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THE INFLUENCE OF ESG, CAPITAL STRUCTURE, AND INTELLECTUAL CAPITAL ON FINANCIAL DISTRESS IN MINING COMPANIES

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Abstract

The mining sector plays a crucial role in Indonesia's economic growth, yet it is highly financially vulnerable due to global commodity price volatility and environmental management demands. This study aims to analyze the influence of ESG Disclosure, Capital Structure, and Intellectual Capital on Financial Distress in mining companies listed on the Indonesia Stock Exchange for the 2022-2024 period. Using a quantitative, associative approach and purposive sampling, a sample of 22 companies was obtained, yielding 66 observations. Data analysis was performed using the panel data method assisted by EViews 13 software. The results indicate that ESG Disclosure has no significant effect on the Altman Z-Score. Capital Structure has a significant negative effect on the Altman Z-Score, whereas Intellectual Capital has a significant positive effect. These findings imply that higher leverage increases the risk of financial distress, whereas stronger intellectual capital reduces it. This study contributes to the literature by providing empirical evidence on the combined effects of ESG disclosure, capital structure, and intellectual capital on financial distress in Indonesian mining companies during the post-pandemic recovery period. The findings also demonstrate that financial policies and intellectual capital play a more decisive role than ESG disclosure in explaining firms' financial health as measured by the Altman Z-Score.

Keywords: *Capital Structure, ESG Disclosure, Financial Distress, Intellectual Capital*

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1. Introduction

The mining sector is a highly important sector for economic growth in Indonesia, which, by nature, is very vulnerable to financial instability. This sector depends on high global commodity price fluctuations, international market dynamics, regulations, and environmental issues that can directly impact the company's financial condition and investor confidence (Larizza & Mulyaningtyas, 2025). Financial instability and large investment needs can trigger financial distress, a condition in which a company experiences a continuous decline in financial performance due to high deficits and an inability to meet its financial obligations resulting from liquidity problems and operational losses (Pradita et al., 2024).

Post-pandemic, several mining companies experienced a decline in revenue due to global commodity price fluctuations and economic conditions, which became a risk to the company's financial stability. This instability caused several companies to experience financial distress. In 2023, PT Bumi Resources Tbk recorded a deficit of USD 2.35 billion with a negative operating cash flow of USD 115.87 million (Hema Yuliana & Rahmawati Wahyu T, 2024). This condition may indicate significant uncertainty in maintaining its business continuity. High short-term obligations relative to current assets can raise doubts about the company's business continuity.

Amidst this financial vulnerability, ESG disclosure is beginning to be viewed as a strategic instrument to mitigate risk. ESG disclosure is information regarding environmental, social, and corporate governance aspects. IDX data as of December 2024 shows that as many as 882 companies, or about 94% of companies in Indonesia, have published sustainability reports for the 2023 reporting year (Heriyanto & Muhiddin, 2025). However, the quality of their transparency still needs to be continually pushed by regulators. ESG disclosure is expected to create long-term and sustainable progress of Indonesia's economy. This is supported by Liwa et al. (2024), Luthan et al. (2025), and Tuswajati and Atiningsih (2025), who found that ESG has a significant positive effect on financial distress. In contrast, Larasati and Mawardi (2024), Oktarina et al. (2023), and Putra and Yuyetta (2026) reported that ESG has a significant negative effect on financial distress.

Another fundamental factor that determines financial distress is funding policy and capital structure. Capital structure becomes one of the main factors causing financial difficulties in financial distress (Afridayani, 2023). In 2021, the mining industry in Indonesia was required to conduct mineral downstreaming, one of which was through the construction of processing facilities (smelters), which is estimated to require a total investment reaching USD 21.28 billion (Kementerian ESDM, 2021). Many companies in the mining sector require large investments to fund construction projects. Companies often use debt-based financing and do not fully use corporate equity for finance very large investment values. Companies consider that using debt provides tax shield benefits

over interest expenses. However, if the portion of debt in the capital structure has passed the optimal point, the interest expense will increase the risk of default, which can increase the risk of financial distress.

In addition to physical assets and capital structure, internal capability in the form of intangible assets becomes a defensive wall for the company. In the context of modern industry, strategic resources can be reflected through intellectual capital, which includes physical capital efficiency, human capital capabilities, and knowledge, as well as structural infrastructure reliability. Intellectual Capital plays an important role in creating added value for the company, which will later improve the company's performance to provide a competitive advantage for the company (Ramadanty & Khomsiyah, 2022). Proper management of intellectual capital enables mining companies to achieve operational cost efficiencies, optimize technology-based exploration processes, and adapt faster to global market volatility, thereby minimizing the risk of financial distress.

