The Effect of Financial Distress and Sustainability Reporting Disclosure on Firm Value with Earnings Management as a Mediating Variable: A Study of Energy Sector Companies on the Indonesia Stock Exchange, 2021–2024

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DOI: https://doi.org/10.51244/IJRSI.2026.1309000290

Received: 10 October 2026; Accepted: 15 October 2026; Published: 26 October 2026

ABSTRACT

This study examines the effect of financial distress and sustainability reporting disclosure on firm value, with earnings management as a mediating variable, among energy sector companies listed on the Indonesia Stock Exchange. The study is motivated by the inconsistent results of prior research, while the energy sector faces commodity price pressure and strong demands for environmental information disclosure. The study uses a quantitative causal associative approach. The sample was determined through purposive sampling, yielding 31 companies with 124 firm-year observations over the 2021–2024 period. Financial distress is measured with the Altman Z-Score, sustainability reporting disclosure with a disclosure index based on GRI indicators, earnings management with discretionary accruals from the Modified Jones model, and firm value with Tobin's Q. The data were analyzed using multiple regression, path analysis, and the Sobel test with IBM SPSS 25 at a 5% significance level. The results show that financial distress is positively and significantly associated with earnings management, whereas sustainability reporting disclosure has no significant effect on earnings management. Financial distress has no significant effect on firm value. Sustainability reporting disclosure and earnings management are each positively and significantly associated with firm value. The Sobel test shows that earnings management does not mediate the effect of either financial distress or sustainability reporting disclosure on firm value. These findings indicate that financial pressure is more closely related to earnings reporting behavior than to market valuation, whereas investors assess sustainability disclosure directly. For management, the results encourage strengthening financial fundamentals and the quality of sustainability reporting, while for regulators, oversight of earnings quality remains necessary. This study adds empirical evidence on a mediation pathway that has rarely been tested in this sector. The explanatory power of the models is low, so the findings should be interpreted with caution.

Keywords: Financial distress, sustainability reporting disclosure, earnings management, firm value, energy sector

INTRODUCTION

Firm value is commonly understood as a reflection of investors' assessment of an entity's performance and prospects, which for a listed company is read through its share price in the capital market (Pranoto & Marsono, 2023). This assessment does not arise on its own. It is shaped by the financial condition visible in the reports, by the quality of the information provided by management, and by the market's belief that the reported figures truly describe the company's situation. Internal factors that influence how investors read a company have therefore remained a continuing subject of study in financial accounting.

The energy sector on the Indonesia Stock Exchange (IDX) provides a context worth examining for this issue. The energy sector index weakened for a time in 2023 and then recovered with a 28.01% gain in 2024, while the Jakarta Composite Index (JCI) corrected from 7,272.80 at the end of 2023 to 7,079.91 in 2024. The sector-level recovery, it turns out, is not always visible at the firm level. For example, the Tobin's Q of PT Indo Tambangraya

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XIII Issue IX September 2026

Megah Tbk rose to 1.32 in 2022 and then fell to 1.04 in 2023 and 0.97 in 2024. This gap between the direction of the sector and the direction of the firm suggests that market valuation is also determined by factors inherent to individual companies.

One factor often associated with firm value is internal financial condition. Financial distress describes a situation in which a company has difficulty meeting its obligations and is potentially heading toward bankruptcy (Revanza & Wahyuni, 2023). The market generally responds to such a situation cautiously, but the empirical evidence is mixed. Heling and Lastanti (2024) report a negative effect of financial distress on firm value, whereas Tanjung (2023) finds no meaningful effect. Similar differences appear for sustainability disclosure. Natalia and Soenarno (2021) obtain a positive effect of sustainability reporting disclosure on firm value, but Ray and Septina (2021) find no significant effect. For earnings management, Juliana and Wijaya (2022) find a negative direction, whereas Wahyuningsih et al. (2018) find a positive direction.

