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A Comparative Analysis of Profitability, Leverage, and Firm Value in Coal Subsector Companies Listed on the Indonesia Stock Exchange Before and After the Global Coal Price Surge in the 2020-2024 Period

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Abstract

This study aims to analyze the differences in profitability, leverage, and firm value before and after the global coal price surge in coal subsector companies listed on the Indonesia Stock Exchange during the 2020-2024 period. Profitability is measured using Return on Assets (ROA), leverage is measured using Debt to Equity Ratio (DER), and firm value is measured using Price to Book Value (PBV). This study employs a quantitative approach with a comparative research design. The data used are secondary data obtained from annual financial report and company stock price data. The sample was selected using purposive sampling, resulting in 15 coal subsector companies. The analysis techniques include descriptive statistics, the Shapiro-Wilk normality test, Paired Sample T-Test, and Wilcoxon Signed-Rank Test. The result show that there is a significant difference in profitability before and after the global coal price surge, as indicated by the Paired Sample T-Test with a significance value of 0.000. In contrast, there is no significant difference in leverage, with a Wilcoxon Signed-Rank Test significance value of 0.100. Similarly, there is no significance difference in firm value, with a significance value of 0.776. The findings indicate that the global coal price surge significantly improved companies' ability to generate profits from their assets, but did not result in statistically significant changes

Keywords: Profitability, leverage, firm value, coal price surge.

INTRODUCTION

The capital market plays a strategic role in the economy as a means of raising funds and facilitating long-term investment. For investors, investment in the capital

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market is primarily aimed at obtaining returns and increasing wealth, which is reflected in firm value. Firm value is an important indicator because it represents investors' perceptions of a company's overall performance and prospects and is generally reflected in its stock price. A higher firm value indicates greater investor confidence in the company's ability to generate sustainable profits.

The coal subsector is one of the industries whose financial performance is highly influenced by fluctuations in global commodity prices. During 2020–2024, coal companies experienced significant changes in global coal prices, ranging from pressure during the COVID-19 pandemic to a substantial price surge in 2021–2022. In 2020, the coal industry experienced considerable pressure as the global pandemic caused the coal reference price to decline sharply. In contrast, during 2021 to the end of 2022, the coal reference price increased significantly and exceeded USD 300 per ton. This surge was associated with the global energy crisis and geopolitical supply disruptions.

The substantial increase in coal prices created opportunities for coal companies to increase revenue and profitability. The increase in coal prices directly affected companies' profit margins and financial performance. Profitability in this study is measured using Return on Assets (ROA), which reflects the company's ability to utilize its assets to generate net income. The surge in coal prices provided companies with greater financial flexibility through increased cash flows and profits.

In addition to profitability, the global coal price surge may also affect companies' capital structure, reflected in the Debt to Equity Ratio (DER). Increased cash flows provide management with greater flexibility in determining the level of debt used in financing activities. From the perspective of agency theory, changes in leverage reflect how management manages potential conflicts of interest between managers and shareholders. A reduction in debt may indicate efforts to strengthen financial stability and reduce agency risks, while an increase in debt may reflect management's financing strategy in response to changing financial conditions.

Changes in profitability and leverage may subsequently be reflected in firm value, which is measured using Price to Book Value (PBV). Firm value represents investors' assessment of a company's performance and future prospects. Based on signaling theory, increased profits and responsible financial policies can be interpreted by investors as positive information, potentially increasing stock prices and firm value. Meanwhile, agency theory emphasizes that investor confidence may increase when management is able to manage the benefits obtained from higher coal prices efficiently and responsibly.

Previous studies have shown that profitability and leverage are important factors in determining the market valuation of coal companies. Several studies have found that ROA contributes to an increase in firm value, while other studies have identified a relationship between leverage and firm value. However, previous empirical findings are

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not entirely consistent. For example, Mustaqim (2025) found that ROA did not significantly affect PBV in mining companies during 2020–2024. These differences indicate a research gap regarding how changes in commodity prices are reflected in companies' financial performance and market valuation.