This research is important to conduct to detect financial distress early, which can threaten business continuity and result in losses for investors. ESG disclosure, capital structure, and intellectual capital are factors estimated to influence a company's financial distress. The novelty of this study lies in its focus on mining companies, the use of the latest data for the 2022–2024 period, and the addition of variables by combining ESG, capital structure, and intellectual capital into one model. The objective of this study is to test the influence of ESG, capital structure, and intellectual capital on the condition of financial distress. This research is urgent, as it provides an early warning system for the mining sector, which is vulnerable to global economic shocks, while also contributing to the literature on sustainable financial management and serving as a guide for managers in making funding policies.

1. Literature Review

2.1 Signaling Theory

Although Signaling Theory suggests that ESG disclosure serves as a positive signal to investors regarding a firm's long-term sustainability and governance quality, the findings of this study indicate that such signals have not been fully translated into improved financial health in Indonesia's mining sector (Spence, 1973). One possible explanation is that investors and creditors continue to prioritize conventional financial indicators, such as profitability, liquidity, and leverage, over ESG disclosures when assessing financial risk. Consequently, ESG disclosure has not yet become a sufficiently strong signal to influence the Altman Z-Score or reduce the likelihood of financial distress. These findings suggest that the explanatory power of Signaling Theory in the Indonesian mining sector remains limited under current market conditions.

2.2 Trade-off Theory

However, Trade-off Theory has several limitations. The theory assumes that firms can determine an optimal capital structure by balancing the tax benefits of debt against the costs of financial distress. In practice, this optimal point is difficult to identify because firms operate under different economic conditions, business risks, financing constraints, and managerial policies Modigliani & Miller, 1963). Particularly in the mining industry, fluctuations in global commodity prices may cause cash flows to become highly volatile, making the optimal debt level vary across firms. Consequently, the relationship between capital structure and financial distress may differ across empirical studies depending on industrial characteristics, macroeconomic conditions, and the measurement of financial distress (Shinta & Riharjo, 2025).

2.3 Resource-Based View (RBV)

Resource-Based View (RBV) was proposed by Wernerfelt (1984). This theory focuses on the importance of unique, rare, and inimitable internal resources in achieving competitive advantage, not only on market position but also on the mastery of strategic assets so that company performance remains superior. Effective resource utilization and management can generate added value and increase the company's competitive advantage, which can reduce the potential for financial distress (Jeryanto et al., 2025). For mining companies, intellectual capital, which includes human resource expertise and structural efficiency, is a strategic asset that can increase the company's operational efficiency. Companies that manage their intellectual capital well will have higher resilience against global commodity price fluctuations, thereby reducing the likelihood of financial distress.

2.4 Financial Distress

Financial distress describes a situation where a company faces financial challenges and cannot meet its short-term or long-term obligations (Laus et al. 2025). This can result from falling profits, liquidity issues, high debt, negative cash flow, or insufficient operating income to cover expenses (Yadav and Simplice 2025). It marks the initial phase of corporate financial failure and, if unmanaged, can escalate to default, restructuring, or bankruptcy (Ansari, Rusmita, and Karpriana 2025; Erika 2023; Nurfauziah et al., 2024). In the mining sector, financial distress is especially critical due to heavy capital needs, fluctuating commodity prices, environmental risks, and rising stakeholder demands. As a result, factors like ESG performance, capital structure choices, and intellectual capital management are key in determining the risk of financial distress.

2.5 Environment, Social and Governance (ESG)

Environmental, Social, and Governance (ESG) is a framework for evaluating a company's commitment and effectiveness in managing sustainability responsibilities across three core areas: environmental, social, and governance (Maji and Tiwari 2025). The environmental aspect measures how well a company manages its environmental impact, including efforts in energy efficiency, lowering emissions, waste management, and

controlling environmental risks (Sun et al. 2026). The social aspect concerns the company's responsibilities to employees, communities, customers, and other stakeholders. The governance aspect involves corporate transparency, ethical conduct, ownership structure, board performance, and internal controls (Jatmiko et al, 2025). Regarding financial distress, strong ESG performance can lower the risk of financial trouble, as companies with robust ESG practices often have better risk management, a stronger reputation, easier access to financing, and more stable stakeholder relationships. On the other hand, weak ESG performance can heighten the risk of financial distress by exposing the company to operational hazards, regulatory challenges, stakeholder disputes, and reduced investor confidence, ultimately harming financial results and sustainability.

2.6 Capital Structure

Capital structure refers to how a company finances its operations and investments, mainly through a mix of debt and equity. It shows how much the company depends on external funding and shapes its financial risk profile (Okon et al. 2026). In financial distress, relying too heavily on debt can increase fixed financial obligations like interest payments and debt repayments, which may limit the company's ability to generate enough cash flow to meet its commitments (Gonçalves et al, 2024). This risk is especially pronounced in mining companies, where large capital needs, long-term projects, and volatile commodity prices are common. On the other hand, an optimal capital structure can offer financial advantages by boosting capital efficiency and lowering the overall cost of funding. Thus, managing capital structure effectively is crucial for maintaining financial health and minimizing the risk of financial distress.

