

Do ESG and Earnings Management Influence Audit Opinions? Evidence from Indonesia Mining Sector

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ABSTRACT

This study examines how non-financial and financial signals influence the issuance of modified audit opinions in the Indonesian mining sector. In recent years, auditors have increasingly incorporated sustainability-related considerations into audit risk assessments, particularly in industries characterized by high environmental and regulatory risk. This research aims to investigate whether Environmental, Social, and Governance (ESG) performance and earnings management affect auditors' decisions to issue modified audit opinions. Using a quantitative causal research design, the study analyzes mining companies listed on the Indonesia Stock Exchange that are included in the Katadata ESG Index during the observation period. Modified audit opinion serves as the dependent variable. At the same time, ESG performance and discretionary accrual-based earnings management are the main independent variables, with firm size and leverage included as control variables. Given the relatively low occurrence of modified audit opinions, the empirical analysis employs Firth Logistic Regression to address rare-event bias. The results show that ESG performance has a significant negative association with the likelihood of receiving a modified audit opinion, indicating that auditors perceive stronger sustainability and governance practices as signals of lower audit risk. In contrast, earnings management does not significantly affect audit opinion outcomes. These findings suggest that in high-risk industries such as mining, auditors place greater reliance on credible non-financial signals related to sustainability and governance than on accrual-based financial signals when forming audit opinions.

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1. Introduction

Audit opinion is the auditor's professional statement regarding the fairness of the financial statement presentation in accordance with applicable standards (Sari & Putra, 2021). As an essential communication mechanism, audit opinions convey signals about the reliability of financial statements and the risks that may affect stakeholders' decision-making. In the process, auditors

evaluate audit evidence to determine whether the financial statements contain material misstatements or significant uncertainties that require disclosure (Krismiaji & Sumayyah, 2023). If auditors identify material misstatements or are unable to obtain sufficient and appropriate audit evidence to support their conclusion, SA 705 (Revised 2021) requires a modification of the opinion. Thus, the opinion issued reflects auditors' risk perceptions formed throughout the audit process (Betri & Thalia, 2019; Matonti et al., 2024).

The auditor's decision is influenced by various signals that reflect the company's financial condition, reporting practices, and risk exposure. Auditors consider aspects such as solvency, profitability, the effectiveness of internal controls, and financial pressure that may increase the risk of material misstatement or uncertainty regarding going concern (Alshehadeh & Atieh, 2020; Sapiri, 2024). In addition, the consistency of reporting practices and management integrity strongly determines the level of transparency in financial statements. Inconsistencies or low reporting integrity may signal information distortion or fraud (Darmawan, 2023; Efunniyi et al., 2024). As risk-based audit approaches continue to evolve, auditors' considerations have expanded to include operational aspects of the company, including environmental and social compliance, which may signal the stability of business processes (Rakipi & D'Onza, 2024; Vo Van et al., 2025). Thus, the various signals generated by a company form the basis for auditors' assessment of audit risk before an opinion is issued.

Environmental, Social, and Governance (ESG) performance has become increasingly relevant to auditors as a non-financial signal of business risk, particularly in the Indonesian mining sector. Recent regulatory enforcement actions in Indonesia have highlighted this relevance, such as the suspension of 190 mining permits by the Ministry of Energy and Mineral Resources due to failures in meeting reclamation obligations and environmental compliance requirements, which disrupted operations and increased regulatory uncertainty for affected firms. Among these companies are coal and mineral miners such as PT Sato Mining and PT Anugrah Mining Persada, whose permits were suspended for failing to secure the environmental guarantees required under prevailing mining regulations. Such enforcement underscores that environmental noncompliance may lead to operational disruptions, reputational challenges, and heightened regulatory risk, which auditors must consider when planning and assessing audit engagements. From an auditing perspective, poorly managed environmental and social obligations signal potential weaknesses in governance, internal control, and enterprise risk management, making ESG issues increasingly critical in audit risk assessments (Broadstock et al., 2020).