Therefore, this study compares the financial conditions of coal subsector companies before and after the global coal price surge. The period before the surge covers 2020–2021, while the period after the surge covers 2022–2024. The comparison is conducted using difference tests to determine whether there are significant differences in profitability, leverage, and firm value between the two periods.

Based on this background, the objectives of this study are to analyze the differences in profitability, leverage, and firm value in coal subsector companies listed on the Indonesia Stock Exchange before and after the global coal price surge.

LITERATURE REVIEW AND HYPOTHESIS FORMULATION

Agency Theory

Agency theory explains the relationship between the owner of a company as the principal and management as the agent. The separation between ownership and management may create differences in interests and potential agency conflicts. Managers generally possess more information regarding the company than shareholders, creating information asymmetry. Therefore, financial transparency and monitoring mechanisms are necessary to reduce agency conflicts.

In the context of coal subsector companies, changes in external conditions such as the global coal price surge may affect managerial decisions concerning asset management, debt utilization, and operational strategies. ROA, DER, and PBV can therefore provide information regarding how management responds to changes in external economic conditions and manages company resources in the interests of shareholders.

Signaling Theory

Signaling theory explains how information provided by a company can influence investors' perceptions. An increase in profitability can serve as a positive signal regarding the company's performance and prospects. Similarly, responsible financial policies may strengthen investor confidence. In this study, changes in ROA, DER, and PBV are used to examine whether the global coal price surge resulted in meaningful changes in corporate financial performance and market valuation.

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Profitability

Profitability reflects a company's ability to utilize its assets to generate profits. In this study, profitability is measured using Return on Assets (ROA), calculated as net income after tax divided by total assets.

The substantial increase in coal prices can increase company revenue and profit, thereby potentially increasing ROA. Therefore, the first hypothesis is:

H1: There is a significant difference in profitability between coal subsector companies listed on the Indonesia Stock Exchange before and after the global coal price surge.

Leverage

Leverage indicates the extent to which a company uses debt in its financing structure. In this study, leverage is measured using the Debt to Equity Ratio (DER), calculated as total liabilities divided by total equity.

The increase in cash flows following the coal price surge may provide companies with greater flexibility to reduce their reliance on debt. Therefore:

H2: There is a significant difference in leverage between coal subsector companies listed on the Indonesia Stock Exchange before and after the global coal price surge.

Firm Value

Firm value reflects the market's perception of a company's performance and prospects and is measured in this study using Price to Book Value (PBV). PBV is calculated by comparing the market price per share with the book value per share.

The increase in profitability following the coal price surge may provide a positive signal to investors and potentially increase firm value. Therefore:

H3: There is a significant difference in firm value between coal subsector companies listed on the Indonesia Stock Exchange before and after the global coal price surge.

RESEARCH METHODOLOGY

Research Design

This study uses a quantitative approach with an ex post facto strategy and a comparative research design. The global coal price surge is not treated as an independent variable tested causally, but rather as the basis for dividing the observation period into two periods: before the surge and after the surge. The variables examined are profitability measured by ROA, leverage measured by DER, and firm value measured by PBV.

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Population and Sample

The population consists of 26 coal subsector companies listed on the Indonesia Stock Exchange during the research period. Using purposive sampling based on predetermined criteria, 15 companies were selected as the research sample. The observation period covers 2020–2024, resulting in 75 company-year observations.

The sample companies are ABMM, ADRO, ARII, BSSR, BYAN, GEMS, GTBO, HRUM, INDY, ITMG, KKGI, MBAP, PTBA, SMMT, and TOBA.

The sample selection criteria include companies classified in the Coal Production sub-industry according to the IDX Industrial Classification, listed consistently during 2020–2024, publishing complete audited annual reports, providing complete ROA, DER, and PBV data, and not undertaking corporate actions such as mergers or acquisitions that could substantially distort financial statements during the observation period.

