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The Effect of Tax Expense Efficiency, Debt to Equity Ratio and Firm Size on Return on Assets

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ABSTRACT: This study looks at the impact of Firm Size, Debt to Equity Ratio, and Tax Expense Efficiency on Return on Assets in coal subsector companies listed on the Indonesia Stock Exchange between 2017 and 2024. There are seven firms in the sample, which results in 56 firm-year observations. "Pooled ordinary least squares (OLS) regression is used in the empirical analysis on firm-year data, and diagnostic tests are used to confirm that the calculated connections are reliable". The findings show that the regression model as a whole is statistically significant, indicating that the independent variables work together to explain changes in Return on Assets. However, partial test findings reveal that Firm Size has a positive and statistically significant impact on Return on Assets, the Debt to Equity Ratio has a negative and statistically significant association, and Tax Expense Efficiency has no statistically significant influence. These results suggest that business size and capital structure have a greater impact on profitability in the coal subsector than does tax expense efficiency. By offering sector-specific data from a capital-intensive industry, this study adds to the body of literature by emphasizing the significance of financing choices and operational scale in determining business profitability as well as the limited relevance of tax efficiency under stringent regulatory frameworks.

Keywords: Tax Expense Efficiency, Debt to Equity Ratio, Firm Size, Return on Assets, Coal Subsector Companies.

INTRODUCTION

"Financial statement analysis plays a strategic role in assessing the quality of managerial decision-making and identifying the level of financial risk inherent in the company's activities." Through this analysis, financial information can be interpreted in greater depth as a metric for assessing corporate results and financial condition (Brigham & Houston, 2019; Subramanyam & Wild, 2020).

In the context of the coal mining industry, financial performance analysis is of high urgency. This industry is classified as a capital-intensive sector with large investment requirements, a high level of dependence on external financing, and significant exposure to risk due to global commodity

price volatility and environmental policy dynamics (Jamasb et al., 2017). These conditions cause the financial performance of coal companies to fluctuate, making profitability measurement an important indicator in assessing business sustainability.

Recent research shows that mining companies face greater financial performance pressures than other sectors due to high capital intensity, commodity price fluctuations, and dependence on external financing. Coal price volatility directly affects companies' cash flow and profitability, making financial structure management a crucial factor in maintaining business sustainability. In addition, environmental policies and the global energy transition have increased business uncertainty in the mining industry, which has impacted the stability of companies' financial performance (International Energy Agency, 2023).

A business's ability to generate money by managing its resources is termed profitability. Return on Assets signifies a company's profitability indicator commonly used in financial studies because it shows how well a business uses its total assets to generate net income. (Hery, 2018; Palepu et al., 2020).

The profitability performance of a business entity is influenced by various elements, not only by external factors but also by internal factors that contribute to it. One important internal factor is the effectiveness of tax burden management. Tax expenses are a cost component that directly affects net profit, so suboptimal ineffective tax management can diminish a company's profitability (Chen et al., 2018; Richardson et al., 2016).

Return on Assets (ROA) measures an organization's capacity to earn profits via utilization of all managed assets. Companies with high profitability generally have greater tax liabilities due to increased taxable income, while companies with low profits or losses tend to bear smaller tax burdens or even have no tax liabilities in certain periods (Shabrina & Hadian, 2021).

Furthermore, tax expenses not only affect net income, but also have implications for strategic management policies, particularly those related to investment decisions and funding structures. Graham et al. (2017) show that effective tax rates can affect asset utilization, choice of funding sources, and investment intensity through their impact on the availability of operating cash flows. Therefore, effective tax expense management supports the optimization of company asset utilization, which is reflected in ROA performance, in addition to increasing after-tax profits.

The percentage of company income tax expenses compared to earnings before taxes is known as Tax Expense Efficiency (TEE) in this study. It indicates how much tax responsibilities lower pre-tax profitability. The Methods section clearly outlines the exact measurement, data treatment, and outlier handling techniques due to probable distortions resulting from negative or almost zero profits. However, empirical findings show that the effect of tax efficiency on profitability is not consistent, especially in sectors with complex fiscal regulatory characteristics such as the mining industry. In sectors with strict tax regulations, managerial space to optimize tax expenses is relatively limited, so that the impact on profitability is insignificant (Kovermann & Velte, 2019). In addition, differences in fiscal policies between countries and industry characteristics also influence the correlation between tax efficiency and a company's financial outcomes (Salehi et al., 2020).

In addition to tax efficiency, a firm's financing decisions also play a crucial role in determining its

financial performance. The capital structure, as reflected by the Debt to Equity Ratio, eflects the proportion of debt financing relative to shareholders' equity. An excessive reliance on debt may elevate financial risk as a result of interest obligations and fixed repayment commitments, which can ultimately have a negative impact on the firm's profitability (Aydn et al., 2021).