Earnings management (EM), commonly measured by discretionary accruals, is a financial reporting signal that auditors closely examine when assessing reporting credibility and misstatement risk. Higher EM levels reflect greater managerial discretion in financial reporting, which may obscure underlying economic conditions and increase the likelihood of material misstatements, whereas lower EM levels indicate more stable, reliable reporting practices (Ben Amar & Turki, 2022). Empirical studies show that firms exhibiting aggressive EM tend to require more extensive audit procedures and face a higher probability of receiving a modified audit opinion (Tache, 2021). However, evidence remains mixed, as other studies find no significant association between EM and audit opinion outcomes, suggesting that auditors' responses to EM may vary across institutional settings and industry risk profiles (Monday Olade & Owa, 2025). This inconsistency suggests that the interpretation of EM as a risk signal may depend on broader contextual factors, such as governance quality and industry-specific characteristics.

Although Environmental, Social, and Governance (ESG) performance and earnings management (EM) have been widely examined individually, empirical evidence integrating both as signaling mechanisms within a unified framework, particularly in the Indonesian mining sector, remains limited. Prior studies rarely employ domestic sustainability indicators, such as the Katadata ESG Index (KESGI), and inconsistent findings on the relationship between EM and audit outcomes suggest that auditors' responses to financial signals remain poorly understood. Addressing these gaps, this study examines how non-financial signals (ESG performance) and financial signals (earnings management) jointly influence the likelihood of receiving a modified audit opinion in a high-risk industry. The novelty of this research lies in its integration of ESG and EM within a unified signaling-theory framework, its use of KESGI as a context-specific sustainability

measure for Indonesian mining firms, and its application of Firth Logistic Regression to account for the rare-event nature of modified audit opinions, thereby enhancing the robustness of the empirical analysis.

Signaling theory

Signaling theory, introduced by Spence (1973), explains how firms reduce information asymmetry by conveying observable signals through reporting choices and disclosure practices, a perspective further developed in subsequent literature (Fathi et al., 2024). These signals may take the form of financial indicators, such as earnings performance and earnings management practices, as well as non-financial indicators, including sustainability commitment and governance quality. In the auditing context, auditors interpret such signals to assess management integrity, the reliability of financial reporting, and the firm's overall risk profile (Juliyanti Sidik Tjan et al., 2024). Signals that reflect stability and transparency tend to reduce auditors' perceived audit risk, whereas signals indicating uncertainty increase professional skepticism and require more extensive audit procedures (Connelly et al., 2025). However, the informational value of a signal depends not only on its visibility but also on its credibility, as auditors evaluate whether signals are trustworthy, verifiable, and costly to manipulate, with external auditing playing a key role in enhancing signal credibility through independent verification (Akther & Xu, 2021).

1.1 Hypotheses Development

ESG Performance and Modified Audit Opinion

Based on signaling theory, companies convey information to reduce information asymmetry through observable signals that reflect their underlying quality and risk profile. In the auditing context, Environmental, Social, and Governance (ESG) performance serves as a non-financial signal that reflects governance effectiveness, sustainability commitment, and the robustness of risk management practices. Strong ESG performance signals operational stability and managerial integrity, which reduces auditors' perceived audit risk and the likelihood of identifying material misstatements (Broadstock et al., 2020; Moussa & Elmarzouky, 2024).

Al Amosh & Khatib (2022) document that firms with stronger ESG performance are less likely to receive modified audit opinions, as auditors associate robust sustainability practices with lower operational and reporting risk. Similar evidence is reported by Wang et al. (2023) and Zhang et al. (2024), who find that higher ESG performance signals stronger governance quality and reduces auditors' perceived audit risk. In the Indonesian context, Nur Laila & Nyoman Alit Triani (2025) also show that firms with superior ESG performance tend to receive fewer modified audit opinions. Accordingly, firms with stronger ESG performance are expected to face a lower probability of receiving a modified audit opinion.

H₁: ESG performance has a negative effect on the likelihood of a company receiving a modified audit opinion.

Earnings Management and Modified Audit Opinion

From a signaling perspective, earnings management (EM) represents a financial signal that reflects management's reporting behavior and the degree of accounting discretion exercised in financial reporting. High levels of EM signals, greater reporting flexibility, and potential opportunistic behavior may obscure a firm's underlying economic condition and increase information asymmetry between management and external stakeholders (Ben Amar & Turki, 2022; Connelly et al., 2025). For auditors, such signals raise concerns regarding reporting reliability and increase perceived audit risk.