This inconsistency gives reason to examine the relationships among the four variables within a single framework. Agency theory predicts that financial pressure widens the conflict of interest between managers and shareholders, and that this conflict can be channeled through the management of reported earnings. Signaling theory, on the other hand, views sustainability disclosure as a nonfinancial signal that reduces information asymmetry. Puspitasari and Yusuf (2023) even position sustainability reporting as a mechanism that can restrain managers' opportunistic behavior. If these views are correct, earnings management occupies a strategic position, namely as a pathway that may connect financial pressure and information disclosure to market valuation.

To the authors' knowledge, studies that position earnings management as a mediating variable for financial distress and sustainability reporting disclosure among energy companies in Indonesia remain limited. This study fills that gap with seven sequentially arranged research questions: the effect of financial distress and sustainability reporting disclosure on earnings management; the effect of all three variables on firm value; and the mediating role of earnings management in the relationship of financial distress and sustainability reporting disclosure with firm value among energy sector companies listed on the IDX during 2021–2024.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Agency theory and signaling theory

Agency theory describes a contractual relationship in which owners (principals) delegate some authority to managers (agents) to run the company (Jensen & Meckling, 1976). Principals usually do not have information as complete as that of agents regarding the company's performance and prospects. This information gap opens the possibility for agents to act in their own interest, for example by presenting reports that do not fully reflect the actual situation.

Signaling theory starts from the same problem but views it from the side of the information sender. According to Spence (1973), signals are needed to reduce information asymmetry, and the party receiving the signal interprets it as an indication of the sender's quality. The review by Connelly et al. (2011) emphasizes that the value of a signal depends on its credibility. In the corporate context, financial reports and sustainability reports both function as signals, and investors use both to assess the company's prospects.

Firm value

Firm value is the result of the market's assessment of a company's ability to create economic value over time. For investors, a high value signals confidence in the company's prospects (Pranoto & Marsono, 2023). Tobin's Q is widely used to measure it because this ratio compares market value with asset value and thus contains an element of market assessment that is absent from purely accounting-based measures (Heling & Lastanti, 2024).

Financial distress

Financial distress begins with liquidity pressure and a decline in asset value that make it difficult for a company to meet its financial obligations (Tanjung, 2023). Its impact extends to relationships with suppliers, creditors, and customers, and the condition is typically marked by weakening cash flow (Revanza & Wahyuni, 2023). One

tool for predicting it is the Altman Z-Score, which combines several weighted financial ratios into a single score (Pertiwi & Putri, 2021).

Sustainability reporting disclosure

Sustainability reporting disclosure is the disclosure of a company's economic, environmental, and social performance according to the triple bottom line principle (Septina & Idawati, 2023). In Indonesia, the quality of this disclosure is often measured with an index referring to the Global Reporting Initiative (GRI) standards (Manurung et al., 2025). Such reports are also regarded as a means of accountability because they show how a company manages the impact of its operations on the environment and society (Puspita & Jasman, 2022).

Earnings management

According to Healy and Wahlen (1999), earnings management occurs when managers use judgment in financial reporting or in structuring transactions to alter reported earnings. This practice arises from agency conflict and information asymmetry (Nurmaya et al., 2025). It can take the form of managing discretionary accruals, for example through estimates of depreciation and allowances for receivables, or of manipulating real activities such as accelerating sales (Mufa, 2023; Roychowdhury, 2006). The ethical problem remains because the resulting reports reflect the company's condition less faithfully (Abdullah, 2013; Abdullah & Suardi, 2017).

Financial distress and earnings management

Within the framework of agency theory, a company under financial pressure puts managers in a difficult position. They are asked to maintain performance and business continuity while the company's actual condition is deteriorating. The incentive to present earnings that look better then grows stronger. Faukha (2024) finds a significant positive effect of financial distress on earnings management, and this finding is in line with Rasfiud et al. (2022) and Agustina et al. (2023), who point to financial pressure as a driver of earnings management decisions. Not all studies agree. Heling and Lastanti (2024) find an effect that is not always significant, especially in companies with strong governance. Based on most of the evidence and the agency logic above, the first hypothesis is formulated as follows.

