

Analysis of The Impact of Liquidity, Capital Structure, and Asset Growth on The Value of Mining Companies in The Coal Subsector in Indonesia

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Keywords:

Liquidity; Capital Structure; Asset Growth; Firm Value; Coal Mining Industry.

Abstract

This study aimed to analyze the impact of liquidity, capital structure, and asset growth on firm value in coal mining subsector companies listed on the Indonesia Stock Exchange (IDX). The phenomenon of global coal price volatility and energy transition policies provided an important backdrop for examining the factors influencing market valuation in this sector. The population consisted of 27 coal mining companies. Using a purposive sampling method, 22 companies were selected as the research sample over the observation period 2021–2024, resulting in 88 panel observations. The data were analyzed using panel data regression, with the Fixed Effects Model (FEM) selected and estimated using the Panel EGLS (cross-section weights) method to address heteroskedasticity issues. The results indicated that, simultaneously, liquidity, capital structure, and asset growth had a significant effect on firm value. Partially, capital structure had a positive and significant effect on firm value, supporting the Trade-Off Theory, which suggests that debt usage provides tax shield benefits for coal mining companies. In contrast, asset growth had a negative and significant effect, indicating that overly aggressive asset expansion without corresponding profitability improvements is negatively perceived by the market. Meanwhile, liquidity was found to have no significant effect on firm value in this sector. The Adjusted R-squared value of 0.7120 indicated that the independent variables explained 71.20% of the variation in firm value.

INTRODUCTION

The coal mining industry is one of the important sectors in a country's economy. Various global disruptions in recent years, such as wars, climate events, the COVID-19 pandemic, and policy changes, have significantly affected the mining industry (Rumokoy et al., 2023). Coal is not only a major export commodity but also plays a key role in meeting national energy needs through coal-fired power plants (PLTU) (Fernando & Runturambi, 2024; Schernikau, 2017). According to data from the Ministry of Energy and Mineral Resources (MEMR, 2024), Indonesia's coal production reached 775 million tons in 2024, increasing from 687 million tons in the previous year. Although production volume continues to rise, the industry remains highly dependent on global conditions. The decline in international coal prices—from around USD 400 per ton in 2022 to approximately USD 135 per ton in early 2024 (World Bank, 2024)—reflects significant pressure on company profitability, thereby affecting overall firm value.

Global instability has had a substantial impact on coal companies listed on the IDX and has also increased geopolitical risks affecting international market conditions (Rumokoy et al., 2025). At the beginning of the COVID-19 pandemic, global demand declined sharply as

industrial activity slowed across many countries. International coal prices fell below USD 60 per ton, the lowest level in recent years. Although domestic production remained relatively high, companies faced sales constraints due to weakening export demand. This condition reduced the Profitability of coal companies on the IDX, such as PTBA, ITMG, and ADRO, throughout 2020. Entering 2021, energy demand began to recover in line with global economic improvement. Coal prices rose above USD 150 per ton, contributing to improved financial performance of coal issuers. However, domestic regulatory constraints emerged, as the government limited coal exports in early 2021 to ensure domestic supply for PLN. For public companies, this created sales uncertainty despite high global prices. Thus, 2021 was marked by recovering Asset Growth alongside ongoing policy-related market instability (Kanova, 2026; Lu et al., 2026; Oyadeyi et al., 2026).

In 2022, coal companies on the IDX experienced a peak period. The global energy crisis triggered by the Russia–Ukraine war and restrictions on Russian coal exports to Europe drove prices up to around USD 400 per ton. Companies such as PTBA and ITMG recorded historically high net profits. However, concerns emerged regarding sustainability, as profit increases were largely driven by external factors rather than internal efficiency. In addition, the government imposed a temporary export ban in January 2022 to address domestic supply shortages (Zhu et al., 2025). This regulatory uncertainty represented a significant risk despite strong financial performance. Indonesia's coal production reached a record 775 million tons, exceeding government targets (Rahman & Raphael, 2025). However, coal prices subsequently declined to around USD 225 per ton, nearly half of the 2022 peak. This reduced profit margins despite high sales volumes, and several IDX-listed companies reported lower net profits compared to the previous year. Furthermore, increasing ESG pressures and the global energy transition have made foreign investors more cautious in investing in coal stocks (Olanrewaju et al., 2025; Sanz Cedrón, 2023; Zhu et al., 2025).

