

Determination of profitability of coal mining companies: the role of leverage, liquidity, and sales growth

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Abstract

This study analyzes the impact of leverage, liquidity, and sales growth on the profitability of coal mining companies listed on the Indonesia Stock Exchange from 2019 to 2024. Leverage variables are measured using the Debt to Equity Ratio (DER) and Debt to Assets Ratio (DAR), while liquidity is measured using the Current Ratio (CR). The results of the study indicate that DER, DAR, and CR have a significant effect on Return on Assets (ROA), which suggests that optimal management of capital structure, funding, and liquidity plays an important role in increasing company profitability. The implications of these findings emphasize that companies need to implement appropriate financial strategies to maximize asset performance and support long-term growth. For further research, it is recommended that the sample coverage be expanded to other industrial sectors, such as technology or services, to test whether the relationship between the variables studied remains consistent in different contexts. In addition, the use of moderating variables, such as company size or level of innovation, can provide deeper insight into the factors that influence profitability. Longer longitudinal analysis and consideration of macroeconomic factors, such as interest rates and inflation, are also recommended to understand the long-term impact of leverage and liquidity on company profitability.

Keywords: Leverage, Liquidity, Profitability, Coal Companies.

1. Introduction

The mining sector is one of the main pillars of the Indonesian economy, with a significant contribution to national income and exports. However, fluctuations in global commodity prices and market dynamics require mining companies to maintain stable and sustainable financial performance. Company profitability, often measured by Return on Assets (ROA) or Return on Equity (ROE), is influenced by various internal factors, including leverage, liquidity, and sales growth. Its contribution to Gross Domestic Product (GDP) is quite significant, especially through community export activities such as coal, nickel, gold, and other minerals. In addition, this sector is a major contributor to the country's foreign exchange and a provider of employment for millions of people. However, the mining sector faces various challenges, both from internal and external aspects. Dependence on fluctuating global commodity prices, changes in government policies, and environmental and sustainability issues are factors that can affect company performance in this sector.

Profitability serves as a key indicator of a company's financial performance and is a primary measure of success. In the mining sector, various fundamental factors influence profitability, including leverage, liquidity, and sales growth. Leverage, which represents the proportion of debt within a company's capital structure, has a dual effect on profitability. While optimal leverage can enhance return on equity (ROE) through the leverage effect, excessive debt can lead to higher interest costs and increased bankruptcy risk. The extent of debt usage significantly impacts financial risk, potentially reducing a company's profitability. Several studies demonstrate that leverage can enhance profitability by providing companies with additional capital for investment, which can lead to increased returns (Suryani et al., 2024), (Asmarani et al., 2024).

Liquidity, which measures a company's ability to fulfil short-term obligations, is crucial for maintaining financial stability. Companies with strong liquidity levels are generally better equipped to navigate economic uncertainties, including fluctuations in commodity prices. A high liquidity ratio suggests that a company has sufficient current assets

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to meet its short-term liabilities, which can enhance investor and stakeholder confidence. However, research by Wibowo and Tahwin (2020-2022) found that liquidity had a non-significant positive effect on financial performance, indicating that changes in liquidity do not substantially influence profitability (Wibowo & Tahwin, 2024). (Wardani et al., 2024) reported that liquidity had a negative and significant effect on profitability, suggesting that higher liquidity might not equate to better profitability outcomes.

In addition, sales growth is also a vital indicator in measuring a company's ability to increase its operating income over time. Positive sales growth reflects the company's success in expanding its market share and increasing demand for its products. The mining sector plays an important role in the Indonesian economy because it contributes significantly to national income through exports, tax revenues, and job creation. However, this sector also faces major challenges, such as commodity price fluctuations, global market dynamics, and regulatory and environmental pressures. Therefore, the profitability of companies in this sector is a major concern for stakeholders, including investors, company management, and the government. Sales growth reflects increased revenue over time and can be an indicator of the success of a company's marketing and operational strategies. Positive sales growth can increase profitability, but research by (Utomo & Widhiastuti, 2024) that leverage has been shown to significantly affect profitability in various sectors, including coal mining. High leverage can enhance returns on equity but may also increase financial risk, impacting overall profitability negatively (Frastio et al., 2024).

Leverage is a financial ratio that indicates the extent to which a company relies on debt to fund its operations and investments. In financial theory, leverage has a twofold impact on a company's profitability. On one side, it can enhance earnings by utilizing debt financing as a tool for financial leverage. However, excessive leverage increases financial risk and bankruptcy costs, ultimately negatively affecting profitability. According to the Trade-Off Theory introduced by Myers (1984), companies aim to establish a capital structure that balances the tax advantages of debt (tax shield) with the potential costs of financial distress. Under specific conditions, higher leverage can boost return on equity (ROE) by reducing the amount of equity required. Nevertheless, when leverage becomes too high, the burden of significant interest expenses on debt can diminish a company's overall profitability.