Doan et al. (2021) find that firms engaging in higher levels of earnings management are more likely to receive modified audit opinions, as auditors respond to increased misstatement risk by exercising greater professional skepticism. Similar evidence is documented by Hu et al. (2022) and Imen & Anis (2021), who show that aggressive accrual-based earnings management increases auditors' concerns regarding reporting reliability and audit risk. In addition, Tache (2021) reports that higher levels of earnings management are associated with a greater likelihood of modified audit

opinions. Although some studies report mixed findings, the dominant empirical evidence indicates a positive association between earnings management and the likelihood of a modified audit opinion.

H₂: Earnings management has a positive effect on the likelihood of a company receiving a modified audit opinion.

To clarify the relationships among the variables examined, Figure 2 presents the research design underlying the empirical analysis. This design positions ESG performance and earnings management as signals auditors interpret during the risk assessment process, while firm size and leverage are included as control variables to enhance the model's robustness.

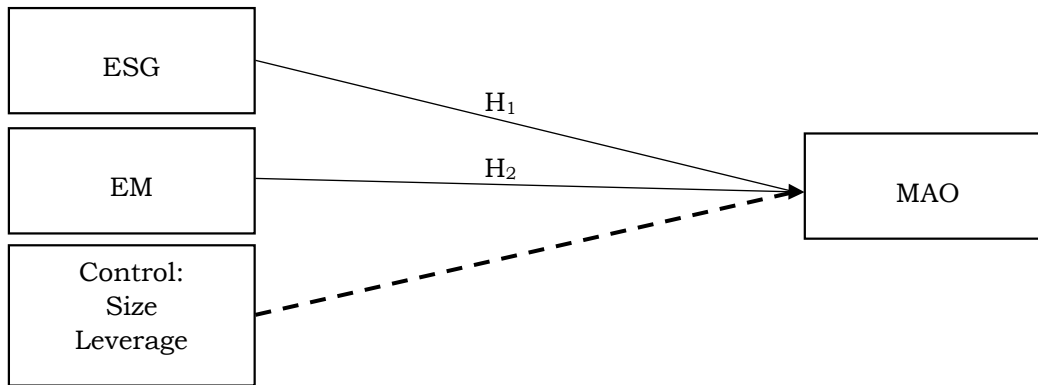


Figure 1. Research Design

2. Methods

This study employs a quantitative causal research design to examine the effect of Environmental, Social, and Governance (ESG) performance and earnings management (EM) on the likelihood of receiving a Modified Audit Opinion (MAO). The research focuses on mining-sector firms listed on the Indonesia Stock Exchange (IDX) that are included in the Katadata ESG Index (KESGI) during the 2022-2024 period. Data were collected from audited financial statements, independent auditor reports, and ESG performance published by KESGI.

A purposive sampling technique was applied to ensure that only companies with complete ESG performance, audited financial statements, and auditor opinions for all years of observation were included (Sekaran & Bougie Roger, 2016). The sample selection process is summarized in Table 1.

Table 1. Sample Selection Process

No	Description	Total
1	Mining-sector companies listed on the Indonesia Stock Exchange (IDX) and included in the Katadata ESG Index (KESGI) during 2022-2024	48
2	Companies lacking ESG data or complete audited financial statements during the observation period	(7)
3	Companies that exited the ESG index during part of the observation period	(1)
Number of companies meeting the criteria		40
Total observations for 3 years (2022-2024)		120

Source: Data Processed by Researcher (2025)

Variable Definition and Measurement

The dependent variable in this research is the Modified Audit Opinion (MAO). It is defined as a binary indicator that takes the value 1 when a firm receives any form of modified opinion, such as a qualified, adverse, or disclaimer opinion, and 0 when the auditor issues an unqualified opinion. This classification follows the audit opinion categories established in Audit Standards (SA) 700 and SA 705 (Institut Akuntan Publik Indonesia, 2021a, 2021b).

The first independent variable is Environmental, Social, and Governance (ESG) performance, measured as a company's sustainability score on a scale from 0 to 100, as issued by the Katadata ESG Index (KESGI), where higher scores indicate better sustainability performance and stronger governance credibility.

