

Financial Ratios and Corporate Performance: The Interaction of Liquidity, Solvency, and Profitability in Indonesian Mining Companies

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Abstract

This study examines the impact of liquidity and solvency ratios on the financial performance of mining companies listed on the Indonesia Stock Exchange (IDX) during the 2019–2023 period. Amid global commodity price volatility and the implementation of downstream policies in Indonesia's mining sector, the management of financial structures is becoming increasingly critical. Liquidity is measured using cash ratios and quick ratios, while solvency is represented by debt-to-equity ratio (DER) and debt-to-asset ratio (DAR). Financial performance is assessed using profitability indicators such as Return on Assets (ROA) and Return on Equity (ROE), with company size, company age, and exchange rate as control variables. Panel data regression using the Random Effects Model (REM) revealed that DAR had a significant negative effect on ROA, while DER significantly and negatively affected ROE. In contrast, the liquidity ratio did not show a significant effect on profitability. These findings suggest that excessive debt can hinder profitability and that maintaining an optimal capital structure is essential for sustainable financial performance in Indonesia's capital-intensive mining industry. This study provides empirical insights for the formulation of financial strategies in resource-based sectors that are vulnerable to external shocks.

Keywords : Liquidity Ratio, Solvency Ratio, Financial Performance, Mining Sector, Indonesia, ROA, ROE

INTRODUCTION

Global demand for mining commodities continues to show an upward trend in line with the global energy transition and the growth of strategic industrial sectors. Nickel, as a key component in the production of electric vehicle batteries, as well as coal and aluminum, needed to meet the energy needs and construction industries, is experiencing a year-on-year surge in global consumption (Jennifer, 2024; IEA, 2023; WEF, 2024). Seeing this opportunity, the Indonesian government implemented a downstream policy stipulated in Law No. 3 of 2020 concerning Mineral and Coal Mining, which requires mining companies to process mining products domestically (Muhid, 2023). This policy aims to increase added value, strengthen the domestic industry, and make the mining sector one of the backbones of the national economy, with a contribution to GDP reaching 9.3% in the first quarter of 2023 (Public Relations, 2024).

Despite this, the mining sector faces serious challenges due to fluctuations in global commodity prices. In 2023, although the export volume of Indonesia's mining commodities increased from 499.1 million tons to 535.3 million tons, the export value actually decreased sharply by 20.62% (Efliza et al., 2024). This mismatch between the increase in volume and the decrease in

value shows the vulnerability of the mining company's revenue structure to international price volatility. These conditions can affect a company's ability to maintain its liquidity and solvency, which in turn impacts the company's overall financial performance and profitability.

During this uncertainty, the management of a sound financial structure is essential. The liquidity ratio describes a company's ability to meet short-term obligations without experiencing operational disruptions (Sierpińska-Sawicz, 2021). While the solvency ratio measures the long-term ability to meet obligations to creditors (Batrancea, 2021; Kasmir, 2018). In a capital-intensive mining industry that relies heavily on external financing, companies are faced with the dilemma of maintaining an optimal balance of capital structure. This imbalance, if not managed properly, can disrupt business continuity and reduce the company's competitiveness.

Several previous studies have identified a significant influence between financial ratios on company performance, but results vary depending on industry characteristics and country context. For example Ayoush et al. (2021) found positive influence in various sectors in Jordan, while Batrancea (2021) noted the negative association between DER and ROA in the healthcare sector in the United States. This points to the need for more specific research on the mining sector in Indonesia, which has unique characteristics in asset structure, funding, and commodity risk.

This study aims to analyze the effect of liquidity and solvency ratios on financial performance, as measured using profitability ratios (ROA and ROE), in mining companies listed on the Indonesia Stock Exchange during the 2019–2023 period. The study also considered control variables such as company size, company age, and exchange rate as external factors that can affect the relationship between variables. Using the Random Effects Model (REM) panel data regression model, the results of this study are expected to contribute to strategic financial decision-making during global commodity price dynamics, as well as enrich the empirical literature related to the financial management of the mining sector in developing countries.