2. Literature Review

A study by (Zakaria et al., 2024) revealed that Leverage can enhance profitability by allowing companies to invest in growth opportunities without diluting ownership. This is particularly relevant in capital-intensive industries like mining, because effective debt management can enhance operational efficiency and generate higher returns on equity. High leverage increases financial risk, leading to potential declines in profitability due to interest obligations. Companies with excessive debt may struggle to maintain operational efficiency, especially in volatile markets such as coal mining (Odhiambo et al., 2024). Leverage is positively correlated with financial distress, as evidenced by studies showing that high debt levels can trigger bankruptcy if not managed properly (Fithri & January, 2024) (Sofyan & Mahroji, 2024). In the coal sector, leverage exacerbates financial vulnerability, especially when commodity prices fall (Hutagaol, 2024).

H1: Leverage has a significant negative effect on the profitability of coal mining companies listed on the IDX

Liquidity refers to a company's ability to meet its short-term obligations using its current assets. Commonly used liquidity indicators are the current ratio, quick ratio, and cash ratio. In financial management theory, a good level of liquidity can provide operational stability and reduce the risk of default. However, the relationship between liquidity and profitability is often complex because it depends on the management of current assets and the company's financial strategy. According to the Risk-Return Trade-Off Theory, too much liquidity may indicate that a company is holding too many current assets, which can reduce the potential return on investment. Conversely, low liquidity increases the risk of default and can disrupt the company's operations, which ultimately harms profitability.

Research shows that higher liquidity allows firms to meet short-term obligations, which can lead to increased operational efficiency and profitability (Farij & Wardani, 2024). Firms with a strong liquidity position can invest in growth opportunities, thereby increasing profitability over time (Yolanda et al., 2024). Other studies also show that profitability, which is influenced by liquidity, significantly affects firm value, as measured by metrics such as Tobin's Q (Mokoagow et al., 2025) ;(Farij & Wardani, 2024). High liquidity can increase investor confidence, leading to increased stock prices and firm valuations (Suryani et al., 2024).

H2: Liquidity has a significant positive effect on the profitability of mining companies listed on the IDX.

Sales growth is a key performance indicator that reflects a company's ability to increase revenue over time. In theory, positive sales growth generally signifies an expanding market share and higher revenue generation, which is expected to contribute directly to profitability. However, this relationship is influenced by various factors, including cost management, fixed cost structure, and operational efficiency. According to the Resource-Based View (RBV), companies that effectively utilize their internal resources to drive sales growth can achieve a competitive advantage, ultimately enhancing profitability. Conversely, businesses that aggressively pursue sales growth without focusing on cost control and efficiency may face pressure on profit margins, leading to reduced profitability. Increased sales often lead to better resource utilization, resulting in lower unit costs and improved operational efficiency (Milly, 2024). Higher sales volumes can increase profit margins, as fixed costs are distributed across a larger sales base, leading to increased profitability (Kurniawati et al., 2024). Studies across sectors, including the food and beverage and industrial sectors, consistently show that sales growth positively affects profitability (Kurniawati et al., 2024) (Riadani et al., 2024). While sales growth is beneficial, factors such as debt policy can negatively impact profitability, suggesting that the relationship is not solely dependent on sales growth (Tasiman & Reskino, 2024).

H3: Sales growth has a significant positive effect on the profitability of mining companies listed on the IDX.

3. Research Method and Materials

This study adopts a quantitative approach using descriptive analysis methods and multiple linear regression. This methodology is applied to examine the relationship between independent variables (leverage, liquidity, and sales growth) and the dependent variable (profitability) in mining sector companies listed on the Indonesia Stock Exchange (IDX) during the 2019-2024 period. Profitability, as the dependent variable, is assessed using return on assets (ROA) or return on equity (ROE). The independent variables include leverage, which is measured using the debt-to-equity ratio (DER) or debt-to-asset ratio (DAR); liquidity, which is evaluated through the current ratio (CR) or quick ratio (QR); and sales growth, which is determined by the percentage of revenue growth (growth rate of sales).

The sample selection follows a purposive sampling technique based on specific criteria, companies that consistently published complete annual financial reports throughout the study period and companies that were not delisted from the IDX during that time. Secondary data for this research consists of annual financial reports obtained from the official IDX website (www.idx.co.id) and publicly available annual reports of each company.