In 2024, Indonesia's coal production again increased significantly to more than 830 million tons, exceeding government targets. Nevertheless, international benchmark coal prices fell to around USD 135 per ton at the beginning of the year, negatively affecting Profitability for most companies. PT Bukit Asam, for example, reported a profit decline of more than 30% in the first quarter of 2024 compared to the same period in the previous year. Overproduction conditions also raised concerns regarding the sustainability of national coal reserves, which the Ministry of Energy and Mineral Resources (ESDM) estimates to last approximately 44 years if current trends continue (Hersaputri et al., 2024; Malec, 2022). In addition, energy transition pressures intensified, reflected in the rejection of supply contracts by several international partners due to sustainability concerns (Aisbett et al., 2023; Baker, 2022; Newell, 2021).

A number of previous studies have examined the relationship between financial factors and firm value, but the findings remain inconsistent. Some studies suggest that liquidity positively affects firm value because it reflects financial stability (Fajaria & Isnalita, 2018; Nurwulandari, 2021). Conversely, other studies report a negative relationship, arguing that excessively high liquidity may indicate inefficient use of assets (Edem, 2017; Kontuš & Mihanović, 2019). Similar inconsistencies are found in capital structure studies, where some findings show that debt increases firm value through tax benefits (tax shield), while others suggest that high leverage reduces firm value due to increased financial risk. Asset growth also shows mixed results; some studies indicate a positive effect due to expansion opportunities,

whereas in capital-intensive industries such as mining, asset expansion does not always translate into higher market value.

This study aimed to analyze the impact of liquidity, capital structure, and asset growth on firm value in coal mining subsector companies listed on the Indonesia Stock Exchange during the 2021–2024 period. Specifically, it examined the partial and simultaneous effects of these variables on firm value and identified the key determinants of market valuation in the Indonesian coal mining industry amid global price volatility and energy transition challenges.

The study is unique in focusing on coal subsector mining companies in Indonesia while simultaneously examining the effects of liquidity, capital structure, and asset growth on firm value. It also uses recent data reflecting post-pandemic industry conditions and ongoing energy transition dynamics. Thus, it provides a more relevant empirical picture of current coal industry developments in Indonesia. This approach contributes to the financial literature, particularly regarding determinants of firm value in sectors facing global sustainability pressures.

The relevance of this study is high, as its findings are expected to provide both practical and academic benefits. For investors, it offers insights for evaluating the prospects and performance of coal companies in the capital market. For corporate management, it provides a basis for strategic decision-making related to liquidity management, funding policies, and asset growth strategies to enhance firm value. Overall, the study contributes to both academic development in corporate finance and managerial practice in Indonesia's coal mining sector.

RESEARCH METHOD

This research employed a quantitative approach to examine the effect of liquidity (Current Ratio/CR), capital structure (Debt-to-Equity Ratio/DER), and Asset Growth (Growth) on firm value in coal mining companies listed on the Indonesia Stock Exchange (IDX) during the 2021–2024 period. The study was motivated by global coal price volatility and energy transition policies, which highlight the importance of financial factors in determining market valuation.

The population consisted of all coal mining companies listed on the IDX during the study period, totaling 27 firms. Using purposive sampling, 22 companies were selected, resulting in 88 observations (22 companies over four years). The study used secondary data obtained from annual reports, financial statements, and cash flow statements sourced from company disclosures and the IDX database to ensure data reliability and accuracy.

Liquidity was measured using the Current Ratio (CR), capital structure using the Debt-to-Equity Ratio (DER), Asset Growth measured by total asset growth rate (GROWTH), and firm value using Price to Book Value (PBV). These variables were selected based on prior empirical studies in corporate financial management.

Data analysis was conducted using multiple linear regression to examine the relationships between independent and dependent variables. Panel data processing was carried out using EViews 12, enabling both partial and simultaneous hypothesis testing. Classical assumption tests, including multicollinearity, heteroscedasticity, and normality tests, were conducted to ensure model validity. The study also incorporated insights from previous empirical literature to support the development of hypotheses and the research model, ensuring that the methodology was grounded in both theoretical and empirical foundations.

