Therefore, DER represents a limited association rather than a dominant determinant of Earnings Management.

The positive DER finding is consistent with Kharomah (2022), Sari and Susilowati (2021), Muhtadin and Hasnawati (2022), and Sitanggang and Purba (2024), who reported that higher leverage is associated with greater earnings-management activity. It also aligns with Wahyuningtyas *et al.*, (2025), who found that DER was associated with Earnings Management among Indonesian energy companies. However, the result differs from Atmamiki and Priantinah (2023), who reported that leverage did not affect Earnings Management. These differences suggest that the consequences of debt depend on creditor monitoring, covenant structure, financing composition, company-specific risk, and the institutional setting. For practitioners, the result emphasizes the importance of proportional debt management and transparent communication with creditors, although reducing leverage alone cannot ensure higher financial-reporting quality.

ROA was not associated with Earnings Management, indicating that differences in profitability did not systematically correspond with discretionary accruals during the observation period. Profitable companies may have fewer incentives to adjust earnings because their reported performance already satisfies stakeholders' expectations. Conversely, strong monitoring, audit scrutiny, and limited accounting flexibility may prevent managers from translating performance pressure into discretionary accruals. The finding contradicts Asyati and Farida (2020), Dewi and Nurhayati (2022), and Nugraha (2017), who identified a positive relationship between profitability and Earnings Management. However, it supports Wahyuningtyas *et al.*, (2025), who found that ROA did not affect Earnings Management on its own in energy companies. Thus, profitability should not be treated as an automatic indicator of either the presence or absence of earnings-management practices.

Firm Size was also not associated with Earnings Management. This result indicates that organizational scale alone did not determine the use of discretionary accruals among the sampled companies. Larger energy companies may engage in more complex transactions and accounting estimates, which may increase managerial discretion. At the same time, they are generally subject to stronger scrutiny from auditors, regulators, analysts, creditors, and investors. These opposing mechanisms may offset each other, producing no systematic relationship. The finding differs from

Atmamiki and Priantinah (2023), who identified a positive relationship, but is consistent with Lusiani and Khafid (2022) and Wahyuningtyas *et al.*, (2025), who found no significant role for Firm Size. Consequently, total assets capture organizational scale but may not adequately represent the governance and reporting conditions that shape discretionary accruals.

Managerial Ownership did not moderate the relationship between DER and Earnings Management. Although Agency Theory proposes that managerial share ownership can align managers' interests with those of shareholders, such ownership may have been insufficient to change managers' responses to debt pressure. Creditor requirements arise from contractual obligations that remain binding regardless of whether managers own company shares. This finding differs from Rely (2022), who found that Managerial Ownership weakens the influence of leverage on Earnings Management, but is consistent with Wardana *et al.*, (2024) and Puspita *et al.*, (2025), who reported that Managerial Ownership did not moderate the leverage–earnings management relationship. The result implies that managerial share ownership cannot be assumed to substitute for creditor oversight, audit quality, or effective internal control.

Managerial Ownership also failed to moderate the relationships of ROA and Firm Size with Earnings Management. Regarding ROA, managerial share ownership did not transform profitability into either stronger or weaker reporting discretion, possibly because profitability was not directly associated with Earnings Management in the first place. Regarding Firm Size, managerial ownership did not alter the balance between organizational complexity and external monitoring. These results support Wardana *et al.*, (2024), who found no moderating role for Managerial Ownership in the relationships between profitability and Firm Size and Earnings Management. They are also consistent with Atmamiki and Priantinah (2023) and Puspita *et al.*, (2025), who reported ineffective moderation in comparable relationships. Therefore, the alignment mechanism proposed by Agency Theory was not empirically supported in this setting.

Taken together, neither the direct-effect model nor the moderation model provided a significant overall explanation of Earnings Management, and both demonstrated very weak explanatory power. The inclusion of Managerial Ownership and the interaction terms did not meaningfully improve the model. These findings indicate that discretionary accruals in energy companies are likely associated with factors not represented in the present specification, such as cash-flow conditions, sales growth, audit quality, board effectiveness, ownership concentration, covenant intensity, commodity-price volatility, regulatory pressure, taxation, and company-specific operating risks. Accordingly, the study offers only limited support for the proposed Agency Theory mechanism: debt pressure appears relevant at the individual-coefficient level, but profitability, company scale, and managerial ownership do not provide a comprehensive explanation of Earnings Management. The conclusions should therefore remain bounded by the short observation period, the restriction to profitable companies, the limited model fit, and the sensitivity of discretionary-accrual estimates to data scaling and measurement choices.

5. Concluding Remarks and Recommendation

This study examined whether DER, ROA, and Firm Size were associated with Earnings Management and whether Managerial Ownership moderated these relationships among 54 energy-sector companies listed on the Indonesia Stock Exchange during 2023–2024, comprising 108 firm-year observations.



Earnings Management was represented by signed discretionary accruals estimated through the complete Modified Jones procedure, which separates total accruals into nondiscretionary and discretionary components. The findings show that neither the direct-effect model nor the moderation model was statistically significant overall. At the individual-coefficient level, only DER had a positive relationship with Earnings Management, whereas ROA and Firm Size were not statistically significant. Managerial Ownership did not moderate the relationships of DER, ROA, or Firm Size with Earnings Management. Therefore, the findings provide only limited evidence concerning the role of debt and do not support the proposed moderating function of Managerial Ownership.

The study contributes to Agency Theory by showing that the alignment mechanism associated with managerial share ownership is not necessarily sufficient to alter financial-reporting responses to debt, profitability, or company scale. The positive DER coefficient suggests that debt pressure may be relevant. However, its theoretical importance should not be overstated, given that the overall model was nonsignificant and had very weak explanatory power. In practice, managers should maintain a proportional financing structure, strengthen internal controls, and ensure the consistent application of accounting policies. Investors and creditors should evaluate accrual quality, cash-flow conditions, debt structure, audit quality, and broader governance arrangements rather than relying solely on profitability, company size, or managerial share ownership. Regulators should encourage transparent ownership disclosure and consistent reporting of the financial-statement components required to evaluate discretionary accruals.

The study is limited by its two-year observation period, its focus on profitable energy-sector companies, and the very low explanatory power of both models. The findings may not represent loss-reporting companies, other sectors, or longer economic cycles. In addition, discretionary-accrual estimates are sensitive to data scaling, denominator selection, extreme observations, and the specification used to estimate normal accruals. Future research should extend the observation period, incorporate loss-reporting companies, apply panel estimators that address firm-level dependence and year effects, and conduct robust sensitivity analyses for influential observations. Subsequent studies may also examine audit quality, institutional ownership, board and audit committee effectiveness, covenant intensity, free cash flow, sales growth, commodity price volatility, executive compensation, political connections, and macroeconomic conditions to develop a more comprehensive explanation of Earnings Management.

Statement of Use of Generative AI

During the preparation of this work, the author used generative artificial intelligence tools to support the scientific writing process. Grammarly was used to check grammar, refine writing style, and improve clarity in scientific writing. All interpretations, analyses, and conclusions presented in this study are the sole responsibility of the author.

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Corresponding author

Tassha Eddryawati can be contacted at: 211310228@unmuhpnk.ac.id