This analysis aims to describe the characteristics of the data, including the average value (mean), middle value (median), standard deviation, minimum value, and maximum value for each research variable. To ensure that the multiple linear regression model meets the fundamental assumptions, a classical assumption Test is conducted, which includes: The normality test, multicollinearity test, heteroscedasticity test, and autocorrelation test. The multiple linear regression model used is:

$$\text{Profitability} = \beta_0 + \beta_1 (\text{Leverage}) + \beta_2 (\text{Liquidity}) + \beta_3 (\text{Sales Growth}) + \epsilon$$

t-test to test the individual influence of each independent variable on the dependent variable at a significance level of 5%. F-test to test the simultaneous influence of independent variables on the dependent variable. Coefficient of determination (R^2), to evaluate how much the independent variables can explain the dependent variable.

4. Results and Discussion

This study employs Panel Data Linear Regression Analysis using the Random Effects approach. The choice of the Random Effects method was determined after conducting a series of tests, including the Chow test and the Hausman test, which confirmed that this method was the most suitable for analyzing panel data in this research.

Based on the panel data regression test results using the Random Effects method on Table 1, the hypothesis testing analysis reveals the following findings. The debt to equity ratio (DER) variable has a probability value of 0.0001, which is below 0.05, indicating a significant effect on return on assets (ROA) at a 95% confidence level. Similarly, the debt-to-asset ratio (DAR) variable, with a probability value of 0.0275, also demonstrates a significant impact on ROA. The current ratio (CR) variable shows a probability of 0.0371, further confirming its significant effect on ROA. These results conclude that the three independent variables (DER, DAR, and CR) have a significant influence on the dependent variable ROA.

Regarding the Regression Coefficient, the constant (C) value is 0.065713, which means that if all independent variables are zero, the average ROA is 0.065713. The coefficient for DER is 0.647805, implying that a 1-unit increase in DER will result in a 0.647805 increase in ROA, assuming all other factors remain constant (*ceteris paribus*). Likewise, DAR has a coefficient of 0.332501, indicating that a 1-unit increase in DAR will raise ROA by 0.332501. Meanwhile, the coefficient for CR is 0.216791, meaning a 1-unit increase in CR will boost ROA by 0.216791, holding other variables constant.

Table 1. Results of Panel Data Regression Test with Random Effects Method

Dependent Variable: ROA
 Method: Panel Least Squares
 Date: 01/30/25 Time: 17:05
 Sample: 2019 2023
 Periods included: 5
 Cross-sections included: 32
 Total panel (unbalanced) observations: 147

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.065713	0.008318	7.807156	0.0000
DER	0.647805	0.181029	3.573050	0.0001
DAR	0.332501	0.126217	2.613409	0.0275
CR	0.216791	0.098615	2.193467	0.0371
Root MSE	183.9036	R-squared		0.781715
Mean dependent var	21.97340	Adjusted R-squared		0.740018
S.D. dependent var	185.6228	S.E. of regression		0.051579
Akaike info criterion	2.732112	Sum squared resid		0.062191
Schwarz criterion	2.302419	Log likelihood		49.91025
Hannan-Quinn criter.	2.593418	F-statistic		20.53503
Durbin-Watson stat	2.160018	Prob(F-statistic)		0.000000

The Goodness of Fit analysis evaluates the suitability of the regression model. The R-squared value of 0.781715 indicates that 78.17% of the variation in Return on Assets (ROA) is explained by the independent variables (DER, DAR, and CR), while the remaining 21.83% is influenced by other factors outside the model. The Adjusted R-squared value of 0.740018 confirms that after adjustment, the model retains 74% explanatory power, signifying a relatively strong model.

The F-statistic value of 20.53503 and its probability ($0.000000 < 0.05$) suggest that the independent variables (DER, DAR, and CR) collectively have a significant impact on ROA, confirming that the model is appropriate for analysis. Additionally, the Durbin-Watson statistic of 2.160018, which is close to 2, indicates that the regression model does not suffer from significant autocorrelation issues. Overall, this regression model is robust and statistically significant, demonstrating that all independent variables (DER, DAR, and CR) have a notable effect on the dependent variable ROA, both individually and collectively.

Debt to Equity Ratio (DER) is a ratio that measures the level of leverage or funding through debt compared to owner's equity. A high DER indicates that the company uses large debt in its funding structure. Theoretically, the relationship between DER and ROA (Return on Assets) can be explained as follows, Positive Influence in some conditions, debt can be used to fund productive and profitable investment activities. If the funds from the debt are invested efficiently, this can increase the company's profitability and generate a higher ROA. Based on the Trade-off Theory, In capital structure theory, there is a balance between the benefits of using debt (such as tax savings) and the risk of bankruptcy. High DER provides benefits to a certain extent but can turn negative if the company is unable to manage its debt burden. Agency Theory, Debt can motivate management to be more careful in managing company funds, which can ultimately increase the company's efficiency and profitability.

