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Research Article

The Effect of ESG Disclosure, Green Accounting, and Workplace Safety on Profitability Value (Study on Mining Sector Companies listed on the Indonesia Stock Exchange 2019-2023)

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ABSTRACT

Introduction: Indonesia possesses extensive natural resources, with the mining industry playing a pivotal role in national economic development. Major mining activities particularly coal, oil, and gas are spread across regions like Kalimantan, Sumatra, and Sulawesi. Leading producers such as PT Bumi Resources and PT Adaro Energy significantly contribute to the nation's output. This study evaluates the profitability of 63 mining firms listed on the Indonesia Stock Exchange to guide stakeholder decision-making.

Objectives: The study investigates how ESG disclosure, green accounting, and workplace safety practices impact the profitability of mining companies traded on the IDX from 2019 to 2023.

Methods: This research adopts a quantitative approach, using secondary data sourced from the annual reports of eight mining companies. The study applies multiple linear regression analysis to evaluate how ESG disclosure, green accounting, and workplace safety influence profitability, measured by Return on Assets (ROA).

Results: Findings demonstrate that all three independent variables—ESG disclosure, green accounting, and workplace safety, have a significant effect on profitability, both jointly and individually.

Conclusions: The results highlight the financial advantages of integrating sustainability and safety practices. These insights may guide corporations in developing ESG strategies and inform policy-makers aiming to promote responsible corporate behavior in Indonesia's mining sector.

Keywords: ESG Disclosure, Green Accounting, dan Workplace Safety, Profitabilitas.

INTRODUCTION

In the current dynamic business environment, sustainability considerations—such as ESG disclosure, green accounting implementation, and occupational safety—have gained increasing importance. Stakeholder Theory and Legitimacy Theory provide a conceptual basis to understand how companies aim to build trust and maintain legitimacy within society (Freeman et al., 2010; Deegan, 2002).

Return on Assets (ROA) serves as a key indicator of financial performance, measuring how effectively firms manage their assets to generate income. According to Ramadhany et al. (2018), companies with stronger profitability tend to expedite financial reporting to broadcast favorable outcomes, reinforcing profitability's relevance in corporate transparency. Data from annual reports of IDX-listed mining firms (2021–2023) reveal volatile ROA figures, underscoring the sector's sensitivity to global price shifts and crises such as the COVID-19 pandemic.

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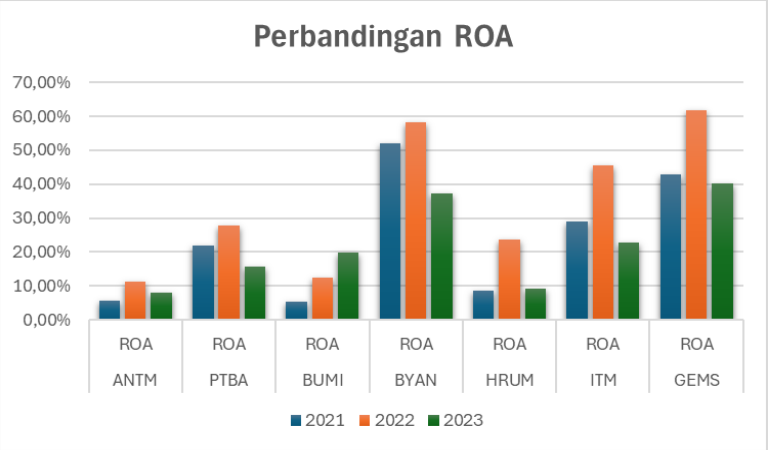

Figure 1 Return on Assets (ROA) Trends of Seven Mining Companies (2021–2023)

The ROA trends suggest that 2022 marked the highest profitability, with a general decline observed in 2023. For example, PT Bayan Resources Tbk (BYAN) achieved a 58.30% ROA in 2022, which dropped to 37.20% in 2023. BUMI Resources, in contrast, improved gradually from 5.29% (2021) to 19.75% (2023).

Prior literature offers inconsistent conclusions regarding ESG's impact on profitability. While some studies demonstrate a significant positive effect (e.g., Mahendra et al., 2023; Almeyda & Darmansyah, 2019), others find no clear association (Ramadhan et al., 2024). Similarly, the influence of green accounting and workplace safety yields mixed outcomes, suggesting a complex relationship dependent on firm-specific and contextual factors.

Workplace safety, in particular, is a vital element of operational risk management. It can enhance efficiency and reduce accident-related costs, potentially improving ROA. Though some findings (Sari, 2021) show a positive impact, others (Jhanatri et al., 2023; Putra et al., 2023) do not support this claim. This study investigates the impact of ESG disclosure (X1), green accounting (X2), and workplace safety (X3) on profitability (Y1), with profitability measured using ROA. The goal is to assess how sustainable practices influence firm performance in Indonesia's mining industry between 2019 and 2023.