Variables Measurement

Table 1. Variables Measurement

Variable	Measurement
Profitability (ROA)	Net Income After Tax / Total Assets
Leverage (DER)	Total Liabilities / Total Equity
Firm Value (PBV)	Stock Price per Share / Book Value per Share

Data Analysis Technique

The data were analyzed using descriptive statistics, the Shapiro-Wilk normality test, and difference tests using IBM SPSS Statistics 27. The annual data for each company were averaged into two observation periods: before the global coal price surge (2020–2021) and after the surge (2022–2024).

The Paired Sample T-Test was used when the data fulfilled the normality assumption, while the Wilcoxon Signed-Rank Test was used when the normality assumption was not fulfilled. The hypothesis was tested at a 5% significance level. A significance value below 0.05 indicates a significant difference, while a value above 0.05 indicates no significant difference.

RESULT AND DISCUSSION

Descriptive Statistics

Descriptive statistical analysis was conducted to provide of overview of the characteristics of profitability, leverage, and firm value before and after the global coal

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price surge. The analysis includes the minimum, maximum, mean, and standard deviation values of each variable. The results are presented in Table 2.

Table 2. Descriptive Statistics

Variable	N	Minimum	Maximum	Mean	Std. Deviation
ROA Before	15	-0.02	0.37	0.1307	0.12107
ROA After	15	0.02	0.47	0.2085	0.14314
DER Before	15	0.22	10.12	1.5672	2.54679
DER After	15	0.27	6.50	1.0862	1.56783
PBV Before	15	0.32	6.70	1.8170	1.61167
PBV After	15	0.46	20.70	2.7847	5.08553

Source: Processed from IBM SPSS Statistics 27

Based on Table 2, the average ROA increased from 0.1307 before the global coal price surge to 0.2085 after the surge. Meanwhile, the average DER decreased from 1.5672 to 1.0862. The average PBV increased from 1.8170 to 2.7847. These results indicate an improvement in the average profitability and firm value, accompanied by a decrease in the average leverage of the sampled companies after the coal price surge.

Normality Test

The Shapiro-Wilk test was conducted to determine the distribution of the data before selecting the appropriate difference test. The results are presented in Table 3.

Table 3. Shapiro-Wilk Normality Test Result

Variable	Statistic	df	Sig.
ROA Before	0.925	15	0.231
ROA After	0.927	15	0.242
DER Before	0.554	15	0.000
DER After	0.531	15	0.000
PBV Before	0.746	15	0.001
PBV After	0.458	15	0.000

Source: Processed from IBM SPSS Statistics 27

The Shapiro-Wilk test shows that ROA is normally distributed because its significance values before and after the surge are greater than 0.05. Therefore, the

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Paired Sample T-Test was used to examine differences in ROA. In contrast, DER and PBV have significance values below 0.05, indicating that the data are not normally distributed. Therefore, the Wilcoxon Signed-Rank Test was used for DER and PBV.

Difference Test

The difference test was conducted to determine whether there were significant differences in profitability (ROA), leverage (DER), and firm value (PBV) before and after the global coal price surge. The Paired Sample T-Test was applied to DER and PBV based on the results of the normality test.

Table 4. Paired Sample T-Test Results for ROA

Pair	Mean Difference	Std. Deviation	t	df	Sig. (2-tailed)
ROA Before-ROA After	-0.07775	0.06169	-4.881	14	0.000

Source: Processed from IBM SPSS Statistics 27

The Paired Sample T-Test produces a significance value of 0.000, which is below 0.05. Therefore, there is a significant difference in profitability (ROA) before and after the global coal price surge. The negative mean difference of -0.07775 indicates that ROA was higher after the surge. The mean ROA increased from 0.1307 before the surge to 0.2085 after the surge.

This finding in indicates that the global coal price surge was accompanied by an improvement in the ability of coal subsector companies to generate profits from their assets.