2.7 Intellectual Capital

Intellectual capital encompasses a company's intangible assets such as knowledge, employee skills, organizational systems, technological know-how, innovation, and external networks that drive value creation (Sari et al. 2026). It is typically divided into three main components: human capital, structural capital, and relational capital, all of which together enhance organizational performance and competitive advantage (Hermawan et al. 2025). Companies with strong intellectual capital are generally better equipped to adapt to market changes, boost operational efficiency, foster innovation, and maintain steady financial performance, thereby lowering their risk of financial distress. In contrast, poor management of intellectual capital can hinder a company's ability to innovate, adapt, and compete, leading to weaker performance and a higher chance of financial difficulties.

3. Research Methods

The variables used in this study consist of two types: the dependent variable (Y) and the independent variables (X). The dependent variable in this study is the risk of financial distress (Y), while the independent variables consist of ESG disclosure (X1),

capital structure (X2), and Intellectual Capital (X3). The population in this study consists of all mining energy companies listed on the Indonesia Stock Exchange (IDX) during the 2022–2024 period, totaling 91 companies. This study uses secondary data sourced from corporate annual reports that can be accessed through www.idx.co.id and the official websites of each respective company. The sample in this study was selected using the purposive sampling method, which is sample determination based on specific criteria to represent the total population. The sample selection criteria are as follows: 1) Mining energy companies listed on the Indonesia Stock Exchange (IDX) for the 2022–2024 period. 2) Mining energy companies presenting complete annual reports for the 2022–2024 period. 3) Companies disclosing the GRI index 2021 in their sustainability reports for the 2022–2024 period.

Table 1. Research Sample

No	Description	Amount
1.	Total population (energy mining sector companies listed on the Indonesia Stock Exchange (IDX))	91
2.	Mining energy companies not listed on the Indonesia Stock Exchange (IDX) for the 2022–2024 period	16
3.	Companies not presenting complete annual reports for the 2022–2024 period	9
4.	Companies not disclosing the GRI index 2021 in their sustainability reports during the 2022–2024 period	44
Total Research Sample		**22**
Total Observations (22 companies x 3 years)		**66**

Source: *Indonesia Stock Exchange*

The following presents the operationalization of the variables used in this study.

Table 2. Operational Definition of Research Variables

Variable	Measurement Indicator	Source
Financial Distress	$Z\text{-}Score = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4 + 0.99X_5$ (Financial distress was measured using the original Altman Z-Score model (Altman, 1968). Although the model was initially developed for manufacturing firms, it has been widely applied in studies involving mining and other non-financial industries because it provides a comprehensive assessment of corporate financial health based on liquidity, profitability, leverage, solvency, and asset turnover. Several previous studies on Indonesian mining companies have also adopted this model, allowing comparison with prior	Previous Research

Variable	Measurement Indicator	Source
	empirical findings.	
ESG Disclosure	ESG Disclosure Index (ESGDI) = ΣXi / N	Previous Research
Capital Structure	*Debt to Equity Ratio (DER) = Total Liabilities / Total Equity*	Previous Research
Intellectual Capital	*Value Added Intellectual Coefficient (VAIC) = VACA + VAHU + STVA* (Intellectual Capital was measured using the Value-Added Intellectual Coefficient (VAIC) method developed by Public (2000). The first step is calculating Value Added (VA), which is obtained by subtracting input (operating expenses excluding employee costs) from output (total revenue). Subsequently, VAIC is calculated as the sum of Value-Added Capital Employed (VACA), Value Added Human Capital (VAHU), and Structural Capital Value Added (STVA). All financial data required for these calculations were obtained from the companies' annual reports.	Previous Research

Source: *Previous Research*

This study uses a quantitative data analysis method with an associative approach to test the influence of ESG disclosure, capital structure, and intellectual capital on financial distress. The data analysis technique used in this study is panel data analysis. The stages of panel data regression are as follows: 1) Descriptive Statistical Test, 2) Regression Model Selection Test (Chow, Hausman, Lagrange Multiplier), 3) Classical Assumption Test, 4) Panel Data Regression Test (Coefficient of Determination (R^2) Test, F-Test, and T-Test).