OBJECTIVES

This research aims to examine the relationship between ESG disclosure, green accounting, and workplace safety with the financial performance, particularly profitability of mining companies listed on the Indonesia Stock Exchange from 2019 to 2023. In light of the growing relevance of sustainability within the mining sector, this study is designed to: (1) outline the current implementation levels of ESG, green accounting, and safety practices among selected companies; (2) investigate whether these factors collectively impact profitability; and (3) analyze the individual contribution of each variable to financial outcomes. Through this approach, the research seeks to offer insights into how sustainability-focused strategies can support financial performance, particularly in the context of developing economies such as Indonesia.

LITERATURE REVIEW

Environmental, social, and governance (esg)

ESG encompasses non-financial metrics that represent a company's commitment to environmental stewardship, social responsibility, and corporate governance quality (Melinda & Wardhani, 2020). It serves as a framework for long-term value creation and sustainable business operations. Organizations that integrate ESG principles tend to minimize future risk exposure and improve communication transparency with stakeholders, ultimately attracting long-term investors.

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Green accounting

Green accounting, as described by Zulhaimi (2015), incorporates the costs associated with environmental protection and social welfare into the company's financial records. This accounting practice involves identifying, measuring, and reporting environmental expenditures alongside financial metrics to reduce environmental degradation and its associated financial burden. Despite often incurring substantial upfront costs, green accounting is believed to provide strategic long-term benefits by improving a company's environmental footprint and contributing to sustainable economic growth (Meiyana & Aisyah, 2019).

Workplace safety

Workplace safety refers to the implementation of policies and practices that prevent occupational hazards and ensure a healthy, secure, and conducive working environment (Suherman et al., 2021). It encompasses both physical protection and psychological well-being of employees. The International Labour Organization (ILO) highlights its importance in promoting holistic worker welfare (Aprilliani et al., 2022). Commonly, the effectiveness of safety measures is evaluated using the Injury Frequency Rate (IFR), which quantifies workplace incidents relative to total working hours.

Profitability value

Profitability is an essential measure of a firm's capacity to generate income based on its assets, sales, or equity (Santoso & Priatinah, 2016). It reflects how efficiently a company utilizes capital to create value for stakeholders. According to Ambarsari & Hermanto (2017), strong profitability indicates efficient operations and investment performance. In this study, Return on Assets (ROA) is used to assess profitability, as it gauges the returns generated by total assets, combining both debt and equity. A higher ROA implies better asset management and stronger financial outcomes (Kasmir, 2019).

METHODS

This study employs a quantitative approach to analyze how ESG disclosure, green accounting, and occupational safety influence the profitability of mining firms listed on the IDX from 2019 to 2023. It utilizes a descriptive case study method based on secondary data derived from annual reports and sustainability disclosures. The data are analyzed using panel data regression techniques, allowing for the examination of both time-series and cross-sectional elements across companies and years (Sugiyono, 2022; Pandoyo & Sofyan, 2018).

The study involves one dependent variable—profitability, as measured by ROA—and three independent variables: ESG disclosure (X1), green accounting (X2), and workplace safety (X3). ESG is evaluated using GRI-G4 indicators, green accounting through the ratio of CSR expenses to net profit, and workplace safety via the Injury Frequency Rate (IFR) (Kasmir, 2012; Jeanice & Kim, 2023; Meiyana & Aisyah, 2019).

In accordance with the framework proposed by Bougie & Sekaran (2019), the research follows a seven-step process: identifying the problem, reviewing relevant literature, constructing a theoretical framework, developing hypotheses, collecting data, analyzing the data, and drawing conclusions. The study targets all mining companies listed on the IDX between 2019 and 2023. A purposive sampling method is employed, concentrating on firms that consistently released sustainability reports during this timeframe. From a total of 63 companies, only 8 satisfied the selection criteria, producing 40 firm-year observations for analysis.