RESULTS AND DISCUSSION

Classical Assumption Tests

Normality Test

This study employed the **Jarque–Bera (JB) test** and the **histogram normality test** to assess data normality. The data are considered normally distributed if the probability value is greater than the 5% significance level ($p > 0.05$). Conversely, if the probability value is less than 0.05 ($p < 0.05$), the data are considered not normally distributed.

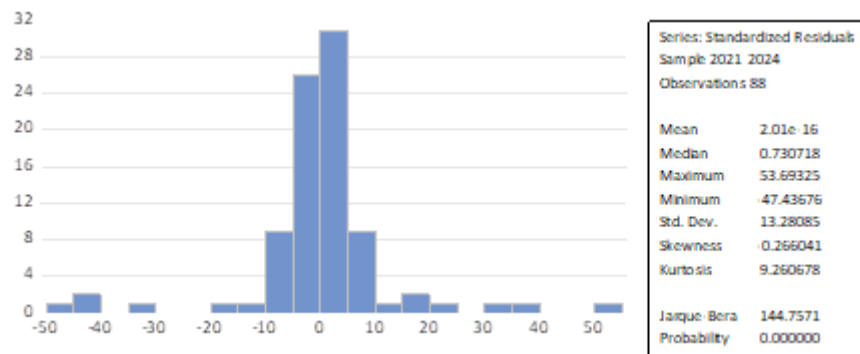


Figure 1. Normality Test Results

Source: EViews 13 (processed data)

Based on the Jarque–Bera normality test, the regression model produced a Jarque–Bera statistic of **144.7571** with a **probability value of 0.000000**. Since the probability value is lower than the 5% significance level ($0.000000 < 0.05$), it can be concluded that the residuals of the regression model are **not normally distributed**. This finding is further supported by the **kurtosis value of 9.26**, which is substantially higher than the ideal kurtosis value of 3 for a normal distribution, as well as the presence of several outliers at both the negative and positive extremes, as illustrated in the histogram.

Multicollinearity Test

Multicollinearity was examined using the **correlation matrix** among the independent variables generated in EViews. According to Ghozali (2018), if the correlation coefficient between any two independent variables is less than **0.80**, the regression model is considered free from multicollinearity.

Table 1 Multicollinearity Test

	CR	DER	GROWTH
CR	1.000000	-0.416944	0.153231
DER	-0.416944	1.000000	0.075232
GROWTH	0.153231	0.075232	1.000000

Source: EViews 13 (processed data)

The correlation matrix shows that the correlation coefficient between **Current Ratio (CR)** and **Debt-to-Equity Ratio (DER)** is **-0.4169**, between **CR** and **GROWTH** is **0.1532**, and between **DER** and **GROWTH** is **0.0752**. Since all correlation coefficients among the independent variables are below the threshold of **0.80**, it can be concluded that the regression model is **free from multicollinearity**. Therefore, these independent variables can be included simultaneously in the regression model without causing significant linear relationship problems.

Heteroskedasticity Test

Table 2 Heteroskedasticity Test

Panel Cross-section Heteroskedasticity LR Test			
Equation: UNTITLED			
Specification: PBV C CR DER GROWTH			
Null hypothesis: Residuals are homoskedastic			
	Value	df	Probability
Likelihood ratio	561.6496	22	0.0000

Source: EViews 13 (processed data)

The heteroskedasticity test was conducted to determine whether the variance of the residuals remains constant across observations. Based on the **Likelihood Ratio (LR) test**, the probability value obtained was **0.0000**. Since this probability is lower than the 5% significance level ($0.0000 < 0.05$), the null hypothesis (H_0) is rejected. This result indicates that the regression model **exhibits heteroskedasticity**, meaning that the residual variance is **not constant (non-homoskedastic)** across observations.