RESEARCH METHOD

This study used a quantitative approach with an associative method to examine the influence of liquidity and solvency on the profitability of mining sector companies listed on the Indonesia Stock Exchange (IDX) during the 2019–2023 period. The population in this study consisted of all mining companies listed on the IDX, while the sampling technique applied purposive sampling with the criteria that the company remained consistently registered during the observation period, published complete financial statements, and reported the data required to calculate the liquidity, solvency, and profitability ratio. Based on these criteria, several companies were selected as research samples.

The type of data used in this study is secondary data obtained from the annual financial statements published through the official website of the IDX and the official website of each company. The variables observed include liquidity measured using liquidity measured by Cash Ratio (CR) and Quick Ratio (QR). Also, solvency is measured using the Debt to Asset Ratio (DAR) and Debt to Equity Ratio (DER), and profitability is measured using Return on Assets (ROA) and Return on Equity (ROE).

The data analysis in this study used multiple linear regression to test the effect of liquidity and solvency ratios on profitability. Before the regression test, a classical assumption test consisting of normality, multicollinearity, and heteroscedasticity tests was performed. The results of the normality test showed that the data presented was not distributed normally. Furthermore, the regression model was tested by conducting a chow test, a thirst test, and a lagrange multiplier test where the result was that the Random Effect Model (REM) is a suitable model to be used in this study. Hypothesis testing was carried out using t-tests and F-tests with a significance level of 5%. The entire data analysis process is carried out with the help of Eviews. The following are the models tested:

$$ROA = \beta_0 + X1CR_{it} + X2QR_{it} + X3DER_{it} + X4DAR_{it} + \varepsilon_{it}$$

$$ROE = \beta_0 + X1CR_{it} + X2QR_{it} + X3DER_{it} + X4DAR_{it} + \varepsilon_{it}$$

Literature Review

Table 1. Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
CR	210	.001	6.756	.73997	1.181495
QR	210	.05	9.59	1.38705	1.387155
DER	210	-753.542	826.372	4.08969	80.704766
DAR	210	.088	2.418	.55618	0.348839
ROA	210	-.260	.588	0.05971	0.138172
ROE	210	-2.994	138.508	0.76780	9.558523
FA	210	1.00	33.00	16.1429	8.54924
Log_FS	210	8.85	12.25	4.1663	0.02181
Log_ER	210	4.14	4.20	8.1912	2.15729

Liquidity Ratio

The liquidity ratio reflects a company's ability to meet short-term obligations using its current assets. In the mining industry, the level of liquidity is important because companies face long cash cycles due to large investments and commodity price uncertainty. Having liquidity indicators that ensure adequate access to the necessary resources, along with financing decision-making that maintains a balance between internal and external funding, is essential for the smooth operation of the company (Nejadmalayeri & Usman, 2022). This study uses two liquidity indicators, namely Cash Ratio (CR) and Quick Ratio (QR). Yussof (2017) said that a company that does not have sufficient liquidity may not be able to pay its short-term debt to suppliers and

cannot run its business properly, thus the impact affects the company's reputation so that it can cause the company to go bankrupt because it is unable to manage its assets optimally. Companies with high liquidity tend to rely on internal funding sources. By utilizing in-house financing, they can lower the cost of capital, which in turn increases the company's profitability (Tailing et al., 2023).

Solvency Ratio

Solvency reflects the extent to which a company's assets are funded by debt (Dzikra, 2024). In the mining sector, debt utilization is often large due to the capital-intensive and long-term nature of projects. Debt to Assets Ratio (DAR) and Debt to Equity Ratio (DER) are the main indicators. A higher solvency ratio indicates that companies are faced with greater financial risks, but on the other hand they also have the opportunity to earn more profits (Afifah, 2018). Meanwhile, the company's low solvency ratio indicates that the financial risks faced by the company are smaller. This causes companies to only get a small rate of return when economic conditions are good. This statement is supported by (Arhinful & Radmehr, 2023) which states that the company's DER level must be balanced because a high DER indicates that the company is having difficulty paying obligations but if the DER is too low, it limits the profitability obtained.