Table 1 Sampling Criteria

No	Sampling Criteria	Total
1	Mining sector companies listed on the Indonesia Stock Exchange (IDX) in 2019-2023	63
2	Mining sector companies that do not consistently publish sustainability reports in 2019-2023	(55)

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No	Sampling Criteria	Total
	Total research samples that meet the criteria	8
	Total sample data in 5 years	40

Secondary data were collected through document analysis, including annual and sustainability reports available on official company websites and the IDX portal. The data were analyzed using EViews software with panel data regression. The steps in the analytical process are as follows:

- **Descriptive statistics**: to summarize and describe patterns across ESG disclosure, green accounting, workplace safety, and profitability (measured by ROA).
- **Classical assumption testing**: includes the Jarque-Bera normality test, multicollinearity assessment (tolerance > 0.8), and heteroskedasticity testing (probability > 0.05 indicating homoscedasticity) (Ghozali, 2018; Basuki & Prawoto, 2017).
- **Model estimation**: involves three model options—Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM).
- **Model selection**: uses Chow Test (CEM vs FEM), Hausman Test (FEM vs REM), and Lagrange Multiplier Test (REM vs CEM).
- **Hypothesis testing**: includes Coefficient of Determination (R^2), F-test for simultaneous influence, and t-tests for individual variable impact.

The null hypothesis (H_0) posits no relationship between ESG disclosure, green accounting, and workplace safety with profitability. The alternative hypothesis (H_1) suggests otherwise.

RESULTS

This research employs descriptive statistical analysis to explain and summarize the collected data without attempting to draw general conclusions (Sugiyono, 2014). Descriptive statistics illustrate various values such as the minimum, maximum, average, standard deviation, and others (Sekaran & Bougie, 2016). The data examined covers the independent variables, which include ESG Disclosure, Green Accounting, and Workplace Safety, as well as the dependent variable, Profitability (indicated by ROA). The study population consists of mining companies listed on the Indonesia Stock Exchange (IDX) from 2019 to 2023. A purposive sampling method was used, producing 40 observations (8 companies over 5 years). The results of the descriptive statistical analysis are shown below:

Table 2 Descriptive Analysis Results

	Green Accounting	ESG Disclosure	Workplace Safety	ROA
Mean	-0.032268	-6.75E-12	-1.25E-11	-1.22E-11
Median	-0.255028	0.166199	-0.385683	-0.101009
Maximum	5.524441	1.147345	3.418123	2.724835
Minimum	-0.416721	-2.385555	-0.389828	-1.714465
Std.Dev	0.951275	1.012739	1.012739	1.012739
Skewness	5.303099	-0.968472	2.400349	0.926548

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Based on Table 2, The descriptive analysis aims to explain the characteristics of each variable using mean, minimum, maximum, standard deviation, and skewness values. The dataset includes 8 mining companies observed over a 5-year period (2019–2023), totaling 40 data points.

- **Green Accounting** shows a mean value of -0.0323 with a relatively large standard deviation of 0.9513, indicating considerable variation. Its range spans from -0.4167 to 5.5244. The distribution is positively skewed (5.30), suggesting the presence of outliers in some companies with very high environmental costs.
- **ESG Disclosure** has an average value close to zero (-6.75E-12) and a standard deviation of 1.0127. The values range from -2.3856 to 1.1473. The negative skewness (-0.97) reflects a concentration of data on the right-hand side, with a tail on the left.
- **Workplace Safety**, measured using the Injury Frequency Rate (IFR), also shows a near-zero mean (-1.25E-11) and the same standard deviation of 1.0127. Its skewness is 2.40, indicating a long right tail and several extreme values in some companies.
- The **dependent variable ROA** has a similar mean of -1.22E-11 and standard deviation of 1.0127, with values ranging between -1.7145 and 2.7248. The positive skewness (0.93) implies that most companies had ROA values clustered toward the lower range, with fewer achieving very high profitability.

This analysis reveals that although the variables are centered around zero, their distribution and variability differ significantly. These patterns suggest that while some companies have adopted green and safety initiatives extensively, others have lagged behind.

Table 3 Green Accounting Descriptive Statistical Test Results

ESG						
No	**Perusah aan**	**2019**	**2020**	**2021**	**2022**	**2023**
1	**Indo Tambangraya Megah (ITMG)**	1,10297	0,33985	0,38914	0,13521	0,31054
2	**Bukit Asam (PTBA)**	0,27595	0,54422	0,17149	0,17613	0,46318
3	**PT ABM Investama Tbk (ABMM)**	0,97843	0,23686	1,27000	1,11000	1,10000
4	**Bumi Resource Tbk (BUMI)**	0,45000	0,21000	0,41000	0,71000	0,90000
5	**Bayan Resource Tbk (BYAN)**	0,04044	0,07426	0,00746	0,13332	0,00716
6	**United Tractors Tbk (UNTR)**	0,11000	0,02000	0,04000	0,14000	0,12000
7	**Alamtri Resources Indonesia (ADRO)**	0,33956	0,82821	0,17130	0,06281	0,11255
8	**Petrindo Jaya Kreasi**	0,00526	0,00712	0,02899	0,04757	0,35838