Hypothesis Testing

t-Test

Table 3 t-Test Results

Variabel	T-Statistik	Prob
CR	-1.933029	0.0577
DER	3.866204	0.0003
GROWTH	-2.823695	0.0063

Source: EViews 13 (processed data)

Based on the t-test results, the findings can be explained as follows:

1. Effect of Current Ratio (CR) on Firm Value (PBV)

The Current Ratio (CR) variable has a regression coefficient of **-1.1027** with a probability value of **0.0577**. Since the probability value is greater than the 5% significance level ($0.0577 > 0.05$), it can be concluded that CR does **not** have a statistically significant partial effect on Firm Value (PBV). This finding indicates that the company's level of liquidity is not a primary consideration for investors in determining firm value within the context of this study.

2. Effect of Debt-to-Equity Ratio (DER) on Firm Value (PBV)

The Debt-to-Equity Ratio (DER) has a positive regression coefficient of **4.8517** with a probability value of **0.0003**. Since the probability value is well below the 5% significance level ($0.0003 < 0.05$), DER is concluded to have a **positive and statistically significant** effect on Firm Value (PBV). This result suggests that greater reliance on debt financing is perceived positively by the market, as debt is viewed as a source of capital for business expansion that can enhance firm value.

3. Effect of Asset Growth (GROWTH) on Firm Value (PBV)

The GROWTH variable has a negative regression coefficient of **-2.7140** with a probability value of **0.0063**. Since the probability value is less than 0.05 ($0.0063 < 0.05$), Asset Growth has a **negative and statistically significant** effect on Firm Value (PBV). Although statistically significant, the negative coefficient indicates that inefficient or overly aggressive asset growth

during the study period was perceived negatively by investors, resulting in a decline in firm value.

F-Test

Table 4 F-Test Results

Statistik-F	9.964955
Prob-F	0.000000

Source: EViews 13 (processed data)

Based on the F-test results, the decision criterion is that if the **Prob(F-statistic)** is less than **0.05**, the regression model is considered statistically significant. In this study, the probability value is **0.000000**, which is substantially lower than 0.05. Therefore, it can be concluded that **Current Ratio (CR)**, **Debt-to-Equity Ratio (DER)**, and **Asset Growth (GROWTH)** simultaneously have a **significant effect** on Firm Value (PBV). This finding indicates that the regression model is statistically valid (fit) for explaining and predicting firm value during the **2021–2024** observation period.

Coefficient of Determination (R²)

Table 5 Coefficient of Determination (Adjusted R²)

Adjusted R-square
0.712072

Source: EViews 13 (processed data)

Based on the results presented in Table 4.6, the **Adjusted R-squared** value is **0.712072**. This indicates that the independent variables—**Current Ratio (CR)**, **Debt-to-Equity Ratio (DER)**, and **Asset Growth (GROWTH)**—collectively explain **71.21%** of the variation in the dependent variable, **Firm Value (PBV)**. The remaining **28.79%** of the variation is explained by other variables or factors that are not included in the regression model. The use of the **Adjusted R-squared** provides a more reliable and unbiased measure of explanatory power, as it has been adjusted for the number of explanatory variables and the sample size used in the study.

Discussion of Results

Based on the results of hypothesis testing that has been carried out using the *Fixed Effects Model* (FEM) method with the *Cross-section Weights* (EGLS) approach, the following is an in-depth discussion of the influence of each variable:

The Effect of Liquidity on Company Value

The results of the t-test showed that the Liquidity variable (CR) had a regression coefficient value of -1.1027 with a significance level of 0.0577. Because the probability value is greater than 0.05 ($0.0577 > 0.05$), it can be concluded that Liquidity has a negative but insignificant effect on the Company Value in the coal mining sector. These findings are not in line with the Signalling Theory (Brigham and Houston, 2011) which assumes that high liquidity is a positive signal regarding the financial health of the company. The insignificance of this liquidity is suspected because the market interprets the level of current assets that are too high as an indication of the existence of idle cash that is not productive. Investors tend to appreciate companies that are able to allocate their resources efficiently to operational activities that generate profits or strategic expansion, rather than simply maintaining excess cash positions but not generating returns.