The panel data regression equation model in this study is as follows:

$$Y = \alpha + \beta 1X_1 + \beta 2X_2 + \beta 3X_3 + \varepsilon$$

Description:

Y = Financial Distress

α = Constant

β = Correlation Coefficient / Regression Coefficient

X_1 = ESG Disclosure

X_2 = Capital Structure

X_3 = Intellectual Capital

ε = Error term

4. Results and Discussion

4.2 Result

4.2.1 Descriptive Statistical Analysis

Table 3. Descriptive Statistics Results

	Mean	Median	Maximum	Minimum	Std. Deviation	Observations
Z-Score	3.616312	2.775230	12.02976	0.001310	2.715907	66
ESGDI	-0.353484	-0.229577	0.000000	-1.098622	0.314599	66
DER	-0.271104	-0.010075	1.974498	-2.835332	0.954487	66
VAIC	2.009274	1.836897	4.822117	0.553937	0.913478	66

Source: *EViews 13 data processing*

Descriptive statistical analysis aims to display relevant information related to the sample contained in the research data results, consisting of mean, median, maximum, minimum, and standard deviation values. The mean value of the Z-Score and VAIC variables is greater than their standard deviation values, indicating that both variables have a normal, diverse data distribution and do not cause bias. Meanwhile, for the ESGDI and DER variables, the mean value is lower compared to their standard deviation values, showing that both variables have a low data spread. The negative mean value of ESGDI does not indicate a negative ESG disclosure level. Instead, it reflects the natural logarithm transformation applied to the ESG Disclosure Index, whose original values ranged between 0 and 1. Likewise, the transformed DER values include negative observations due to the logarithmic transformation and the presence of companies with relatively low DER values.

4.2.2 Regression Model Selection Test

Table 4. Model Selection Test Results

Method of Testing	Effect Test	Probability Value	Conclusion
Chow Test	Cross-section F	0.0000	FEM is better than CEM
Hausman Test	Cross-section Random	0.1678	REM is better than FEM
Lagrange Multiplier	Cross-section Breusch-Pagan	0.0000	REM is better than CEM

Source: *EViews 13 data processing*

The Chow test is used to determine whether the appropriate model is the Common Effect Model (CEM) or the Fixed Effect Model (FEM). Based on Table 4, the cross-section F probability value of 0.0000 is less than 0.05, so it can be concluded that the Fixed Effect

Model (FEM) is better compared to the Common Effect Model (CEM). After model selection in the Chow Test, the selection is carried out in the Hausman Test, which is used to determine the best model between the Fixed Effect Model (FEM) and the Random Effect Model (REM). Based on Table 4, the Hausman Test results show a cross-section random probability value of 0.1678, which is greater than 0.05, so the most suitable model is the Random Effect Model (REM). Furthermore, to evaluate whether the panel data regression model should use the Common Effect Model (CEM) or the Random Effect Model (REM), the Lagrange Multiplier Test developed by Breusch and Pagan was conducted. Based on Table 4, the cross-section Breusch-Pagan probability value is 0.0000, which is less than 0.05, so it can be concluded that the Random Effect Model (REM) is the more suitable model to use compared to the other two models.

4.2.3 Multicollinearity Test

Table 5. Multicollinearity Test Results

Variable	ESGDI	DER	VAIC
ESGDI	1	0.237	0.061
DER	0.237	1	-0.164
VAIC	0.061	-0.164	1

Source: *EViews 13 data processing*

Based on Table 5, the multicollinearity test results show that the correlation coefficient between ESG (X1) and DER (X2) is 0.237, which is less than 0.85. The correlation coefficient between ESG (X1) and VAIC (X3) is 0.061, which is less than 0.85. The correlation coefficient between DER (X2) and VAI (X3) is -0.164, which is less than 0.85. Thus, it can be concluded that the independent variables are free from multicollinearity.

4.2.4 Heteroscedasticity Test

Table 6. Heteroscedasticity Test Results

Variable	Coefficient	Std. Error	t-Statistic	Probability
C	1.056915	0.527052	2.005331	0.0493
ESGDI	-0.065943	0.603752	-0.109222	0.9134
DER	-0.166239	0.235531	-0.705806	0.4830
VAIC	0.245865	0.216241	1.136992	0.2599

Source: *EViews 13 data processing*

Based on the heteroscedasticity test results in Table 6, it is known that the probability value of the ESGDI variable is 0.9134, which is greater than 0.05; the probability value of the DER variable is 0.4830, which is greater than 0.05; and the

probability value of the VAIC variable is 0.2599, which is greater than 0.05. Therefore, it can be concluded that the independent variables in this study are feasible and good for use and are free from elements of heteroscedasticity.

