



JIATIS

Journal of International Accounting, Taxation
and Information Systems

<https://jiatis.com/index.php/journal>

Online ISSN 3048-085X

Measurement of Company Financial Performance Using Debt to Equity Ratio and Debt to Total Asset Ratio in Mining Companies in Indonesia

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ARTICLE INFO

Article History

Received : 29.07.2025

Revised : 31.08.2025

Accepted : 05.09.2025

Article Type: Research
Article

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ABSTRACT

This research assesses how debt ratios influence the financial performance of Indonesian coal mining firms by utilizing regression analysis. A sample of 23 coal mining companies listed on the Indonesia Stock Exchange was studied, chosen through purposive sampling from a total of 33 companies between 2020 and 2023. Statistical analysis reveals that Debt to Equity Ratio significantly affects Financial Performance (ROE), demonstrated by a t-test significance value of $0.001 < \alpha 0.05$ and t-value of $-3.390 > t\text{-table } 1.667$. Similarly, Debt to Total Asset Ratio shows significant partial impact on ROE, with t-test results indicating significance of $0.005 < \alpha 0.05$ and t-value of $2.912 > t\text{-table } 1.667$. The F-test confirms that both debt ratios simultaneously influence financial performance, showing significance of $0.003 < \alpha 0.05$ and f-value of $6.169 > f\text{-table } 3.130$. The 0.152 R-squared value suggests that 15.2% of the variability in ROE is accounted for by the independent variables, leaving 84.8% of the variability to be influenced by unexamined factors in this research. The findings demonstrate that debt management strategies significantly impact financial performance in the coal mining sector.

Keywords: Debt to Equity Ratio, Debt to Total Asset Ratio, Financial Performance, ROE, Coal Subsector.

1. Introduction

The tightening economic growth and development encourage companies to maximize value and profits in order to survive and expand their market share. Without profits, companies cannot achieve sustainable growth, which is essential for any type of business. Therefore, companies are required to operate their activities effectively and efficiently, so that good asset management will result in better profits. Along with the growth of the company, they must be able to meet the changing market demands and compete to obtain quality management (Mursalini, Nirwana, et al., 2024).

The success of a company can be determined by reviewing its financial statements, which are essential indicators of its financial well-being (Dewianty et al., 2023). The output of the accounting process, financial statements act as a means of communication linking a company's financial information with its various stakeholders (Artika et al., 2023). Decision-making by investors heavily relies on financial statements, where good financial performance will encourage a higher company value, (Ananda et al., 2023).

Coal mining sub-sector companies, which engage in the exploration and production of coal and lignite, have shown rapid growth, particularly with the surge in global coal prices reaching 85.63% throughout 2021. Despite facing challenges due to the pandemic, these companies have remained stable thanks to a broad market share and consistent sales.

Within the coal sub-sector, key financial indicators such as the Debt to Equity Ratio and Debt to Asset Ratio play a crucial role in determining corporate performance (Mursalini, et al., 2024). DER demonstrates the relationship between debt and equity within the company (Auliyah & Saleh, 2024) while DAR assesses how much of the company's assets are funded by overall debt, (Rizky & Seflidiana, 2019). The more elevated these proportions become, the more the company relies on outside parties and faces the weight of debt expenses that need to be covered (Zaman, 2021). This research is designed to assess the influence of DER and DAR on company financial performance, ultimately aiming to generate knowledge that supports performance improvement initiatives.

2. Literature Review

2.1. Financial Performance

One way to evaluate financial performance is through analyzing Return on Equity (ROE), which illustrates the ability of a company's equity or net assets to generate profits. ROE is a measure of how well a company uses its net assets to maximize its earnings (Kusuma et al., 2021). To carry out the analysis, the following mathematical expression was used:

$$ROE = \frac{\text{Net profit after tax}}{\text{Equity}} \times 100\%$$

2.2. Debt to Equity Ratio

The Debt to Equity Ratio (DER) is a financial measure used to evaluate the ratio of debt to equity. It is calculated by dividing total debt, which includes current liabilities, by total equity (Wulandari & Simamora, 2022). The following formula was employed in this analysis

$$\text{Debt Equity Ratio} = \frac{\text{Total Debt}}{\text{Total Equity}} \times 100\%$$

2.3. Debt to Total Asset Ratio

The ratio known as Debt to Assets Ratio (DAR) is used to evaluate how a company's debts compare to its total assets. Essentially, the impact of the company's assets on the management of those assets is shown (Sari et al., 2021). Here is the formula used:

$$\text{Debt Asset Ratio} = \frac{\text{Total Debt}}{\text{Total Asset}} \times 100\%$$

3. Methodology

The quantitative methodology employed in this study involves gathering data in numerical format and analyzing it using statistical techniques. The study concentrated on analyzing the financial records of coal mining corporations that were listed on the Indonesia Stock Exchange over a period of four years. A total of 23 cases were intentionally chosen from a group of 33 companies as part of the research methodology. Different types of statistical tests, such as traditional assumption checks, tests for multiple linear regression, evaluations of coefficient of determination (R^2), and hypothesis testing, were utilized during the analysis.