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ESG					
Mean	0,41283	0,28257	0,31105	0,31438	0,42148
Median	0,30776	0,22343	0,17140	0,13760	0,33446
Maximum	1,10297	0,82821	1,27000	1,11000	1,10000
Minimum	0,00526	0,00712	0,00746	0,04757	0,00716
Std. Dev	0,3902197 727	0,2657617 993	0,3904604 49	0,3602789 578	0,3649301 583
Observation	8	8	8	8	8

Descriptive analysis of Green Accounting among eight IDX-listed mining companies (2019–2023) reveals inconsistent adoption patterns, with fluctuations in the mean and notable disparities between mean and median values. Outliers like ABMM significantly influenced the data, while companies such as BYAN and UNTR consistently reported lower figures. The high standard deviations in 2019 and 2021 indicate substantial variation in implementation levels across firms, suggesting a lack of uniformity in environmental accounting practices within the industry.

Table 4 Descriptive Statistical Test Results Workplace Safety

Workplace Safety						
No	**Perusah aan**	**2019**	**2020**	**2021**	**2022**	**2023**
1	**Indo Tambangraya Megah (ITMG)**	-0,38416	-0,3802277 899	-0,3876464 43	-0,3893920 085	-0,3824097 467
2	**Bukit Asam (PTBA)**	-0,38851 92257	-0,3845917 035	-0,3893920 085	-0,3898283 998	-0,3824097 467
3	**PT ABM Investama Tbk (ABMM)**	-0,38939 20085	-0,3889556 171	-0,3876464 43	-0,3893920 085	-0,3893920 085
4	**Bumi Resource Tbk (BUMI)**	-0,32655 16529	-0,3518623 517	-0,2466920 345	-0,2859672 567	-0,2209449 444
5	**Bayan Resource Tbk (BYAN)**	-0,37891 86159	-0,3811005 727	-0,3880828 344	-0,3889556 171	-0,3850280 949
6	**United Tractors Tbk (UNTR)**	-0,38808 28344	-0,3867736 603	-0,3876464 43	-0,3880828 344	-0,3863372 69
7	**Alamtri Resources Indonesia (ADRO)**	-0,38764 6443	-0,3876464 43	-0,3850280 949	-0,3850280 949	-0,3867736 603
8	**Petrindo Jaya Kreasi**	2,891834 61	3,4181225 87	2,28175949 2	2,14516899 7	2,28961453 6
Mean		0,03107	0,0946205 5613	-0,0362968 5117	-0,0589346 5285	-0,0304601 1677
Median		-0,38590	-0,3828461 381	-0,3876464 43	-0,3885192 257	-0,3837189 208
Maximum			3,4181225 87	2,28175949 2	2,14516899 7	2,28961453 6

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Workplace Safety					
	2,89183				
Minimum	-0,38939	-0,3889556171	-0,3893920085	-0,3898283998	-0,3893920085
Std. Dev	1,0814473	1,25621537	0,8773563984	0,8337491227	0,8785589332
Observation	8	8	8	8	8

Descriptive statistical analysis of the Workplace Safety variable reveals a significant disparity in occupational safety practices across Indonesia's mining sector. Although the average scores appear relatively low and steady-ranging from 0.031 in 2019 to 0.085 in 2020, these figures mask extreme polarization within the data. Most companies consistently reported negative safety performance values between -0.38 and -0.22, suggesting inadequate implementation of safety protocols. In stark contrast, Petrosea Jaya Kreasi consistently recorded exceptionally high positive values between 2.89 and 3.41, making it a clear outlier in the industry.

This pattern underscores several important observations. First, five major companies ITMG, PTBA, BYAN, UNTR, and ADRO, maintained similarly low scores over five years, indicating limited progress in safety improvements. Second, Petrosea's consistently strong performance sets it apart, suggesting a strategic commitment to workplace safety. Third, BUMI showed a gradual improvement from -0.33 to -0.22, while ABMM experienced a notable decline from -0.06 to -0.39.

The high standard deviation (ranging from 0.83 to 1.25) and a wide value range (from -0.39 to 3.41) reflect strong positive skewness, further highlighting the imbalance in safety practices among firms. These findings suggest that workplace safety has not yet become a strategic priority for many mining companies. However, Petrosea's success demonstrates that higher safety performance is achievable. The disparity also presents critical implications for stakeholders: regulators may need to adopt more differentiated policies; corporate management should consider Petrosea a benchmark for best practices; and investors might view workplace safety as an important indicator of operational risk. Further analysis is warranted to explore the specific factors behind Petrosea's success and the stagnation in other companies, as well as how these safety trends correlate with profitability.