4.2.5 Autocorrelation Test

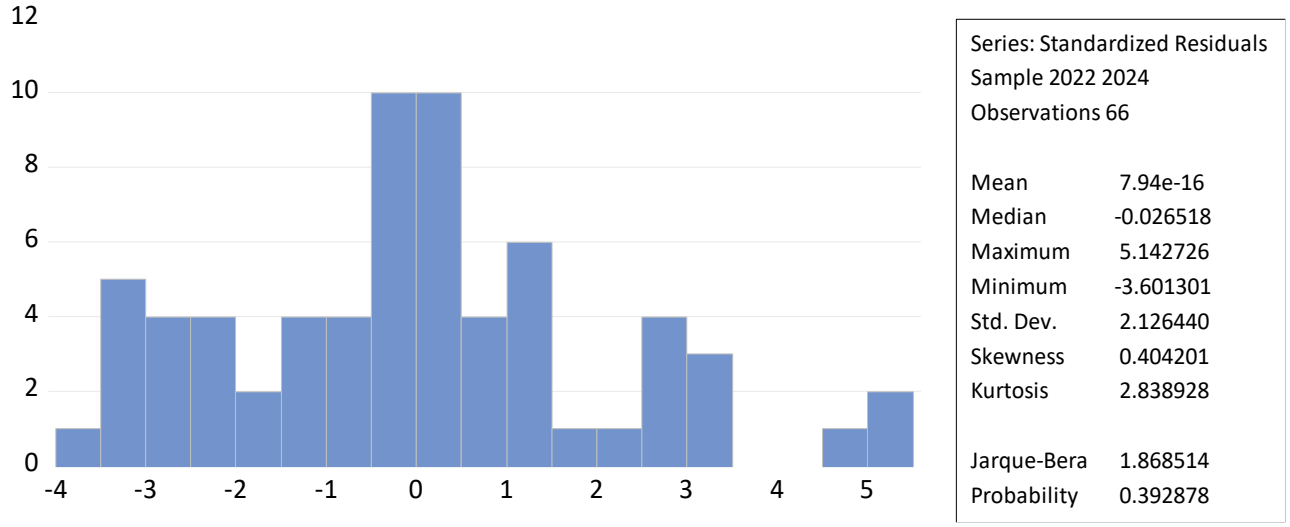
Table 7. Durbin-Watson Autocorrelation Test Result

Weighted Statistics	Value
Durbin-Watson Stat	1.9612

Source: *EViews 13 data processing*

Based on Table 7, the autocorrelation results after using the differencing method yield a probability value of 1.961, with a dU value known through the Durbin-Watson table of 1.6647 and a dL value known through the Durbin-Watson table of 1.3749. This test falls into the criteria of *dU < DW < (4-dL)* or *1.6647 < 1.9612 < 2.6251*. Therefore, it can be concluded that there is no autocorrelation in this study.

4.2.6 Normality Test



Gambar 1. Normality Test

Source: *EViews 13 data processing*

Based on the normality test results, after the data transformation test was performed, the Jarque-Bera Prob. value was found to be 0.392878, which is greater than 0.05. Therefore, it can be concluded that the residuals are normally distributed and the data is feasible to use.

4.2.7 Coefficient of Determination Test (R^2)

Table 8. Coefficient of Determination Test Results

Weighted Statistics	Value
R-Squared	0.3600
Adjusted R-Squared	0.3291

Source: *EViews 13 data processing*

The coefficient of determination (R^2) test was conducted to assess the explanatory power of the research model. As presented in Table 8, the R-Squared value is 0.3600,

indicating that approximately 36% of the variation in the Altman Z-Score can be explained by ESG disclosure, capital structure, and intellectual capital. The remaining 64% is explained by other factors not included in the model.

Although the R-Squared value is relatively moderate, this result is reasonable considering that financial distress is a complex and multidimensional phenomenon influenced by numerous internal and external factors beyond the scope of this study. Variables such as profitability, liquidity, firm size, cash flow, corporate governance, macroeconomic conditions, commodity price fluctuations, and interest rate changes may also contribute significantly to a firm's financial health. Therefore, the relatively modest explanatory power of the model suggests that ESG disclosure, capital structure, and intellectual capital represent only part of the determinants of financial distress in mining companies.

These findings imply that future studies should incorporate additional financial, governance, and macroeconomic variables to improve the explanatory power of the model and provide a more comprehensive understanding of the determinants of financial distress, particularly in capital-intensive industries such as mining.

4.2.8 Simultaneous Hypothesis Test (F-test)

Table 9. Simultaneous Hypothesis Test (F-test)

Weighted Statistics	Value
F-Statistic	11.62713
Prob. (F-Statistic)	0.000004

Source: *EViews 13 data processing*

Based on Table 9, the Prob. (F-Statistic) value is 0.000004, which is smaller than 0.05. Thus, in the F-test, Ha is accepted, and H0 is rejected, and it can be concluded that the independent variables (X) simultaneously have a significant effect on the dependent variable (Y).