The second independent variable is Earnings Management, which is proxied by Discretionary Accruals (DA). According to Dechow et al. (1995), Discretionary Accruals (DA) are quantified using the Modified Jones Model, a widely accepted approach for estimating accrual-based earnings management. The specific equations for calculating earnings management based on this model are detailed below.

$$TA_{i,t} = NI_{i,t} - CFO_{i,t} \dots\dots\dots (1)$$

When, $NI_{i,t}$ = net income for company i in year t $CFO_{i,t}$ = operating cash flow.

The previous year's total assets are then scaled to total accruals. ($A_{i,t-1}$):

$$\frac{TA_{i,t}}{A_{i,t-1}} = \alpha_1 + \beta_1 \left(\frac{1}{A_{i,t-1}} \right) + \beta_2 \left(\frac{\Delta REV_{i,t} - \Delta REC_{i,t}}{A_{i,t-1}} \right) + \beta_3 \left(\frac{PPE_{i,t}}{A_{i,t-1}} \right) + \varepsilon_{DA-MDJONES} \dots\dots\dots (1)$$

Where ΔREV is the change in revenue, ΔREC is the change in accounts receivable, and PPE is gross property, plant, and equipment.

The fitted values (NDA) represent Non-Discretionary Accruals, while the residuals ($\varepsilon_{DA-MDJONES}$) represent Discretionary Accruals (DA), the proxy for earnings management:

$$DA_{i,t} = \frac{TA_{i,t}}{A_{i,t-1}} - NDA_{i,t} \dots\dots\dots (2)$$

The discretionary accruals (DA) value serves as an indicator for earnings management. A greater distance of DA from zero signifies stronger earnings management practices.

In addition to the main independent variables, this study includes two control variables: leverage (LEV) and firm size (SIZE). The proportion of total liabilities relative to total assets determines leverage. The natural logarithm of total assets represents firm size. All variable definitions and measurement procedures are summarized in Table 2.

Table 2. Variable Definition and Measurement

Variable	Definition and Measurement	Source	Prior Studies
MAO	Dummy variable with a value of 1 if the company receives a modified audit opinion, and 0 if it receives an unqualified opinion.	Auditor Report (IDX)	(Diab & Eissa, 2024; Hou & Zhang, 2024; Wang et al., 2023)
ESG Performance	The company's sustainability score is based on the KESGI index (0-100).	KESGI	-
EM	Earnings management is measured using discretionary accruals estimated through an accrual-based approach from Equation 3.	Financial Statements	(Monday Olade & Owa, 2025; Nurhidayah et al., 2024)
LEV	Ratio of total liabilities to total assets.	Financial Statements	(He et al., 2024)
SIZE	Natural logarithm of total assets (ln total assets).	Financial Statements	(Saaydah, 2019; X. Zhang et al., 2022)

Source: Data Processed by Researcher (2025)

Model Specification and Estimation Technique

To test Hypotheses 1 and 2, the study employs logistic regression because the dependent variable MAO is binary (Rainey & McCaskey, 2021). Given the low incidence of modified opinions in the sample, model estimation uses Firth's Penalized Maximum Likelihood Estimation (PMLE), which reduces small-sample bias and resolves potential separation issues (Puhr et al., 2017; Rigon & Aliverti, 2023). The empirical model of the study is specified as follows:

$$\text{Logit}(MAO_i) = \alpha + \beta_1 ESG_i + \beta_2 FRQ_i + \beta_3 EM_i + \beta_4 LEV_i + \varepsilon_i \dots\dots\dots (4)$$

Model estimation is conducted using Stata 18 via the `firthlogit` module, which implements the PMLE method. To ensure the reliability of the findings, the study also conducts a robustness test by re-estimating the model using conventional MLE-based logistic regression and comparing the consistency of coefficient signs, significance levels, and variable relationships, as recommended by prior methodological research (Olmuş et al., 2022). Inferential analysis is carried out using Wald χ^2 statistics and the interpretation of logit coefficients and odds ratios to evaluate the effects of the independent variables on the probability of receiving a modified audit opinion.