Table 5 Descriptive Statistical Test Results Return on Asset

ROA						
No	**Perusah aan**	**2019**	**2020**	**2021**	**2022**	**2023**
1	**Indo Tambangraya Megah (ITMG)**	-0,22599	-0,7463912763	1,025233256	2,067448406	0,6008624536
2	**Bukit Asam (PTBA)**	0,1023503292	-0,2944822684	0,5507287981	0,9616835522	0,1171785935
3	**PT ABM Investama Tbk (ABMM)**	-0,9313915265	-1,309159213	0,01549906676	-0,07770716613	-0,06005447051
4	**Bumi Resource Tbk (BUMI)**	-0,981525182	-1,714465104	-0,7132042086	-0,2062187903	-0,9765824273
5	**Bayan Resource Tbk (BYAN)**	0,2612245898	0,4857668782	2,532067355	2,724834791	1,513859871
6	**United Tractors Tbk (UNTR)**	-0,2796540041	-0,5698643201	-0,3502647866	0,06068996755	-0,05016896096

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ROA						
7	**Alamtri Resources Indonesia (ADRO)**	-0,5924597705	-0,8268875684	-0,1243102826	0,5627326311	0,0988197901
8	**Petrindo Jaya Kreasi**	-1,296449272	-1,158052138	-0,9949412307	1,320386327	-0,5211428802
Mean		-0,49299	-0,7666918763	0,242600996	0,9267312148	0,0903464962
Median		-0,43606	-0,7866394224	-0,05440560791	0,7622080916	0,02432541457
Maximum		0,26122	0,4857668782	2,532067355	2,724834791	1,513859871
Minimum		-1,29645	-1,714465104	-0,9949412307	-0,2062187903	-0,9765824273
Std. Dev		0,5155548787	0,6304878395	1,056638276	0,9915639654	0,6930395244
Observation		8	8	8	8	8

Descriptive analysis of roa indicates highly volatile profitability trends in indonesia's mining sector from 2019–2023. The average roa dropped sharply in 2020 due to covid-19, followed by gradual recovery. Performance varied widely among firms, byan and itmg showed strong recoveries, while bumi consistently underperformed. The high standard deviation and extreme roa range underscore significant heterogeneity, suggesting that post-pandemic recovery was uneven across the industry.

Classical assumption testing is an essential step in multiple linear regression analysis to ensure the validity of research findings. According to Gujarati and Porter (2009) in *Basic Econometrics*, the main assumptions that must be tested include multicollinearity, normality, heteroscedasticity, and autocorrelation. However, in panel data analysis—especially when dealing with cross-sectional characteristics across multiple periods—autocorrelation testing can be disregarded, as noted by Wooldridge (2015). This research utilizes panel data spanning from 2019 to 2023 and applies three classical assumption tests: a normality test to assess the residuals' distribution, a multicollinearity test to examine potential correlations among independent variables, and a heteroscedasticity test to determine whether error variances are consistent. The normality test plays a crucial role in regression analysis as it checks if the residuals are normally distributed. This assumption underlies the reliability of various statistical procedures, including the t-test and F-test. Within this study, the normality test indicates that the residuals meet the normal distribution assumption, as confirmed by several significant indicators.

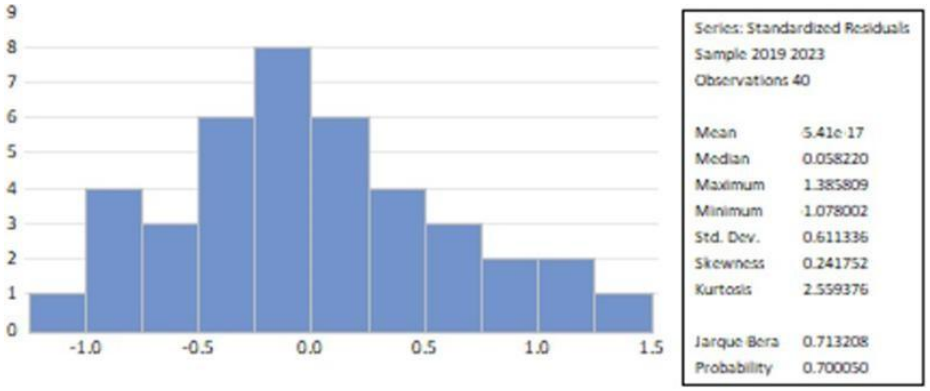

Figure 2 Normality Test

The Jarque-Bera value of 0.713 with a probability of 0.700 (p-value > 0.05) indicates that the residuals are statistically normally distributed. A probability well above the 0.05 significance level is strong evidence that

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there is no significant deviation from the normal distribution. The skewness of 0.612 which is close to zero indicates a symmetrical distribution, with no significant skew to the left or right. Meanwhile, the kurtosis of 2.540 is close to the ideal value of 3, indicating that the shape of the distribution is neither too pointy nor too flat compared to the standard normal distribution.