4. Results and Discussion

4.1. Research Results

The study proceeded with an analysis of the research statements, drawing upon the gathered dataset. In performing this analysis, moderated regression analysis techniques were employed, and statistical calculations were carried out using SPSS version 19. Classical assumption tests are prerequisites for multiple linear regression analysis, which include normality tests, multicollinearity tests, heteroscedasticity tests, and autocorrelation tests.

4.1.1. Normality Test

The normality test evaluates whether the regression model and error term follow a normal distribution. The Kolmogorov-Smirnov test was used to assess normality by comparing the significance level with $\alpha = 0.05$. The p-value of 0.442 from the One-Sample Kolmogorov-Smirnov test indicates that the data do not violate the assumption of normality. Hence, the residuals follow a normal distribution, proving that the data satisfies the normality test requirements.

4.1.2. Multicollinearity Test

The multicollinearity test is determined by the VIF values for each variable. The requirement to be considered free from multicollinearity is that the VIF values of the variables do not exceed 10. In this study, the testing values did not exceed 10, leading to the conclusion that the model is not affected by multicollinearity issues. The results show that the VIF value is 9,610 for X1 (DER) and 9,610 for X2 (DAR). All values are below 10, indicating that multicollinearity does not occur, as the VIF values are less than 10. Therefore, all variables studied meet the requirements for the use of multiple regression models.

4.1.3. Heteroscedasticity Test

The heteroscedasticity test aims to investigate whether there are differences in the variability of the residuals among various observations in the regression model. The output results from the scatterplot indicate that the points are randomly dispersed and are well distributed both above and below zero (0) on the Y-axis, without clustering in any particular area and not forming a specific pattern. Therefore, it can be inferred that there is no evidence of heteroscedasticity in the regression analysis, meaning that the variance of all these variables indicates that the independent variables, namely DER and DAR, can be used to predict financial performance (ROE).

4.1.4. Autocorrelation Test

The presence of autocorrelation in time-series data is examined by employing the Durbin-Watson statistic, which measures the correlation between adjacent residuals. If the Durbin-Watson (DW) score falls within the range of -2 to 2, it suggests the absence of autocorrelation. Based on the output results, the Durbin-Watson test yielded a value of 1,616. Referring to the Durbin-Watson table, with a sample size (n) of 72 and two independent variables, the DW value is greater than 1,6751. Therefore, it is possible to deduce that there is neither a positive nor negative correlation, or one can deduce that correlation is absent.

4.1.5. Multiple Linear Regression Test

Aiming to contribute to financial performance analysis, this research evaluates the potential impact of DER and DAR on ROE. Based on this, to find the regression equation and the correlation coefficient values, The subsequent table presents the data utilized in this study.

Table 1. Multiple Linear Regression Test Results

Coefficients ^a				
Model		Unstandardized Coefficients		Standardized Coefficients
		B	Std. Error	Beta
1	(Constant)	5.082	8.999	
	Debt to Equity Ratio	-.481	.142	-1.165
	Debt to Total Asset Ratio	1.401	.481	1.001

Source: Data processed whit SPSS Version 19

According to the equation for multiple linear regression shown above, the constant value of 5,082 signifies that the Financial Performance (ROE) will be 5,082 or 50.82% when the independent variables DER and DAR are held constant. This negative coefficient value (-0.481) signifies that a 1% increase in DER contributes to a reduction of ROE by 0.481%, assuming other factors remain unchanged, the Financial Performance decreases by -0,481 or 48,1%. The coefficient value b2 is 1,401, indicating that for every 1% increase in DAR, the Financial Performance increases by 1.401 or 14.01%.

4.1.6. Determination Test (R^2)

In order to evaluate the effect of DER and DAR on ROE, regression and correlation analyses are performed. The dataset used in this analysis is presented in the table 2.