3. Results

Descriptive Statistic Analysis

Table 3 Descriptive Statistic Analysis Result

Variable	Minimum	Maximum	Mean	Median	Std. Dev
ESG	5.13	81.58	49.63	54.30	18.03
EM	-0.2806	0.2634	-0.0420	-0.0378	0.1036
SIZE	25.64	32.75	29.43	29.71	1.75
LEV	0.0406	13.684	0.4426	0.4296	0.2511
MAO	0	1	0.0764	0.0000	0.2665

Source: Data Processed by Researcher using Stata 18 (2025)

Table 3 presents the descriptive statistics of the variables used in this study. The Environmental, Social, and Governance (ESG) variable ranges from 5.13 to 81.58, with a mean of 49.63, median of 54.30, and standard deviation of 18.03. Earnings management (EM), measured by discretionary accruals, ranges from -0.2806 to 0.2634, with a mean of -0.0420, a median of -0.0378, and a standard deviation of 0.1036. Firm size (SIZE) shows values between 25.64 and 32.75, with a mean of 29.43, a median of 29.71, and a standard deviation of 1.75, while leverage (LEV) ranges from 0.0406 to 13.684, with a mean of 0.4426, a median of 0.4296, and a standard deviation of 0.2511. The Modified Audit Opinion (MAO) variable ranges from 0 to 1, with a mean of 0.0764, a median of 0, and a standard deviation of 0.2665, based on 144 firm-year observations.

Correlation Analysis

Table 4. Pearson Correlation Matrix

Variable	ESG	EM	SIZE	LEV
ESG	1.000	0.0263	0.5747	-0.3122
EM	0.0263	1.000	-0.0847	-0.0788
SIZE	0.5747	-0.0847	1.000	-0.0643
LEV	-0.3122	-0.0788	-0.0643	1.000

Source: Data Processed by Researcher using Stata 18 (2025)

The correlation results in Table 4 show that all coefficients fall below the commonly used multicollinearity threshold of 0.80, indicating the absence of excessively strong linear relationships among the independent variables. ESG exhibits a moderate positive correlation with firm size ($r = 0.5747$) and a moderate negative correlation with leverage ($r = -0.3122$). At the same time, earnings management displays very weak correlations with all other variables, suggesting minimal association among the predictors. The multicollinearity assessment using the Variance Inflation Factor (VIF) further supports these findings, as all VIF values fall well within acceptable limits, with

the highest VIF for ESG at 1.74, far below the threshold of 10, and the corresponding tolerance values exceeding 0.10. Collectively, these results confirm that the independent variables are not multicollinear and are appropriate for inclusion in the regression model.

Distribution of Modified Audit Opinions

Table 5. Distribution of the MAO Variable

MAO	Frequency	Percentage	Cumulative
0 (Unmodified Opinion)	133	92.36%	92.36%
1 (Modified Opinion)	11	7.64%	100.00%
Total	144	100%	—

Source: Data Processed by Researcher using Stata 18 (2025)

Table 5 shows that modified audit opinions (MAO) occur in only 11 out of 144 observations (7.64%), indicating a highly imbalanced distribution and confirming that MAO is a rare event. Such an imbalance may cause conventional logistic regression (MLE) to generate biased probability estimates and heighten the risk of separation, potentially leading to model instability or non-convergence. Therefore, Firth Logistic Regression was employed as the primary estimation technique because its Penalized Maximum Likelihood Estimation (PMLE) approach reduces small-sample bias and produces more stable, reliable estimates in rare-event settings (Kosmidis & Zietkiewicz, 2024), making it well-suited to the MAO distribution in this study.

Regression Results

Table 6. Firth Logistic Regression

Variable	Odds Ratio	Std. Error	z-Stat	p-Value
ESG (X1)	0.9335	0.0272	-2.37	0.018**
EM (X2)	1.5832	7.2716	0.10	0.920
SIZE	0.7351	0.2267	-1.00	0.318
LEV	19.6327	30.4582	1.92	0.055*

Source: Data Processed by Researcher using Stata 18 (2025)

Table 6 reports the results of the Firth Logistic Regression examining the effects of Environmental, Social, and Governance (ESG) performance and earnings management on the likelihood of firms receiving a Modified Audit Opinion (MAO). Consistent with the research objectives and hypothesis development, the statistical significance discussed in this section focuses on the two main explanatory variables, namely ESG (X1) and earnings management (X2). In contrast, control variables are included to adjust for firm-specific characteristics. The results indicate that ESG performance (X1) has a statistically significant negative association with the likelihood of receiving a modified audit opinion, as evidenced by a z-statistic of -2.37 and a p-value of 0.018, which is significant at the 5% level. In contrast, earnings management (X2) does not exhibit a statistically significant effect on MAO, with a z-statistic of 0.10 and a p-value of 0.920.