H1: *Financial distress has a positive effect on earnings management.*

Sustainability reporting disclosure and earnings management

Sustainability disclosure can be viewed as part of the monitoring mechanism. More open information narrows information asymmetry and adds accountability pressure on managers, so the room for opportunistic action becomes narrower. Ramadanti (2025) finds that energy companies in ASEAN with higher sustainability disclosure tend to record lower earnings management. On the other hand, Wibowo and Aryanindita (2025) find no significant effect, and Sari and Utomo (2019) suspect that a dominant profit orientation means disclosure is not yet sufficient to suppress earnings manipulation. The second hypothesis follows the monitoring logic above.

H2: *Sustainability reporting disclosure has a negative effect on earnings management.*

Financial distress and firm value

From the perspective of signaling theory, information about financial difficulty conveys a bad signal about prospects and business continuity. Investors who read that signal tend to avoid risk and lower their valuation (Katrina Valensia, 2019). Heling and Lastanti (2024) and Merlinda and Putri (2024) find a negative direction, that is, the heavier the financial pressure, the lower the firm value. The third hypothesis follows this direction.

H3: *Financial distress has a negative effect on firm value.*

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Sustainability reporting disclosure and firm value

Consistent and credible sustainability disclosure demonstrates transparency and long-term commitment, and investors read both as positive signals. Natalia and Soenarno (2021), Karya and Mimba (2021), Iskandar et al. (2023), and Putri and Herawaty (2024) all report a positive relationship between sustainability disclosure and firm value. Different results are reported by Nisaih and Prijanto (2023) and Ray and Septina (2021), who state that sustainability information has not become a primary consideration for investors. The fourth hypothesis is directed toward the former view.

H4: *Sustainability reporting disclosure has a positive effect on firm value.*

Earnings management and firm value

Investors receive management's reports without being able to examine the entire process by which they are prepared, so reported earnings are often used as an indicator of performance. In that situation, managed earnings can raise market valuation, at least temporarily. Riswandi and Yuniarti (2020), Lestari and Pamudji (2013), and Wahyuningsih et al. (2018) find a positive effect of earnings management on firm value. Juliana and Wijaya (2022), by contrast, find a negative direction, while Subekti et al. (2016) and Karianga and Kasingku (2022) find no meaningful effect. This study follows the first group of studies.

H5: *Earnings management has a positive effect on firm value.*

The mediating role of earnings management

If financial pressure drives managers to manage earnings (H1), and managed earnings then affect market valuation (H5), then earnings management can serve as a pathway linking financial distress to firm value. Agustina et al. (2023) test this sequence by including earnings management in a firm value model together with financial distress. The same applies to sustainability disclosure. If disclosure limits the room for earnings management (H2), its effect on firm value can run partly through earnings management. Ortiz-Martínez et al. (2023) show that the relationship between nonfinancial reporting and company performance can indeed involve mediating effects. The last two hypotheses are formulated from these considerations.

H6: *Earnings management mediates the effect of financial distress on firm value.*

H7: *Earnings management mediates the effect of sustainability reporting disclosure on firm value.*

The hypothesized relationships among the variables are summarized in Figure 1.