The Influence of Capital Structure on Company Value

The results of the t-test showed that the Capital Structure variable (DER) had a positive coefficient of 4.8517 with a significance value of 0.0003. Since the probability value is much smaller than 0.05 ($0.0003 < 0.05$), it is concluded that the Capital Structure has a positive and significant effect on the Company's Value. These findings support the Trade-Off Theory described by I Made Sudana (2011) and Brigham and Houston (2011), where the use of debt can increase the value of a company through tax *shield* benefits. The increase in debt within certain limits signals to the market that management is optimistic about managing a long-term funding structure for expansion that ultimately improves shareholder prosperity. This result proves that for coal companies in Indonesia, external funding through debt is still seen as a strategic tool to maximize stock prices in the market.

The Effect of Asset Growth on Company Value

The results of the t-test showed that the variable Asset Growth (GROWTH) had a negative coefficient of -2.7140 with a significance level of 0.0063. Because the probability value is less than 0.05 ($0.0063 < 0.05$), it is concluded that Asset Growth has a negative and significant effect on the Company's Value. This finding is in contrast to Growth Theory (Penrose, 1959) which assumes that asset growth is a positive signal regarding the company's expansion. However, these negative results indicate the occurrence of the phenomenon of overinvestment (Brigham and Houston, 2019), where the addition of assets is not followed by a comparable increase in profitability. In the capital-intensive coal sector, the expansion of assets that are too aggressive, especially in non-productive fixed assets, is considered to burden the company's efficiency. Investors responded negatively to this growth because it was feared that it would increase maintenance costs and long-term financial risks, especially amid the uncertainty of the future of fossil energy due to the global energy transition.

Simultaneous Influence of Liquidity, Capital Structure, and Asset Growth

Based on the results of the F test, a significance value of 0.000000 was obtained, which means that together these three variables have a significant effect on the Company Value (PBV). This shows that the combination of the ability to meet short-term liabilities, funding policies, and asset expansion strategies is a crucial factor that investors consider in assessing coal issuers on the Indonesia Stock Exchange. The strength of this model is evidenced by the *Adjusted R-squared* value of 71.21%, which indicates a very high level of explainability of independent variables to the variation of the company's value. Theoretically, these results show that investors do not only look at one financial aspect in isolation, but rather make a holistic assessment of the company's managerial policy combination. In the context of the highly volatile coal industry, these simultaneous results prove that the market responds strongly to how companies balance liquidity resilience amid global commodity price uncertainty, the use of debt as a tax shield, and efficiency in the addition of fixed assets.

CONCLUSION

Based on the results of data analysis and discussion regarding the impact of liquidity, capital structure, and asset growth on firm value in coal mining subsector companies in Indonesia during the 2021–2024 period, the following conclusions can be drawn. Liquidity (Current Ratio) did not have a significant effect on firm value (Price to Book Value). This indicates that a company's ability to meet short-term obligations was not a primary

consideration for investors in valuing coal company shares. These findings also suggest that high liquidity may be interpreted as the presence of idle and unproductive funds. Capital structure (Debt-to-Equity Ratio) had a positive and significant effect on firm value (Price to Book Value). This result indicates that the use of debt in the capital structure was perceived positively by the market, as it signaled strategic financing for operational expansion that could enhance future firm value. Asset growth had a negative and significant effect on firm value (Price to Book Value). This finding shows that overly aggressive or inefficient asset expansion in coal companies was perceived negatively by the market. Investors tended to be concerned about financial risk and operational costs arising from asset increases that were not accompanied by proportional profitability. Simultaneously, liquidity, capital structure, and asset growth had a significant effect on firm value. Based on the F-test results, the regression model was considered fit, with the independent variables explaining 71.21% of the variation in firm value, as indicated by the Adjusted R-squared value.

Based on these findings, several recommendations are proposed. For coal mining companies, it is recommended to optimize debt usage within prudent limits to maximize tax shield benefits, avoid excessive asset expansion without clear Profitability prospects, and manage liquidity efficiently to prevent idle fund accumulation. For investors, capital structure and asset growth should be considered key indicators in evaluating coal mining firm valuations, particularly amid global coal price volatility and energy transition pressures. For future researchers, it is recommended to extend the study period, incorporate additional variables such as profitability or dividend policy, and apply alternative analytical methods to obtain more comprehensive insights into the determinants of firm value in the coal mining sector.

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