A mean residual value close to zero (-5.416E-17) and a median of 0.082220 indicate balance in the distribution, although there is a slight difference between the two values. The standard deviation of 0.611116 indicates a reasonable distribution of residuals around the mean. Based on the analysis of 60 observations, the findings offer sufficient evidence to confirm that the normality assumption is satisfied. The purpose of the multicollinearity test is to identify any strong correlations among the independent variables within the regression model. This problem needs to be identified because high multicollinearity can reduce the reliability of the regression coefficient estimates, making the analysis results difficult to interpret appropriately. In general, multicollinearity is considered a serious problem when the correlation coefficient between variables exceeds 0.8 or when the Variance Inflation Factor (VIF) is greater than 10.

Table 6 Multicolinearity Test

	X1	X2	X3
X1	1.000000	0.224369	-0.081815
X2	0.224369	1.000000	-0.787112
X3	-0.081815	-0.787112	1.000000

Based on the correlation matrix obtained, it can be seen that the relationship between the independent variables shows the following characteristics. The correlation between variables x1 and x2 of 0.224 indicates a relatively low and not alarming relationship. Similarly, the correlation between x1 and x3 which is negative -0.082 indicates almost no linear relationship between the two variables. However, there is a high correlation between x2 and x3 with a value of -0.787, which although not exceeding the critical threshold of 0.8, still needs special attention. These correlation values suggest that in general the model does not suffer from serious multicollinearity problems. The highest correlation that emerged between x2 and x3 (-0.787) is close to the threshold of concern, but still within acceptable tolerances. To further confirm, it would be best if supplemented with a vif calculation, where vif values below 5 are usually considered to indicate insignificant multicollinearity.

The heteroscedasticity test is an important check in regression analysis to verify the assumption that the residual variance is constant (homoscedasticity). Heteroscedasticity problems occur when error variances are unstable, which can result in biased standard error estimates and affect the validity of hypothesis testing. In this study, the Breusch-Pagan-Godfrey test is used as a detection method that tests whether the residual variance depends on the independent variables.

Table 7 Heteroscedasticity Test Results

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
Null hypothesis: Homoscedasticity			
F-statistic	1.189640	Prob. F(3,36)	0.3274
Obs*R-squared	3.607802	Prob. Chi-Square(3)	0.3070
Scaled explained SS	3.824192	Prob. Chi-Square(3)	0.2811

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The outcomes of the test indicate that the p-value for the ObsR-squared statistic is 0.3070, while that for the F-statistic is 0.3274—both exceeding the commonly accepted significance threshold of 0.05. These elevated p-values support the acceptance of the null hypothesis of homoscedasticity, suggesting that there is no strong statistical basis to assert the presence of heteroscedasticity in the model. Additionally, the Scaled explained SS yields a probability of 0.2811, further aligning with the earlier findings. The agreement among all three statistical indicators (F-statistic, ObsR-squared, and Scaled explained SS), each demonstrating a probability greater than 0.05, reinforces the reliability of the homoscedasticity assumption. Therefore, it can be concluded that the regression model meets the classical assumption of constant residual variance, ensuring that the estimated coefficients and results of hypothesis tests are dependable.

The Chow test is an important procedure in panel data analysis that helps determine whether a fixed effects model is more appropriate than a pooled OLS model. The essence of the test is to check whether the unique characteristics of each firm exert a significant influence that needs to be accounted for in the model.

Table 8 Chow Test Results

Redundant Fixed Effects Tests
Equation: Untitled
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	5.623484	(7,29)	0.0004
Cross-section Chi-square	34.302250	7	0.0000

The Chow test results show that the fixed effect model (FEM) is more appropriate than the pooled OLS model. The probability value of the F test (0.0004) and Chi-square (0.0000) which are significant below 0.05 prove that there are differences in characteristics between companies that affect the dependent variable.

Table 9 Hausman Test Results

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	8.097245	3	0.0440

The Hausman test is applied to decide whether a fixed-effects model (FEM) or a random-effects model (REM) is more suitable for panel data analysis. The test yields a Chi-square statistic of 8.097 with a p-value of 0.044, which is significant at the 5% level. Because this p-value is less than 0.05, the null hypothesis favoring the random effects model is rejected. Consequently, the fixed effects model (FEM) is selected as it better fits the data. This choice is justified by the presence of a correlation between firm-specific effects and the independent variables, enabling the FEM to deliver more reliable and precise estimates by accounting for the unique heterogeneity of each mining company in the sample.