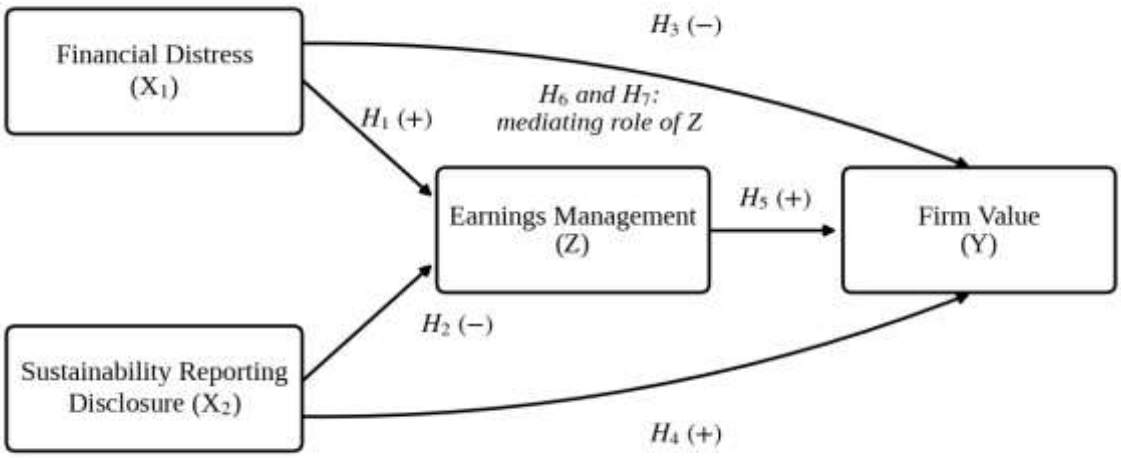


Figure 1. Conceptual Framework of the Study

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RESEARCH METHOD

Research design

This study uses a quantitative approach with a causal associative design, that is, a design that tests hypothesized relationships among variables, either directly or through a mediating variable (Sugiyono, 2013). Because the data are observational, the findings describe statistical associations rather than causal effects. This design is appropriate because the research questions do not stop at direct effects but also ask whether earnings management serves as a channel through which financial distress and sustainability reporting disclosure affect firm value.

Population and sample

The population of the study is all energy sector companies listed on the IDX during 2021–2024, namely 90 companies. The sample was selected using purposive sampling according to three criteria: being listed on the IDX continuously throughout the study period, publishing annual reports for all years of observation, and providing the information needed to measure all variables. Table 1 shows that the selection process left 31 companies, so the total number of observations is 124 firm-years.

Table 1. Sample Selection Criteria

No	Criteria	Number of companies
1	Energy sector companies listed on the IDX	90
2	Companies not listed on the IDX continuously during 2021–2024	(24)
3	Companies that did not provide annual reports for 2021–2024 on the IDX or the company's official website	(18)
4	Companies that did not provide the information needed to measure the research variables	(17)
5	Companies that meet the criteria	31
6	Total observations (31 companies × 4 years)	124

Source: Processed data (2025)

Type, source, and collection of data

The data used are secondary data in the form of the companies' financial statements, annual reports, and sustainability reports. The data were collected through documentation from the official IDX website, each company's website, and the National Center for Sustainability Reporting (NCSR) website for sustainability reports.

Operational definitions of variables

Firm value (Y) is measured with Tobin's Q, namely the sum of the market value of equity and total liabilities divided by total assets (Heling & Lastanti, 2024). The market value of equity is calculated as the number of shares outstanding multiplied by the closing price. Financial distress (X_1) is measured with the modified Altman Z-Score:

$$Z'' = 6.56X_1 + 3.26X_2 + 6.72X_3 + 1.05X_4$$

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where X_1 is working capital to total assets, X_2 is retained earnings to total assets, X_3 is earnings before interest and taxes to total assets, and X_4 is the book value of equity to total liabilities. A company is in the distress zone if $Z'' < 1.1$, in the gray zone if $1.1 \leq Z'' \leq 2.6$, and in the safe zone if $Z'' > 2.6$. A higher score indicates a healthier financial condition, so the sign of the coefficient in the regression model must be read in the opposite direction to the level of financial difficulty.

Sustainability reporting disclosure (X_2) is measured through content analysis of company reports using a list of GRI indicators. Indicators that are disclosed are scored 1 and those that are not disclosed are scored 0. The index is calculated as:

$$SRDI_{it} = \Sigma X_{it} / n$$

where ΣX_{it} is the number of indicators disclosed by company *i* in year *t* and *n* is the number of GRI indicators used. The index is expressed as a percentage ranging from 0 to 100 ($\Sigma X/n \times 100$), and a larger value indicates more complete disclosure.