Robustness Test

Table 7. Robustness Test

Variable	Firth (p-value)	MLE (p-value)	Status
ESG	0.018	0.017	Consistent
EM	0.920	0.846	Consistent
SIZE	0.318	0.255	Consistent
LEV	0.055	0.040	Consistent

Source: Data Processed by Researcher using Stata 18 (2025)

The robustness test results show that the coefficient directions for all variables are consistent between Firth Logistic Regression and conventional logistic regression (MLE). The variables ESG, EM, and SIZE consistently exhibit negative coefficients, while LEV shows a positive coefficient in both models. This directional consistency confirms that the pattern of relationships among the

variables remains unchanged across different estimation methods, indicating that the study's results are not dependent on the analytical technique used. Differences in significance levels between the models remain within a reasonable range, given that MLE is more sensitive to class imbalance (rare events) than Firth Logistic Regression, which is designed to correct for this bias.

Overall, the findings from the comparison model indicate that the study's main inferences remain stable, with ESG being significantly negative in both models, EM and SIZE remaining insignificant, and LEV showing a positive effect in both the Firth model (marginally significant) and the MLE model (significant at the 5% level). This consistency confirms that the study's results are robust, as the direction of the coefficients, the relationship patterns, and the primary interpretations do not change when tested with an alternative estimation method.

4. Discussion

ESG Performance and Modified Audit Opinion

The regression results in Table 6 indicate that ESG has a significant negative effect on the likelihood of receiving a modified audit opinion ($p = 0.018$), thereby supporting the first hypothesis (H1). The odds ratio of 0.9335 implies that a one-point increase in ESG performance reduces the likelihood of receiving a modified opinion by approximately 6.65%. This finding suggests that higher ESG performance provides auditors with stronger indications of sustainability compliance, governance quality, and operational stability, consequently lowering assessed audit risk.

This interpretation aligns with Signaling Theory, in which holds that ESG performance serves as a credible non-financial signal of a firm's environmental responsibility, social due care, and governance effectiveness (Pulino et al., 2022). These signals reduce information asymmetry between auditors and management, enabling auditors to form more favorable assessments of reporting reliability. Prior empirical findings further reinforce ESG's role. C. Zhang et al. (2024) show that firms with higher ESG performance exhibit lower audit risk, while Moffitt et al. (2024) document that stronger governance mechanisms, particularly those captured within the governance pillar of ESG, enhance internal control effectiveness and reduce the likelihood of unfavorable audit opinions. Consistent patterns are reported by Diab and Eissa (Diab & Eissa, 2024), Nur Laila and Nyoman Alit Triani (Nur Laila & Nyoman Alit Triani, 2025), and Wang et al. (Wang et al., 2023), who find that better-quality sustainability disclosures reduce auditors' need to issue modified opinions. Dimitropoulos (2025) also observes that firms with robust ESG compliance are less likely to receive adverse audit opinions. Collectively, these studies indicate that ESG increasingly serves as a meaningful audit risk signal, including in the Indonesian context.

From a practical standpoint, this relationship is particularly relevant in the mining industry, which is characterized by heightened sustainability risks, including environmental degradation, social conflict, and stringent regulatory oversight (Husnah, 2023). These risks heighten auditors' sensitivity to sustainability performance because strong ESG practices signal a firm's ability to manage exposures that may lead to material misstatements or going concern uncertainties. Consequently, firms with stronger ESG profiles are perceived as more stable and better governed, reducing auditors' inclination to issue modified audit opinions.