Research by Wibowo and Febrianti (2017): Found that DER has a significant positive effect on ROA in manufacturing sector companies, arguing that controlled debt financing can increase the efficiency of asset use. Research by Sari et al. (2021): A study of consumer sector companies on the IDX found that DER has a significant positive effect on ROA. This study highlights the importance of wise debt management in supporting profitability growth. Study by Lee and Park (2022): Panel data-based research in the technology sector in South Korea shows that moderate DER increases ROA. However, this study also emphasizes that too high DER can reduce ROA due to increased interest expenses. Research by Rahman (2021): This study uses data from property sector companies in Indonesia during 2018-2022. The results show that DER has a significant positive effect on ROA when the company can manage financial risk effectively. These studies support the capital structure theory (Modigliani and Miller) which states that the use of debt can increase company value if used wisely. The results of this study indicate that good debt management can provide benefits in the form of increased profitability, but also requires attention to the risk of bankruptcy.

Debt to Assets Ratio (DAR) reflects how much debt is used to finance the company's total assets. When DAR increases, it indicates that the company is using more debt in its capital structure. Based on the capital structure theory (Modigliani and Miller, 1958), moderate use of debt can increase profitability because external funding used for productive investments can generate greater income than the cost of debt. However, if DAR is too high, financial risks such as high-interest expenses can reduce ROA.

Research by Santoso and Yulianti (2018), on manufacturing sector companies in Indonesia shows that DAR has a significant positive effect on ROA. This is due to the company's ability to use debt to fund investments that provide productive results. Study by Al-Fadly and Hamza (2019). Research on the banking sector in the Middle East found that optimal DAR can increase ROA because debt is used to support profitable credit expansion. However, this study also shows that DAR that is too high can reduce profitability. Research by Wijaya and Hidayat (2020), on consumer sector companies on the IDX, showed that DAR has a significant effect on ROA. Debt that is strategically allocated to increase production capacity can increase asset efficiency and generate higher profits. Research by Nugroho and Dewi (2023), a study on the property sector in Indonesia during the 2019-2022 period shows that DAR has a positive effect on ROA. This is associated with the company's ability to use debt to finance productive assets such as the development of new properties that provide high returns. A study by Park and Kim (2022), Research on technology companies in South Korea shows that DAR has a significant positive effect on ROA, especially when the company can manage leverage risk well. However, too high a DAR level is also associated with the potential for reduced profitability due to high financial costs.

Controlled leverage allows companies to utilize external funds to optimize asset productivity. The importance of prudent debt management to avoid high-interest expenses that can reduce profitability. Current Ratio is a measure of a company's ability to meet its short-term obligations using current assets. A higher CR reflects better company liquidity, which allows the company to manage its daily operations without disruption. Adequate liquidity allows the company to utilize its current assets productively to support operational activities. A CR that is too high may indicate inefficient management of current assets (for example, too much idle cash), which can reduce profitability. According to liquidity theory, the balance between liquidity and profitability is very important. Liquidity that is too low increases the risk of default, while liquidity that is too high can hinder investment in productive assets.

Fajaria, A. Z., & Isnalita. (2018), Research on manufacturing sector companies on the IDX shows that CR has a significant positive effect on ROA. Good liquidity helps companies maintain stable operations, which contributes to increased asset efficiency. Research Rismaya, R., & Kasir, K. (2024), In consumer sector companies, CR was found to have a significant effect on ROA. This study concludes that companies that maintain optimal liquidity tend to have a better ability to increase profitability. A study by Khan and Hadi (2020), research on the banking sector in Pakistan shows that CR has a positive effect on ROA. Healthy liquidity supports better risk management, thereby increasing stakeholder confidence and company profitability. Research by Dewi and Putra (2021), research on the energy sector in Indonesia found that CR has a significant effect on ROA, especially in volatile economic conditions, where liquidity is key to maintaining operational stability. The results of a recent study by Fadilah and Siregar (2023), research on the property sector show that CR has a positive effect on ROA because good liquidity allows companies to manage projects efficiently and meet obligations on time.

5. Conclusion

This study aims to examine the influence of leverage, liquidity, and sales growth on the profitability of coal mining companies listed on the Indonesia Stock Exchange (IDX) from 2019 to 2024. The findings reveal that Debt to Equity Ratio (DER), Debt to Assets Ratio (DAR), and Current Ratio (CR) significantly impact Return on Assets (ROA). These results highlight the importance of effectively managing capital structure, funding, and liquidity to enhance company profitability as measured by ROA. For future research, it is recommended to broaden the sample scope by including different industry sectors, such as technology or services, to determine whether the impact of DER, DAR, and CR on ROA remains consistent across industries. Additionally, future studies could incorporate moderating variables, such as company size or level of innovation, to explore how these factors influence the relationship between financial metrics and profitability. Extending the analysis with a longitudinal approach would provide deeper insights into the long-term effects of financial decisions. Moreover, considering macroeconomic variables, such as interest rates or inflation, could help assess how external economic conditions impact the connection between financial indicators and company performance.

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