Earnings management (Z) is measured with discretionary accruals according to the Modified Jones model. Total accruals are calculated as the difference between net income and operating cash flow ($TA_{it} = NI_{it} - CFO_{it}$). The model parameters are estimated using ordinary least squares:

$$TA_{it}/A_{it-1} = \beta_1(1/A_{it-1}) + \beta_2[(\Delta Rev_{it} - \Delta Rec_{it})/A_{it-1}] + \beta_3(PPE_{it}/A_{it-1}) + \beta_4 ROA_{it} + \varepsilon_{it}$$

Nondiscretionary accruals (NDA) are obtained by inserting the estimated parameters into the equation above, and discretionary accruals are calculated as $DA_{it} = TA_{it}/A_{it-1} - NDA_{it}$. In this equation, A is total assets, ΔRev is the change in revenue, ΔRec is the change in net receivables, and PPE is fixed assets.

Data analysis technique

The analysis was carried out with IBM SPSS 25 in several stages. The first stage is descriptive statistics. The second stage is the classical assumption tests, covering the residual normality test with Kolmogorov-Smirnov, the multicollinearity test through tolerance and the variance inflation factor (VIF), the heteroscedasticity test using the Glejser method, and the autocorrelation test with the Durbin-Watson statistic. The third stage is hypothesis testing using multiple regression and path analysis on two structural equations:

$$EM = p_1FD + p_2SRD + \varepsilon_1 \quad \text{(Model 1)}$$

$$FV = p_3FD + p_4SRD + p_5EM + \varepsilon_2 \quad \text{(Model 2)}$$

Direct effects were tested with the t-test at a 5% significance level. The mediating role was tested with the Sobel test, which assesses the significance of the indirect effect through the product of path coefficients *a* (from the independent variable to the mediator) and *b* (from the mediator to the dependent variable) relative to its standard error. Mediation is deemed present if the calculated Z value exceeds the critical value of 1.96.

RESULTS AND DISCUSSION

Descriptive statistics

Table 2 presents the descriptive statistics for the 124 observations. The mean Altman Z-Score is 19.83, with a minimum value of 5.24. Because all observations are above the 2.6 threshold, no sample company is classified as at risk of distress according to the Altman classification. The financial distress variable is therefore better read as a continuous measure of financial health, with lower scores indicating greater pressure. The sustainability disclosure index ranges from 11.00 to 69.00 with a mean of 40.00, which shows that the completeness of disclosure varies considerably across companies. Discretionary accruals have a mean of 7.66, with a spread from −9.47 to 24.60.

Table 2. Descriptive Statistics Results

Variable	N	Minimum	Maximum	Mean	Standard deviation
Financial distress (Z-Score)	124	5.24	34.47	19.83	7.36
Sustainability reporting disclosure	124	11.00	69.00	40.00	18.10
Firm value	124	33.00	199.00	118.51	47.24
Earnings management	124	−9.47	24.60	7.66	9.27

Source: SPSS 25 output, processed data (2026)

Classical assumption tests

A summary of the classical assumption tests is presented in Table 3. The tolerance values in both models are greater than 0.10 and the VIF values are less than 10, so no multicollinearity was found. The significance values of the Glejser test for all variables are above 0.05, so heteroscedasticity was likewise not found. The residuals of Model 1 are normally distributed (significance 0.200). The residuals of Model 2 fail the Kolmogorov-Smirnov test (significance 0.000), although the histogram approximates a bell shape. The Durbin-Watson values for Model 1 (1.464) and Model 2 (0.656) are below the lower bound (dL) of the Durbin-Watson table for this sample size, which indicates positive autocorrelation. The last two findings should be kept in mind when reading the hypothesis test results and are discussed again in the limitations section.

Table 3. Summary of Classical Assumption Test Results

Test	Model 1 (FD, SRD → EM)	Model 2 (FD, SRD, EM → FV)
Kolmogorov-Smirnov (Asymp. Sig.)	0.200	0.000
Tolerance	0.986–0.996	0.980–0.994
VIF	1.024–1.064	1.019–1.146
Glejser (Sig.)	0.106–0.347	0.129–0.797
Durbin-Watson	1.464	0.656

Source: SPSS 25 output, processed data (2026)

Hypothesis testing results

In Model 1, financial distress and sustainability reporting disclosure explain 1.9% of the variation in earnings management ($R^2 = 0.019$; adjusted $R^2 = 0.002$). The coefficient of financial distress is negative and significant ($t = -2.471$; $p = 0.015$). Because this variable is measured with a Z-Score on which higher values indicate healthier firms, the negative sign means that the greater the financial pressure, the greater the earnings management. Hypothesis H1 is accepted. The coefficient of sustainability reporting disclosure is not significant ($t = -1.404$; $p = 0.163$), so H2 is rejected.