In this research, multiple linear regression analysis is employed to investigate how the independent variables (ESG Disclosure, Green Accounting, and Workplace Safety) influence the dependent variable (Profitability/ROA). This statistical technique permits the simultaneous examination of the relationships between several predictors and a single outcome variable while controlling for the effects of each independent variable.

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Table 10 Multiple Linear Regression Analysis Results

Dependent Variable: Y
Method: Panel Least Squares
Date: 05/28/25 Time: 01:52
Sample: 2019 2023
Periods included: 5
Cross-sections included: 8
Total panel (balanced) observations: 40

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.001229	0.112188	-0.010956	0.9913
X1	-0.038089	0.141682	-0.268837	0.7900
X2	0.889495	0.347428	2.560230	0.0159
X3	-0.913183	0.665299	-1.372590	0.1804

Based on the regression analysis, the following equation is obtained:
ROA = -0.001229 - 0.038089(ESG Disclosure) + 0.838495(Green Accounting) - 0.913183(Workplace Safety)

1. **Green Accounting** has a positive and significant effect on ROA (p = 0.0159), indicating that better implementation increases profitability.
2. **ESG Disclosure** has no significant effect (p = 0.790); this may be due to the high initial cost of ESG implementation in the mining sector.
3. **Workplace Safety** also shows no significant effect (p = 0.180) and a negative coefficient, possibly reflecting the high costs and short observation period.
4. The **constant** is statistically insignificant (p = 0.991), aligning with theory that companies cannot achieve profitability without implementing ESG, Green Accounting, or Workplace Safety practices.

This research performed hypothesis testing using three statistical techniques: (1) the coefficient of determination (R^2) to evaluate the combined impact strength of the independent variables, (2) the F test to assess overall significance simultaneously, and (3) the t test to examine the individual effect of each independent variable. The purpose of this test is to verify whether the proposed hypothesis is statistically significant so that it can be accepted or rejected (Sugiyono, 2024). This testing process is important to ensure the validity of research findings while providing a scientific basis for drawing conclusions about the relationship between the variables studied.

The coefficient of determination (R^2) indicates the extent to which the independent variables collectively account for the changes in the dependent variable. The value of R^2 lies between 0 and 1, with values nearer to 1 signifying a stronger explanatory power of the model regarding the relationship between variables.

Table 11 Determination Test Results (R^2)

Cross-section fixed (dummy variables)			
R-squared	0.635611	Mean dependent var	-1.22E-11
Adjusted R-squared	0.509960	S.D. dependent var	1.012739
S.E. of regression	0.708947	Akaike info criterion	2.378344
Sum squared resid	14.57556	Schwarz criterion	2.842785
Log likelihood	-36.56687	Hannan-Quinn criter.	2.546271
F-statistic	5.058530	Durbin-Watson stat	2.011633
Prob(F-statistic)	0.000288		

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The results of the analysis reveal an R-squared value of 0.6356, indicating that approximately 63.56% of the changes in profitability (ROA) are accounted for by the variables ESG Disclosure, Green Accounting, and Workplace Safety. Meanwhile, the Adjusted R-squared value of 0.5099 corrects for potential bias introduced by including multiple independent variables, yet still suggests that the model possesses strong predictive capability. The F test, also known as the simultaneous test, assesses whether all independent variables collectively have a significant impact on the dependent variable. The outcome of this test shows a Prob (F-statistic) of 0.000288, which is significantly lower than the 0.01 significance threshold.

Cross-section fixed (dummy variables)			
R-squared	0.635611	Mean dependent var	-1.22E-11
Adjusted R-squared	0.509960	S.D. dependent var	1.012739
S.E. of regression	0.708947	Akaike info criterion	2.378344
Sum squared resid	14.57556	Schwarz criterion	2.842785
Log likelihood	-36.56687	Hannan-Quinn criter.	2.546271
F-statistic	5.058530	Durbin-Watson stat	2.011633
Prob(F-statistic)	0.000288		

Given the very low probability (<0.01), it can be determined that ESG Disclosure, Green Accounting, and Workplace Safety collectively have a significant impact on profitability (ROA). This implies that the regression model is valid, and these three variables together can explain the variations in profitability among mining companies. This finding aligns with the earlier R-squared value, which demonstrates that the model has strong explanatory capability.

The partial t-test is a crucial component of regression analysis used to examine the significance of each independent variable's effect on the dependent variable individually. In this study, the t-test assesses whether ESG Disclosure (X1), Green Accounting (X2), and Workplace Safety (X3) each independently exert a significant influence on company profitability, as indicated by ROA.