Profitability Ratio

Profitability reflects a company's ability to generate profits from its assets and equity so as to provide added value to its shareholders (Jihadi et al., 2021; Suhendro, 2018). In mining companies, profitability is affected by operational efficiency, cost structure, and commodity risk management. The Return on Assets (ROA) and Return on Equity (ROE) ratios are used to measure profitability performance. In the mining industry itself, the profitability of mining companies is not only affected by internal factors (such as liquidity and solvency) but also by external factors such as volatility in coal and metal prices. Hawawini and Viallet (2019) stated that the determinant of profitability is influenced by three factors, including the company's competitive position as measured by the company's market share against its competitors, the quality of products and services through consumer assessments, and the asset structure and costs owned by the company. Nguyen and Nguyen (2020) stating that there are several factors that determine the level of profitability of a company, including financial solvency, liquidity, financial leverage, financial adequacy, financial independence, growth, company size, company age, capital structure, and management decisions.

Controller Variables

This study used three control variables, including company size, company age, and exchange rate. Company size is the size of a company measured by its total equity, sales volume, and total assets (Idi et al., 2021) Jihadi et al. (2021) In their research they found that companies with larger assets can better optimize their assets to generate maximum profits. The age of

a company refers to the age of the company from entering the stock market until 2023. Coad (2016) said that older companies tend to have a more optimal ability to turn sales growth into productivity and profitability. The depreciating rupiah currency exchange rate can affect the increase in company spending, especially for companies that rely on imported raw materials or foreign loans in the form of US dollars in carrying out their operational activities (Antono et al., 2019).

Research Hypothesis

Development of the ROA Model Hypothesis

A company's profitability measured through Return on Assets (ROA) represents the efficiency of a company in utilizing all its assets to generate profits. One of the factors that affect the ROA is the company's liquidity, which is represented through the Cash Ratio and Quick Ratio. Adequate liquidity can ensure smooth operations and avoid disruptions due to short-term liabilities, potentially increasing asset efficiency. However, in the context of a mining industry that has a long-term cash cycle and a high cost structure, this relationship can vary. (Ariawan, 2023) in his research on Indonesian mining companies also highlighted the importance of maintaining a proportionate level of liquidity so as not to reduce the effectiveness of asset use. Therefore, a hypothesis is developed that:

H1 : Cash Ratio has a significant effect on ROA

H2: Quick Ratio has a significant effect on ROA.

In addition, the capital structure also affects profitability. The Debt-to-Equity Ratio (DER) and Debt-to-Assets Ratio (DAR) reflect the level of a company's reliance on debt. Umaryadi and Jaya Studies (2024) about mining companies on the IDX shows that high leverage can reduce asset efficiency due to increased interest expense and greater financial risks. In addition, previous research conducted by Endri et al. (2021), found that DAR has a significant influence on the negative nature of relationships in mining companies. In line with the trade-off theory, the use of debt must be balanced with tax benefits and bankruptcy risks. Therefore, the hypothesis is formulated that:

H3: DAR has a significant effect on ROA

H4: DER has a significant effect on ROE

Development of the ROE Model Hypothesis

Meanwhile, Return on Equity (ROE) measures the extent to which a company is able to generate returns for shareholders on the capital they invest. In this context, liquidity remains an important factor because the high availability of current assets allows companies to avoid expensive external financing, which ultimately increases the value of returns for capital owners. Therefore, it is assumed that:

H5: Cash Ratio has a significant effect on ROE

H6: Quick Ratio has a significant effect on ROE.

On the other hand, the use of debt in the capital structure also affects the number of profits that can be distributed to shareholders. Research on the mining sector by Endri et al. (2021), states that there is a significant relationship between DER and ROE. Further Umaryadi and Jaya (2024) The INOVASI journal shows that the higher the proportion of debt to equity or assets, the risk to distributable profits increases, especially in industries that are sensitive to fluctuations in commodity prices. Using debt financing can provide greater profits for companies, as financial leverage increases returns, while the tax protection effect allows companies to reduce their tax burden (& Li, 2020). Thus, it can be hypothesized that:

H7 : DAR has a significant effect on ROE

H8: DER has a significant effect on ROE

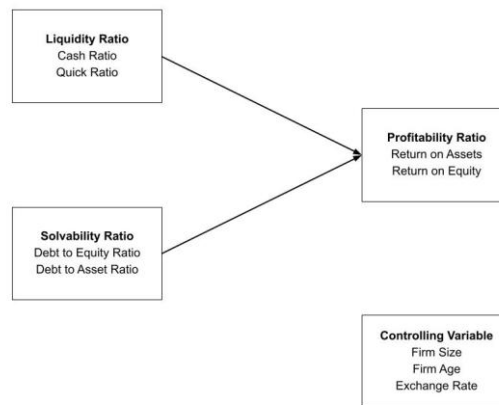


Figure 1. Research Model

RESULTS AND DISCUSSION

Table 2. Liquidity, solvency, and ROA

Variable	Coefficient	Std. Error	t-Statistics	Prob.
C	-4.9599	1.1584	-4.2817	0.0000
CR	-3.1500	0.0107	-0.0029	0.9977
QR	0.0083	0.0103	0.8079	0.4201
DAR	-0.0952	0.0336	-2.8327	0.0051
DER	1.5400	8.2700	0.1866	0.8522
FA	-0.0010	0.0015	-0.7020	0.4835
Log_ER	1.1607	0.2799	4.1471	0.0000
Log_FS	0.0295	0.0061	4.8789	0.0000
Adj. R-Squared	0.216	0.216	0.216	0.216
Observations	210	210	210	210
No. of Firms	42	42	42	42

In the ROA model, the results of the t-statistical test showed that only the Debt to Assets Ratio (DAR) variable had a significant effect on the Return on Assets, with a t-value of -2.832 and a significance level below 0.05. This

means that the higher the company's solvency level, the efficiency of using assets in making profits actually decreases. Meanwhile, the variables Cash Ratio ($t = -0.003$), Quick Ratio ($t = 0.808$), and Debt to Equity Ratio (DER) ($t = -2.832$) did not show a significant effect on ROA. The Adjusted R-Squared value in this model is 0.216, which indicates that 21.6% of the ROA variables can be explained by the independent variables used in the model, while the rest are influenced by other factors outside the model.

A high Debt to Asset Ratio (DAR) reflects that most of the mining company's assets are financed by debt. This condition creates a fixed burden in the form of interest payments and significant loan principals, so that operational cash flow becomes depressed. In the mining sector in Indonesia, revenues are greatly influenced by fluctuations in global commodity prices such as coal, copper, and nickel. When commodity prices decline, the company's revenue is directly affected, resulting in a reduction in net profit. However, interest payment obligations cannot be postponed, so the efficiency of asset use decreases. This causes a company's ability to generate profits from its assets (ROA) tends to decline as DAR increases.

In addition, the high proportion of debt in the funding structure makes mining companies more vulnerable to financial risks and market volatility. The high cost of maintaining mining assets, post-mining land reclamation obligations, and regulatory and CSR demands further increase the cost burden. When debt-financed assets cannot generate comparable revenue, this lowers the asset return rate (ROA). Thus, the higher the DAR, the more likely the company is to experience a decrease in asset utilization efficiency, which is reflected in the negative relationship between DAR and ROA in mining companies in Indonesia.

Table 3. Liquidity, solvency, and ROE

Variable	Coefficient	Std. Error	t-Statistics	Prob.
C	45.9723	92.6599	0.4961	0.6203
CR	0.0267	0.7570	0.0353	0.9719
QR	-0.3198	0.7105	-0.4501	0.6531
DAR	0.8952	1.9081	0.4691	0.6395
DER	-0.0804	0.0063	-12.7716	0.0000
FA	0.0424	0.0718	0.5907	0.5554
Log_ER	-10.6392	22.2781	-0.4776	0.6335
Log_FS	-0.1597	0.2832	-0.5639	0.5735
Adj. R-Squared	0.426	0.426	0.426	0.426
Observations	210	210	210	210
No. of Firms	42	42	42	42

For the ROE model, the results of the t-statistic test showed that only the Debt to Equity Ratio (DER) had a significant influence on the Return on Equity, with a t-value of -12.772. These findings show that the greater the proportion of debt to total assets, the lower the rate of return to shareholders.

Meanwhile, Cash Ratio ($t = 0.035$), Quick Ratio ($t = -0.450$), and DAR ($t = 0.469$) had no significant effect on ROE. The Adjusted R-Squared value in this model was recorded as 0.426, which suggests that about 42.6% of the ROE variable could be explained by the model, and the rest was influenced by other factors not included in the study.