In addition to industry characteristics, regulatory developments in Indonesia further reinforce the importance of ESG in audit decision-making. Regulations such as POJK No. 51/2017 on Sustainable Finance and the OJK sustainability roadmap encourage firms to integrate ESG considerations into their governance and reporting practices. Companies that comply with these regulatory expectations by improving sustainability disclosure and governance quality send stronger signals of reporting credibility and regulatory compliance. Auditors incorporate these regulatory signals into their risk assessments, which further explains why ESG performance emerges as a significant determinant of audit opinion outcomes in this study.

Earnings Management and Modified Audit Opinion

In contrast to ESG performance, the results in Table 6 indicate that earnings management does not significantly affect the issuance of modified audit opinions; therefore, the second hypothesis (H2) is rejected. Although the coefficient for EM is positive, the statistical results show that it is not

significant ($p = 0.920$), indicating that EM has no predictive power in explaining the issuance of a modified audit opinion (MAO) among mining companies. Thus, the level of earnings management, as measured by discretionary accruals (DA), is not shown to influence auditors' assessments in determining audit opinions.

Within the framework of Signalling Theory, discretionary accruals are understood as financial signals that reflect the extent to which management applies accounting discretion to alter reported earnings. Positive DA values indicate income-increasing earnings management, while negative DA values reflect income-decreasing earnings management. Both types of actions theoretically serve as signals of potential financial statement manipulation. However, the average EM value of 0.0420 and the median of -0.0378, combined with a relatively small standard deviation (0.1036), indicate that the financial signals conveyed through earnings management practices in the sample are very weak and insufficiently varied to be detected by auditors as indicators of risk. This low variation in EM makes the financial signals firms send to auditors less informative. In the context of signalling Theory, auditors require strong and clear signals to assess the risk of material misstatement. When financial signals arising from EM are minimal and inconsistent, auditors tend not to consider them relevant in determining the audit opinion. This explains why EM is not significant in the model, despite being theoretically recognized as a potential signal of reporting risk.

Prior studies also show that EM signal strength varies across industries. Research such as Monday Olade and Owa (2025) and Alzoubi (2018) also find that EM is not always a primary indicator for auditors, particularly in high-risk sectors, where auditors place greater emphasis on operational and sustainability risks. Conversely, studies by Golmohammadi Shuraki et al. (2021) and Tommasetti et al. (2018) report different findings in industries characterized by more extreme accrual manipulation patterns. These diverse findings indicate that the effectiveness of financial signals largely depends on industry characteristics and the intensity of discretionary accruals.

In the mining industry, the main risks arise from macro-level factors such as commodity price volatility, reserve uncertainty, reclamation obligations, and environmental and social risks (Sugianto & Augustine, 2019). Auditors tend to prioritize evaluating these risks because their signals are stronger and more directly related to the company's going-concern status. As a result, weak accrual-based financial signals are not the primary basis for audit opinion decisions (Mamcarczyk et al., 2020).

Overall, these findings show that EM is not a key determinant of modified audit opinions in the context of mining companies. The results highlight that in industries with high operational risk exposure, auditors are more responsive to non-financial signals, such as sustainability performance (ESG), and other more tangible financial risk indicators than to technical accrual signals that exhibit limited variation. Thus, this study contributes to a deeper understanding that the strength of accounting signals is highly influenced by industry characteristics and the risk structure faced by firms.

5. Conclusion

This study examines how non-financial and financial signals influence the issuance of modified audit opinions in the Indonesian mining sector. The findings indicate that Environmental, Social, and Governance (ESG) performance plays a significant role in auditors' assessments of audit risk. At the same time, earnings management does not emerge as a decisive factor in determining audit opinion outcomes. These results suggest that in industries characterized by high operational and regulatory risk, auditors tend to rely more on credible non-financial signals related to sustainability, governance, and regulatory compliance than on accrual-based financial signals. Nevertheless, this study is subject to several limitations, including the focus on a single industry, a relatively short observation period, and the use of a single ESG indicator and a single proxy for earnings management, which may not fully capture the complexity of corporate signaling. Accordingly, future research is encouraged to extend the observation period, conduct cross-industry comparisons, and employ alternative measures of ESG performance and earnings management to provide a more comprehensive understanding of the role of financial and non-financial signals in audit opinion

formation. In addition, the findings contribute to the audit literature and professional practice by emphasizing the growing importance of sustainability practices and governance quality in enhancing reporting credibility and audit outcomes.

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