Table 12 Partial Test Results (T)

Dependent Variable: Y
Method: Panel Least Squares
Date: 05/28/25 Time: 01:52
Sample: 2019 2023
Periods included: 5
Cross-sections included: 8
Total panel (balanced) observations: 40

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.001229	0.112188	-0.010956	0.9913
X1	-0.038089	0.141682	-0.268837	0.7900
X2	0.889495	0.347428	2.560230	0.0159
X3	-0.913183	0.665299	-1.372590	0.1804

The regression analysis provides a detailed overview of how each factor influences corporate profitability. Firstly, **ESG Disclosure (X1)** was found to have no significant effect on profitability, with a small negative coefficient (-0.038, p-value 0.790). This suggests that while ESG practices may entail substantial implementation costs in the mining sector, their economic benefits might only emerge in the long term. Almanda et al. (2021) emphasized that intellectual capital disclosures, comparable to ESG disclosures, can be used as strategic tools to retain investors and enhance company value. In contrast, **Green Accounting (X2)** demonstrated a positive and statistically significant impact on Return on Assets (ROA), with a coefficient of 0.889 (p-value 0.016). This supports the notion that green accounting enhances operational efficiency, mitigates environmental risks, and strengthens corporate image, thereby improving financial performance. Meanwhile, **Workplace Safety (X3)** exhibited a relatively large negative coefficient (-0.913), yet the effect

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was not statistically significant (p-value 0.180). This may reflect the high initial costs of safety programs in mining, while the benefits, such as reduced accidents and insurance claims, are typically realized over the long run. Lastly, the **model's constant** was also not statistically significant (coefficient -0.001, p-value 0.991), indicating that without ESG, Green Accounting, or Workplace Safety practices, a firm's profitability would be statistically indistinguishable from zero. This aligns with theoretical expectations that these factors are essential to achieving sustainable financial performance.

DISCUSSION

Based on the results of the research that has been conducted, the following is a discussion of the results of the research:

The Effect of Green Accounting on ROA

The results show that green accounting has a positive and statistically meaningful impact on the profitability of mining firms (coefficient = 0.889; p-value = 0.016). This implies that investing in environmental management goes beyond compliance requirements and serves as a strategic advantage that improves operational performance and minimizes long-term risks. Firms that integrate environmental costs into their financial systems tend to attract more responsible investors, benefit from lower financing costs, and enjoy stronger reputations. However, this study did not examine moderating factors such as company size or capital structure, which could influence this relationship and should be considered in future research.

The Effect of ESG Disclosure on ROA

The analysis shows that ESG disclosure has no statistically significant effect on profitability (coefficient = -0.038; p-value = 0.790). This aligns with previous research that argues the financial returns of ESG practices in capital-intensive industries like mining often require long-term integration. High initial compliance costs, investor skepticism, and lack of short-term performance visibility may hinder immediate profitability gains. Nonetheless, ESG reporting still holds long-term value in strengthening stakeholder trust and fulfilling corporate responsibility expectations.

The Effect of Workplace Safety on ROA

Workplace safety demonstrated a negative but statistically insignificant relationship with ROA (coefficient = -0.913; p-value = 0.180). Safety programs often require substantial upfront investments, particularly in hazardous industries like mining, while the financial benefits, such as fewer workplace accidents and lower insurance claims, materialize over time. Moreover, organizational factors such as mechanization level and workforce scale may also shape the effectiveness of safety initiatives. Though the short-term financial impact may be minimal, promoting a safe work environment contributes to long-term employee satisfaction and firm resilience.

CONCLUSION

This study aimed to evaluate the impact of ESG disclosure, green accounting implementation, and occupational safety on the profitability of mining companies registered on the Indonesia Stock Exchange during the period from 2019 to 2023. The sample included 8 companies over 5 years, resulting in 40 firm-year data points. The conclusions below are derived from descriptive analysis and panel data regression outcomes:

- Green Accounting positively and significantly influences profitability. Companies that effectively incorporate environmental costs into their financial reporting are more likely to experience improved asset utilization and long-term financial gains.
- ESG Disclosure does not show a significant impact on profitability. The findings suggest that the advantages of ESG transparency may take longer to influence financial metrics and are more strategic than immediate in nature.

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- Workplace Safety also shows no statistically significant impact on profitability, although qualitative benefits such as improved morale and brand perception remain important.

Despite the absence of significant individual effects from ESG disclosure and workplace safety, the collective influence of the three variables is substantial, as evidenced by an adjusted R-squared value of 0.5099, meaning around 51% of profitability variation is explained by these factors. The regression model passes classical assumption tests (normality, no multicollinearity, homoscedasticity), supporting the validity of the statistical outcomes.

Implications of this study suggest that integrating green accounting offers immediate financial returns, while ESG and workplace safety efforts may require long-term planning and organizational commitment. Future research should consider longer observation periods and include additional control variables such as firm size, capital intensity, and industry sub-sectors.

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