Table 5. Wilcoxon Signed-Rank Test Results for DER

Comparison	Negative Ranks	Positive Ranks	Ties	Z	Asymp. Sig. (2-tailed)
DER After-DER Before	10	5	0	-1.647	0.100

Source: Processed from IBM SPSS Statistics 27

The Wilcoxon Signed-Rank Test produces an Asymp. Sig. (2-tailed) value of 0.100, which is greater than 0.05. Therefore, there is no significant difference in leverage (DER) before and after the global coal price surge. Although the mean DER decreased from 1.5672 to 1.0862, the decrease was not statistically significant. The test results show that 10 companies experienced a decrease in DER, while 5 companies experienced an increase.

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The result indicates that the global coal price surge did not lead to a statistically significant change in the leverage of the sampled coal subsector companies.

Table 6. Wilcoxon Signed-Rank Test Results for PBV

Comparison	Negative Ranks	Positive Ranks	Ties	Z	Asymp. Sig. (2-tailed)
PBV After-PBV Before	10	5	0	-0.284	0.776

Source: Processed from IBM SPSS Statistics 27

The Wilcoxon Signed-Rank Test produces an Asymp. Sig. (2-tailed) value of 0.776, which is greater than 0.05. Therefore, there is no significant difference in firm value (PBV) before and after the global coal price surge. Although the average PBV increased from 1.8170 before the surge to 2.7847 after the surge, the increase was not statistically significant. The results show that 10 companies experienced a decrease in PBV, while 5 companies experienced an increase.

The finding indicates that the increase in coal price and the improvement in average profitability did not result in a statistically significant change in the market valuation of the sampled companies.

DISCUSSION

Profitability Before and After the Global Coal Price Surge

The results demonstrate a significant difference in profitability, as measured by ROA, before and after the global coal price surge. The increase in average ROA from 0.1307 to 0.2085 indicates that the sampled coal companies generally experienced improved asset utilization in generating profits after the surge. This finding supports the hypothesis that there is a significant difference in profitability between the two periods.

Leverage Before and After the Global Coal Price Surge

The results show that there is no significant difference in leverage, as measured by DER, before and after the global coal price surge. Although the average DER declined from 1.5672 to 1.0862, the statistical test did not confirm a significant difference. This suggests that changes in the coal price environment did not substantially alter the capital structure of the sampled companies.

Firm Value Before and After the Global Coal Price Surge

The results show that there is no significant difference in firm value, as measured by PBV, before and after the global coal price surge. Although the average PBV increased

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from 1.8170 to 2.7847, the Wilcoxon Signed-Rank Test produced a significance value of 0.776. Thus, the descriptive increase in PBV was not sufficient to demonstrate a statistically significant change in firm value.

CONCLUSION

Based on the results of the analysis and discussion, this study concludes that there is a significant difference in profitability, as measured by Return on Assets (ROA), between coal subsector companies listed on the Indonesia Stock Exchange before and after the global coal price surge. The Paired Sample T-Test produced a significance value of 0.000, indicating that the difference is statistically significant. The average ROA increased from 0.1307 before the surge to 0.2085 after the surge.

In contrast, there is no significant difference in leverage, as measured by the Debt to Equity Ratio (DER), before and after the global coal price surge. The Wilcoxon Signed-Rank Test produced a significance value of 0.100, which is greater than 0.05. Although the average DER decreased from 1.5672 to 1.0862, the change was not statistically significant.

There is also no significant difference in firm value, as measured by Price to Book Value (PBV), before and after the global coal price surge. The Wilcoxon Signed-Rank Test produced a significance value of 0.776. Although the average PBV increased from 1.8170 to 2.7847, the increase was not statistically significant.

Overall, the findings indicate that the global coal price surge was accompanied by a significant improvement in the profitability of coal subsector companies, while changes in leverage and firm value were not statistically significant

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