Table 2. Determination Test Results or R Square R^2

Model Summary ^b				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.389 ^a	.152	.127	21.63210

a. Predictors: (Constant), Debt to Total Asset Ratio, Debt to Equity Ratio

b. Dependent Variable: Financial Performance

Source: Data processed whit SPSS Version 19

With an R^2 of 0.152 as shown in Table 2, the model suggests a modest explanatory capacity, where only 15.2% of ROE variation is captured by DER and DAR, and the rest (84.8%) is driven by factors beyond the model's scope.

4.1.7. Hypothesis Test

To determine the partial significance of the independent variables DER and DAR on ROE, a t-test is conducted. In contrast, the F-test is used to assess the joint significance of these variables within the regression model.

Table 3. Partial Test Results and Simultaneous Test Results

Coefficients ^a			
Test	Model	Value	Sig.
t-Test (Partial)	(Constant)	.565	.574
	Debt to Equity Ratio	-3.390	.001
	Debt to Total Asset Ratio	2.912	.005
f-Test (Simultaneous)	Regression	6.169	.003 ^a
	Residual		
	Total		

Source: Data processed whit SPSS Version 19

According to the data analysis conducted in this research, it was determined that the initial hypothesis (H_1) is supported and the null hypothesis (H_0) is disproved, indicating that DER significantly impacts ROE. The t_{value} is $|-3,390| > t_{\text{table}} |1,667|$ and the significance value is $0,001 < \alpha 0,05$. This implies that there is an effect of DER on Financial Performance (ROE).

According to the statistical analysis conducted in this research, the second hypothesis (H_2) is supported while the null hypothesis (H_0) is rejected. The t-statistic of $|2,912|$ exceeds the critical value of $|1,667|$ and the significance level of 0,005 falls below $\alpha 0,05$. This demonstrates that DAR significantly influences Financial Performance.

The results of the F-test indicate that DER and DAR collectively have a statistically significant effect on financial performance, as measured by ROE, with the f-statistic of $|6,169|$ surpassing the critical value of $|3,130|$ and the significance level of 0,003 being less than $\alpha 0,05$. This indicates that DER and DAR jointly exert a significant influence on Financial Performance (ROE).

4.2. Discussion

Through an empirical investigation conducted over the 2020–2023 period, the influence of DER and DAR on financial performance in Indonesia's coal mining industry was analyzed, revealing several key outcomes. The investigation demonstrates that DER significantly impacts Financial Performance within the coal mining sector on the Indonesia Stock Exchange, leading to the acceptance of the first hypothesis (H_1) and rejection of the null hypothesis (H_0). This conclusion is substantiated by a t-statistic of $|-3,390|$ exceeding the critical value of $|1,667|$ alongside a significance level of 0,001 below $\alpha 0,05$.

The analysis reveals that DAR exerts a meaningful influence on Financial Performance among coal mining firms listed on the Indonesia Stock Exchange, resulting in the validation of the second hypothesis (H_2) while dismissing the null hypothesis (H_0). Supporting evidence includes a t-statistic of $|2,912|$ surpassing the threshold of $|1,667|$ with a significance level of 0,005 falling below α 0,05.

The research findings confirm that DER and DAR collectively affect Financial Performance in coal mining companies on the Indonesia Stock Exchange, thereby supporting the third hypothesis (H_3) and rejecting the null hypothesis (H_0). This determination is reinforced by an f-statistic of $|6,169|$ exceeding the critical benchmark of $|3,130|$ accompanied by a significance level of 0,003 below α 0,05.

5. Conclusion

Based on the results of the statistical analysis, this study provides clear evidence that both the Debt to Equity Ratio (DER) and the Debt to Asset Ratio (DAR) significantly influence the financial performance of coal mining companies listed on the Indonesia Stock Exchange during the 2020-2023 period.

First, DER was found to have a significant impact on financial performance (ROE), as it exceeded the critical threshold and met the required significance level. Second, DAR also demonstrated a significant effect on financial performance, as it likewise surpassed the critical benchmark and satisfied the significance criteria. Moreover, the F-test results confirmed that DER and DAR jointly exert a significant influence on ROE, as the test values exceeded the critical limits and met the overall significance requirements.

In light of the study's results, the author recommends that coal sub-sector companies, especially their management teams, maintain vigilant oversight of their Debt to Equity Ratio (DER). This proactive monitoring will support the formulation of strategic financial policies aimed at minimizing the risk of loss due to an imbalanced capital structure.

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