In Model 2, the three variables explain 4.4% of the variation in firm value ($R^2 = 0.044$; adjusted $R^2 = 0.020$). Financial distress has no significant effect on firm value ($t = -1.571$; $p = 0.119$), so H3 is rejected. Sustainability reporting disclosure and earnings management are each positively and significantly associated with firm value at the 5% level, so H4 and H5 are accepted. The path error coefficients are 0.990 for Model 1 and 0.978 for Model 2, which reinforces that most of the variation is explained by factors outside the model.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XIII Issue IX September 2026

The Sobel test results show a Z value of 1.510 (p = 0.130) for the path financial distress → earnings management → firm value and 1.512 (p = 0.130) for the path sustainability reporting disclosure → earnings management → firm value. Both values are below the critical value of 1.96, so earnings management is not shown to mediate either relationship, and H6 and H7 are rejected. Table 4 summarizes the decisions on the seven hypotheses.

Table 4. Summary of Hypothesis Testing Results

Code	Relationship tested	Hypothesized direction	Decision
H1	Financial distress → Earnings management	Positive (negative on Z-Score)	Accepted
H2	Sustainability reporting disclosure → Earnings management	Negative	Rejected
H3	Financial distress → Firm value	Negative (positive on Z-Score)	Rejected
H4	Sustainability reporting disclosure → Firm value	Positive	Accepted
H5	Earnings management → Firm value	Positive	Accepted
H6	Financial distress → Earnings management → Firm value	Mediation	Rejected
H7	Sustainability reporting disclosure → Earnings management → Firm value	Mediation	Rejected

Source: Processed data (2026)

Financial distress and earnings management

The finding that financial pressure is followed by greater earnings management is consistent with agency theory. When a company faces difficulties, managers have an interest in maintaining the image of performance in front of shareholders, creditors, and the market, and discretionary accruals provide room for doing so. This condition makes particular sense for energy companies, which require large amounts of capital and depend on external financing. When access to funding and relationships with creditors are threatened, the temptation to present earnings that look better becomes greater. This result supports Faukha (2024) and Rasfiud et al. (2022), but differs from Heling and Lastanti (2024), who found no significant effect. The difference may stem from the strength of governance and oversight in the respective samples, as hinted at by Merlinda and Putri (2024).

Sustainability reporting disclosure and earnings management

Sustainability disclosure is not shown to suppress earnings management. One explanation lies in the content of the reports themselves. Sustainability reports speak about economic, environmental, and social performance, whereas earnings management works through the accounting policies and estimates that determine the earnings figure. These two things run on different tracks, so a company can report sustainability fully without changing how it presents its earnings. Disclosure may also be made to meet regulatory requirements and improve image, not to restrain managers' behavior. This finding is in line with Wibowo and Aryanindita (2025) but contrary to Ramadanti (2025). For agency theory, this result means that the monitoring function attached to sustainability reporting has not been demonstrated in the Indonesian energy sector during the observed period.

Financial distress and firm value

Financial pressure has no significant effect on firm value. This result is in line with Tanjung (2023) but not with Merlinda and Putri (2024). Two explanations can be offered. First, the research sample contains no companies in the distress zone according to the Altman Z-Score, so the variation in financial pressure that the market could

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XIII Issue IX September 2026

read as a bad signal is relatively narrow. Second, investors in capital-intensive sectors usually weigh many things at once, including commodity prices, business prospects, earnings capacity, and survival strategy. In such considerations, a financial health score is only one input. For signaling theory, this finding indicates that financial distress within the observed range is not yet a strong enough signal to shift market valuation.