4.2.9 T-Test

Table 10. T-Test Results

Variable	Coefficient	Std. Error	t-Statistic	Probability
C	1.457800	0.775842	1.878991	0.0649
ESGDI	-0.595416	0.860808	-0.691694	0.4917
DER	-1.988658	0.352792	-5.636907	0.0000
VAIC	0.701202	0.312663	2.242675	0.0285

The partial t-test was conducted to examine the individual effect of Environmental, Social, and Governance Disclosure Index (ESGDI), capital structure as measured by the Debt-to-Equity Ratio (DER), and intellectual capital as measured by Value Added

Intellectual Coefficient (VAIC) on financial distress in mining companies during the 2022–2024 period. The hypotheses were evaluated at a significance level of 5% (α = 0.05). An independent variable is considered to have a statistically significant effect on financial distress when its probability value is less than 0.05.

The results show that ESGDI has a coefficient of -0.595416, a t-statistic of -0.691694, and a probability value of 0.4917**.** Since the probability value of 0.4917 is greater than 0.05, ESGDI does not have a statistically significant effect on financial distress. Although the negative coefficient indicates an inverse relationship between ESG disclosure and the dependent variable, the relationship is not statistically supported. Therefore, the hypothesis proposing that ESG has a significant effect on financial distress is not supported.

Meanwhile, DER has a coefficient of -1.988658, a t-statistic of -5.636907, and a probability value of 0.0000. Since the probability value is below 0.05, DER has a negative and statistically significant effect on the financial distress measure. This means that, holding other variables constant, a one-unit increase in DER is associated with a 1.988658-unit decrease in the dependent variable. However, the substantive interpretation of this negative relationship depends on how financial distress is operationalized. If a higher value of the dependent variable represents greater financial distress, the result indicates that an increase in DER is associated with lower financial distress. Conversely, if a higher score represents better financial condition or a lower probability of financial distress, the economic interpretation would be reversed. Thus, the hypothesis regarding the effect of capital structure on financial distress is supported statistically**.**

Furthermore, VAIC has a coefficient of 0.701202, a t-statistic of 2.242675, and a probability value of 0.0285**.** Since the probability value of 0.0285 is less than 0.05, VAIC has **a** positive and statistically significant effect on the financial distress measure. Holding other variables constant, a one-unit increase in VAIC is associated with a 0.701202-unit increase in the dependent variable. As with DER, the substantive meaning of this positive coefficient must be interpreted according to the financial distress proxy used in the study. Therefore, the hypothesis proposing that intellectual capital has a significant effect on financial distress is supported**.**

Overall, the partial test results demonstrate that capital structure (DER) and intellectual capital (VAIC) significantly affect the financial distress measure. In contrast, ESGDI does not show a statistically significant effect during the 2022–2024 period. Among the explanatory variables, DER shows the strongest statistical evidence of an association with the dependent variable, as indicated by its absolute t-statistic of 5.636907 and probability value below 0.001.

2.2 Discussion

2.2.1 The Influence of ESG Disclosure on Financial Distress

Based on the T-test results in Table 10, the ESG Disclosure variable has a coefficient value of -0.5954 with a significance probability value of 0.4917, indicating that the probability value is greater than 0.05, so the first hypothesis is rejected. This proves that ESG disclosure does not have a significant effect on the Altman Z-Score value in mining companies on the Indonesia Stock Exchange (IDX) for the 2022–2024 period. This means that the high or low level of transparency in environmental, social, and governance information disclosure conducted by a company does not serve as a determining indicator for the level of financial health or bankruptcy risk of mining issuers.

Theoretically, this finding indicates that Signaling Theory does not effectively influence short-term financial decisions in Indonesia's extractive sector. Although ESG disclosure is intended as a positive signal of sustainable decisions and commitments (Spence, 1973), capital market players and creditors in Indonesia have not yet used this variable as a primary risk assessment instrument in allocating capital or investing in the mining sector. Investors remain conventional, where investment decisions are purely based on short-term profit acquisition and financial liquidity rather than sustainability reports. In addition, the costs incurred to integrate ESG principles and compile sustainability reports in the mining industry are very large. In conditions of global commodity volatility, capital expenditure for ESG is considered not to provide a direct protective impact on operational cash stability, but rather has the potential to become an additional administrative burden. This finding is consistent with and supports the results of previous studies by Larasati & Mawardi (2024) and Putra & Yuyetta (2026), which revealed that ESG disclosure does not have a direct effect on financial distress protection. This simultaneously rejects conclusions that regard ESG as a primary mitigation tool for financial distress. Mining companies operate in a capital-intensive industry where operational performance is highly dependent on global commodity prices, production capacity, and capital expenditure. Consequently, short-term financial conditions are more strongly influenced by market fluctuations than by ESG disclosure practices. Therefore, ESG disclosure may not immediately translate into improvements in financial health as measured by the Altman Z-Score.