In mining companies in Indonesia, the high Debt to Equity Ratio (DER) shows a great dependence on debt as a source of funding (Mwenda, 2024). This creates a high interest burden that must be paid periodically, while the company's income is highly dependent on the volatile prices of global commodities such as coal, nickel, and gold. When commodity prices decline, income is immediately depressed so that net profit decreases, while interest obligations remain to be met. This causes a company's ability to generate a return on shareholders (ROE) to decline as the DER increases.

In addition, the mining industry in Indonesia operates in a strict regulatory environment, including obligations to meet environmental standards, pay royalties, and implement downstream programs in accordance with government policies. Mining companies are also required to prepare reclamation funds for post-mining land recovery, which adds to the long-term financial burden. In addition, corporate social responsibility (CSR) which includes the development of community infrastructure, education, and health in the operating area also adds to non-operational costs. This combination of regulatory obligations, reclamation costs, and the implementation of CSR further worsens profitability, especially when the company already has a high capital structure on the debt side.

Robustness Test

Table 3. Robustness Test

	ROA		ROE	
	t-Stat.	Sig.	t-Stat.	Sig.
(Constant)	-3.284	0.001	0.532	0.595
CR	-0.241	0.810	0.024	0.981
QR	0.885	0.377	-0.588	0.557
DAR	-4.537	0.000	0.288	0.773
DER	0.264	0.792	-11.972	0.000
FA	-1.197	0.233	0.700	0.485
Log_FS	7.602	0.000	-0.701	0.484
Log_ER	3.218	0.002	-0.511	0.610
R-square	0.384		0.424	
Adj. R-square	0.363		0.404	
Observations	210		210	
No. of Firms	42		42	

The robustness test with the OLS method showed results consistent with the estimates using REM in both models (ROA and ROE), which showed that the proposed model was stable. Although the adjusted R-squared on OLS is higher, this does not make it superior as REM is better suited for panel data.

Lower REM values also make sense, given its more conservative approach because it takes into account variations between companies.

Discussion

Research shows that liquidity ratios and solvency ratios have varying influences on the financial performance of mining companies in Indonesia. Liquidity ratios measured through cash ratios and quick ratios generally have a positive but not significant effect on profitability, both ROA and ROE. This suggests that even if a company has an adequate amount of cash or current assets, it is not always able to drive an immediate improvement in financial performance. This condition can be explained by the characteristics of the mining industry that is capital-intensive and has a long-term operational cycle, so high cash tends to be saved for long-term investment and operational needs rather than used for short-term productive activities. Meanwhile, solvency ratios measured through debt-to-equity ratios (DERs) show significant negative influences on ROAs, and insignificant negative influences on ROE. This strengthens the view that high debt use actually reduces the efficiency of asset utilization in generating profits. These results are in line with the Chain of Power Theory which states that companies prefer internal financing and tend to avoid debt due to financial costs and risk of bankruptcy. Meanwhile, the debt-to-assets ratio (DAR) shows a significant negative effect on ROE, but not significantly on ROA. These findings suggest that excessive debt burdens on total assets can limit shareholder returns, especially in volatile global commodity price conditions. Previous research conducted by Becerra et al. (2023) It also found that commodity price volatility has a significant influence on economic growth in some countries. Overall, the results of this study confirm the importance of prudent management of financial structures in the mining industry which is heavily influenced by external volatility. Companies need to maintain a balance between sufficient liquidity and a healthy level of leverage to maintain their long-term profitability and competitiveness.

CONCLUSION

This study concludes that while liquidity ratios such as cash ratio and quick ratio do not significantly affect profitability in Indonesia's mining sector, solvency ratios—particularly debt-to-equity ratio (DER) and debt-to-asset ratio (DAR)—negatively impact financial performance, indicating that excessive debt use can reduce shareholder returns. Given the mining industry's characteristics of long-term investment and high operational costs, companies should carefully balance internal and external funding to optimize capital structure. These findings contribute empirically to financial literature in the mining sector and offer practical guidance for management to develop adaptive financial strategies that sustain profitability amid external fluctuations. Future research could explore the impact of market conditions and regulatory changes

on the dynamic relationship between financial structure and corporate performance in resource-based industries.

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