Sustainability reporting disclosure and firm value

Sustainability disclosure is positively and significantly associated with firm value. This finding supports signaling theory: a complete report tells the market that the company pays attention to its environmental and social impact and has a long-term orientation, and that belief is reflected in a higher valuation. For energy companies, whose activities directly intersect with the environment and society, this kind of disclosure carries more weight than in other sectors. The result is consistent with Natalia and Soenarno (2021), Karya and Mimba (2021), and Putri and Herawaty (2024), and differs from Ray and Septina (2021), who found no significant effect. The difference may be related to the quality of disclosure, sample characteristics, and the extent to which investors give weight to nonfinancial information.

Earnings management and firm value

Earnings management is positively and significantly associated with firm value. This finding can be read through signaling theory. Investors in the energy sector during 2021–2024 appear to have responded to reported earnings figures as an indicator of performance, and earnings that look good are rewarded by the market without in-depth examination of their quality. This result is in line with Riswandi and Yuniarti (2020), Lestari and Pamudji (2013), and Wahyuningsih et al. (2018), and differs from Juliana and Wijaya (2022), who found a negative direction. This positive relationship must not be interpreted as a justification for earnings management practices. The effect is visible in the short term, whereas the ethical consequences and the risk of losing reporting credibility are felt only later (Abdullah, 2013).

The mediating role of earnings management

Earnings management does not mediate the effect of either financial distress or sustainability reporting disclosure on firm value. In other words, the pathway anticipated through agency theory, namely financial pressure triggering earnings management that then affects market valuation, is not shown in these data. For financial distress, the effect on firm value is insignificant both directly and through earnings management. For sustainability reporting disclosure, the effect on firm value runs directly and does not depend on earnings reporting behavior. Investors appear to assess sustainability information disclosure on its own, without linking it to the company's earnings policy. This result suggests that for energy companies in 2021–2024, investor decisions rest more on company fundamentals than on the earnings management behavior arising from financial pressure.

CONCLUSION

This study examines the effect of financial distress and sustainability reporting disclosure on firm value with earnings management as a mediating variable among 31 energy sector companies on the IDX during 2021–2024. The results show that financial distress is positively and significantly associated with earnings management, whereas sustainability reporting disclosure has no significant effect on earnings management. Financial distress has no significant effect on firm value, whereas sustainability reporting disclosure and earnings management are each positively and significantly associated with firm value. The Sobel test shows that earnings management does not mediate the effect of either financial distress or sustainability reporting disclosure on firm value.

Theoretically, these findings are consistent with the explanation of agency theory regarding the relationship between financial pressure and earnings management, as well as the explanation of signaling theory regarding the role of sustainability disclosure and reported earnings in market valuation. The absence of mediation suggests that financial distress and sustainability reporting disclosure do not operate through earnings reporting behavior in influencing firm value. Practically, managers of energy companies should focus on strengthening financial fundamentals and the quality of sustainability reporting, rather than on earnings management, which is risky for

long-term credibility. Investors are advised to assess earnings quality and financial risk more carefully and to use sustainability indicators as a consideration. Regulators such as the Financial Services Authority (OJK) and the IDX can strengthen reporting standards and oversight so that company reports, including those of companies under financial pressure, continue to reflect the actual situation.

This study has several limitations. Its scope is limited to the energy sector over a four-year period, so generalization to other sectors should be made cautiously. Discretionary accruals from the Modified Jones model do not capture real activities manipulation. The explanatory power of the models is low (R^2 of 0.019 and 0.044), and the assumption tests show non-normally distributed residuals in Model 2 and indications of autocorrelation in both models, so the test results should be interpreted with caution. Moreover, the study did not model the panel structure of the data (repeated observations of the same firms) and relied on conventional regression and the Sobel test for mediation, so the standard errors and significance levels should be interpreted with caution. No sample firm falls in the distress zone, which limits the variation available to assess financial distress. Future research can expand the sample to other sectors and lengthen the observation period, add variables such as corporate governance, profitability, leverage, and firm size, and use panel data estimators that handle autocorrelation.

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