2.2.2 The Influence of Capital Structure on Financial Distress

The results of the second hypothesis testing show that the capital structure variable has a coefficient value of −1.9887 with a significance probability of 0.0000, which is smaller than 0.05. This indicates that capital structure has a negative and statistically significant effect on the Altman Z-Score. The negative coefficient implies that an increase in the Debt-to-Equity Ratio (DER) leads to a decrease in the Altman Z-Score. Since a lower Altman Z-Score reflects poorer financial health and a higher probability of financial distress, these findings indicate that companies with higher leverage are more likely to experience financial distress.

This empirical finding provides support for the Trade-off Theory (Modigliani & Miller, 1963), which argues that firms seek to balance the tax benefits of debt against the costs associated with financial distress. In the mining industry, which requires substantial capital investment for exploration, downstream processing, and infrastructure development, debt financing is often considered an attractive funding source because it provides tax advantages through interest deductions. However, when the proportion of debt exceeds the optimal level, the resulting interest expenses, principal repayments, and agency costs increase the company's financial burden and reduce profitability. Consequently, excessive leverage weakens the firm's financial condition, lowers the Altman Z-Score, and increases the likelihood of financial distress.

Nevertheless, Trade-off Theory also has limitations. The theory assumes that firms can determine an optimal capital structure by balancing the benefits and costs of debt. In reality, however, the optimal debt level varies across firms due to differences in business risk, managerial policies, financing constraints, and macroeconomic conditions. In the mining sector, cash flows are highly sensitive to fluctuations in global commodity prices, making the optimal capital structure more difficult to achieve. Therefore, the relationship between capital structure and financial distress may differ across industries and empirical settings.

The findings of this study are particularly relevant to the mining sector because mining companies generally require large external financing to support exploration activities, smelter construction, and operational expansion. During periods of declining commodity prices, companies with high leverage experience greater pressure on cash flows and debt servicing capacity, making them more vulnerable to financial distress than firms operating in less capital-intensive industries.

The results of this study are consistent with the findings of Erawati and Widawati (2023), who reported that an aggressive debt-based capital structure increases the likelihood of corporate financial distress. However, these findings differ from those of Shinta and Riharjo (2025), who found that capital structure does not significantly affect financial distress. This inconsistency may be explained by differences in industrial characteristics, sample selection, observation periods, and the proxies used to measure financial distress. Unlike previous studies that examined broader industrial sectors, this study focuses exclusively on mining companies, whose financial performance is highly dependent on commodity price volatility and capital-intensive investment. These characteristics make leverage a more critical determinant of financial distress in the mining industry.

2.2.3 The Influence of Intellectual Capital on Financial Distress

Based on the T-test results in Table 10, the intellectual capital variable has a coefficient value of 0.7012 with a probability value of 0.0285, which is less than 0.05. This finding indicates that intellectual capital has a positive and statistically significant effect on

the Altman Z-Score. The positive coefficient implies that greater efficiency in managing intellectual capital increases the Altman Z-Score. Since a higher Altman Z-Score reflects better financial health and a lower probability of financial distress, the findings suggest that companies with stronger intellectual capital are less likely to experience financial distress.

This result provides empirical support for the Resource-Based View (RBV), which argues that sustainable competitive advantage is derived from valuable, rare, inimitable, and well-organized resources, including intangible assets such as intellectual capital. In the mining industry, intellectual capital extends beyond employee knowledge and expertise to include technological capabilities, operational digitalization, innovation in exploration activities, organizational processes, and effective knowledge management. These intangible resources enable firms to improve operational efficiency, optimize resource utilization, and enhance decision-making quality, thereby strengthening financial performance.

The positive effect of VAIC on the Altman Z-Score may also be explained through its three components. Efficient utilization of capital employed (VACA) reflects the firm's ability to generate greater value from its financial and physical resources. Human capital efficiency (VAHU) enhances employee productivity, innovation, and problem-solving capabilities, while structural capital efficiency (STVA) strengthens organizational systems, technology, and operational procedures. The interaction of these components improves value creation, profitability, and operational resilience, ultimately reducing the likelihood of financial distress.

These findings are particularly relevant to mining companies because the industry operates in a highly competitive, capital-intensive environment characterized by fluctuating commodity prices and increasing environmental and operational challenges. Companies with superior intellectual capital are generally better able to adapt to market uncertainty, improve operational efficiency, and maintain financial stability during periods of economic volatility. Consequently, intellectual capital becomes an important strategic resource for sustaining long-term corporate performance.

The findings of this study are consistent with those reported by Jeryanto et al. (2025), who concluded that firms optimizing their intellectual capital demonstrate stronger resilience to external shocks and lower financial vulnerability. The consistency of these findings reinforces the Resource-Based View, suggesting that intellectual capital contributes not only to competitive advantage but also to improved financial health by increasing the Altman Z-Score and reducing the risk of financial distress.

Although VAIC is widely used to measure intellectual capital efficiency, it has several limitations. VAIC relies primarily on accounting-based information and focuses on value creation efficiency derived from financial statements. Consequently, it may not fully capture qualitative dimensions of intellectual capital, such as innovation capability,

organizational culture, knowledge sharing, employee creativity, and relational capital. Therefore, future studies are encouraged to combine VAIC with other intellectual capital measurement approaches to provide a more comprehensive assessment.

2.2.4 The Simultaneous Influence of ESG Disclosure, Capital Structure, and Intellectual Capital on Financial Distress

Based on the simultaneous test results presented in Table 9, the model produced a probability value of 0.000004, which is lower than the significance level of 0.05. This indicates that ESG disclosure, capital structure, and intellectual capital jointly have a statistically significant effect on the Altman Z-Score of mining companies listed on the Indonesia Stock Exchange during the 2022–2024 period. These findings suggest that the three variables collectively explain variations in the financial health of mining companies, although their individual contributions differ.

The simultaneous significance indicates that financial distress cannot be explained by a single factor alone. Instead, it is influenced by the interaction of sustainability practices, financing decisions, and the efficient utilization of intangible resources. While ESG disclosure was found to have no significant individual effect, capital structure and intellectual capital significantly contributed to changes in the Altman Z-Score. This suggests that the model's overall explanatory power is primarily driven by financial and operational factors rather than ESG disclosure alone.

From a theoretical perspective, these findings imply that corporate financial health is multidimensional. Signaling Theory, Trade-off Theory, and the Resource-Based View complement one another in explaining financial distress. ESG disclosure represents external corporate signaling, capital structure reflects financing policy, and intellectual capital represents strategic internal resources. Together, these factors provide a more comprehensive explanation of a firm's financial condition than any single variable considered independently.

From a practical perspective, the findings indicate that managers should not rely solely on ESG disclosure to strengthen financial resilience. Instead, companies should integrate sustainable business practices with prudent debt management and continuous investment in intellectual capital. Such an integrated approach is expected to improve financial stability and reduce the likelihood of financial distress, particularly in the mining industry, which is characterized by high capital requirements and volatile commodity prices. This study contributes to the literature in several ways. First, it extends the application of Signaling Theory, Trade-off Theory, and the Resource-Based View by examining their relevance in explaining financial distress within the Indonesian mining industry. Second, unlike previous studies that predominantly focused on manufacturing or multi-sector companies, this study specifically investigates mining companies during the post-pandemic recovery period, providing evidence under unique economic conditions. Third, the findings reveal that capital structure and intellectual capital are

more influential determinants of financial distress than ESG disclosure, thereby enriching the empirical literature concerning the relative importance of financial and non-financial factors in predicting corporate financial health.

5. Conclusions

Based on the results of the data analysis and discussion performed, it can be concluded that, partially, ESG disclosure does not have a significant effect on the risk of bankruptcy in mining companies in Indonesia. This is because the domestic financial market has not fully integrated sustainability values and does not have a direct impact on financial distress. Conversely, capital structure is proven to have a significant negative effect, confirming that high debt dependence can accelerate the company's financial vulnerability toward financial distress. Intellectual capital is proven to have a significant positive effect on the Z-Score, providing validation that intellectual capital is a strong step in supporting the company's financial health.

This study has several limitations. First, the observation period is relatively short, covering only three years (2022–2024), which may not fully capture long-term changes in the relationship between ESG disclosure, capital structure, intellectual capital, and financial distress. Moreover, this period represents the post-pandemic economic recovery, during which firms were still adapting to changes in global commodity prices, financing conditions, and operational performance. Therefore, the findings may reflect conditions specific to the post-pandemic recovery period and should be generalized with caution. Second, this study focuses solely on mining companies, limiting the generalizability of the findings to other industrial sectors. Future research is recommended to extend the observation period, include different phases of the economic cycle, and expand the sample to other industries to improve the robustness and generalizability of the findings.

Mining companies should maintain an optimal capital structure by avoiding excessive reliance on debt financing. Companies should also strengthen intellectual capital through employee competency development, technological innovation, and digital transformation to improve operational efficiency and financial resilience. Investors should not rely solely on ESG disclosure when evaluating mining companies. Greater attention should be given to leverage levels and intellectual capital efficiency because these variables have stronger explanatory power regarding financial distress risk. Regulators, including the Indonesia Stock Exchange and the Financial Services Authority, should continue improving ESG reporting quality and standardization so that sustainability disclosures become more relevant for investment decision-making. Future studies are encouraged to include profitability, liquidity, firm size, corporate governance, and macroeconomic variables, as well as extending the observation period beyond the post-pandemic recovery phase.

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