Firm Size is reflected by the scale of the company's assets base and its operational capacity. Larger corporate entities generally demonstrate superior operational efficiency, along with stronger organizational stability and easier access to funding sources, thereby potentially improving financial performance (Almajali et al., 2016).

In addition, large-scale businesses usually have relatively significant asset ownership, which provides greater flexibility and operational capacity in supporting business activities and increasing profitability (Agape & Triyonowati, 2018). However, the size of assets does not automatically guarantee high profitability if these assets are not managed effectively and efficiently by management.

Excessive leverage may raise financial risk and reduce profitability, according to capital structure theory, especially in capital-intensive sectors like mining, which indicate that excessive financial leverage can increase financial risk and suppress company profitability. In capital-intensive industries such as mining, increased leverage increases interest expenses and increases the company's sensitivity to income fluctuations, thereby negatively impacting Return on Assets (Vo & Ellis, 2017; Zeitun & Tian, 2018).

The inconsistency of previous research results regarding the effect of "Tax Expense Efficiency (TEE), Debt to Equity Ratio (DER), and Firm Size on ROA" indicates a gap in the research field that requires further investigation. In addition, empirical studies that specifically analyze business entities in the coal sub-sector in Indonesia with a relatively long observation period are still limited. In fact, the characteristics of risk and performance volatility in this sub-sector require more in-depth and contextual analysis.

This study is driven by the unique institutional and economic circumstances "Indonesian coal businesses experienced between 2017 and 2024", which goes beyond empirical discrepancies. This time frame encompasses significant fluctuations in commodity prices, stricter environmental rules, and growing pressure from the global energy transition, all of which could change the significance of conventional profitability factors. Therefore, this study investigates whether well-known financial mechanisms such as scale-related efficiency, capital structure trade-offs, and tax efficiency function differently in a highly regulated and capital-intensive extractive industry.

Referring to the background described above, this study seeks to examine the effects of "Tax Expense Efficiency, Debt to Equity Ratio, and Firm Size on Return on Assets in companies in the coal sub-sector listed on the Indonesia Stock Exchange during the period 2017–2024." The results of this study are expected to contribute empirically to the literature on the financial performance of business entities that depend on natural resources, as well as serve as a reference for investors and management in the financial decision-making process.

Financial Statement Analysis

"Financial statement analysis can be understood as a structured evaluative process to assess the financial condition and performance of a company through the interpretation of information presented in financial statements." In addition to describing the historical condition of a company, financial condition analysis, such analysis also serves as an empirical approach to explain a corporate performance through the use of liquidity, solvency, activity, and profitability masures, which are just a few of the financial metrics that have proven useful in capturing the financial dynamics of publicly listed companies on the Indonesia Stock Exchange (Nawawi, 2024).

"The purpose of financial statement analysis is to provide insight into the company's financial status, operational performance, and ability to utilize its financial resources effectively." According to Kasmir (2019), financial statement analysis is applied to identify the capabilities and limitations of business entities, which are then used by management and external stakeholders as a basis for making economic decisions.

In line with this, Harahap (2018) states that financial reporting involves breaking down financial statement items into more specific parts to gain a deeper understanding of the relationships among them. Financial ratios that reflect tax management efficiency, funding structure, company size, and profitability are used in financial statements as the primary method for disseminating information about the financial health of the coal sub-sector business in the context of this study.

Financial Performance

Financial performance refers to the level of effectiveness of management in managing an entity's assets to achieve its operational and financial objectives within a specified period. Financial performance serves as a crucial indicator for evaluating managerial effectiveness and ensuring business sustainability. According to Kasmir (2019), financial performance is a company's achievement as reflected in its financial statements and can be used to evaluate the company's ability to generate profits and maintain its financial stability.

In empirical literature, financial performance is understood as the outcome of effective asset management, funding structure, and operational efficiency of the company. Pervan et al. (2019) emphasize that profitability is a primary indicator of financial performance because it directly reflects a business entity's capacity to generate returns from managed asets, and is often used in empirical investigations to evaluate the success of corporate administration.

Financial ratios are commonly applied to measure financial performance as they provide more concise and informative information than absolute financial risk. Financial ratios are used to describing a company's operational efficiency, financial risk, and ability to create economic value. Since profitability ratios illustrate how effectively a company's generate money from its managed assets, these ratios are used in this study to assess financial performance.

Profitability

"A company's ability to generate profits using its assets and economic resources is reflected in its profitability." Profitability indicators serve to estimate the level of management effectiveness in managing the operational activities of a business entity in order to reap profits. Hery (2018) states that profitability reflects a company's success in optimizing all economic resources, while Kasmir (2019) emphasizes that profitability ratios serve as a tool for evaluating management's effectiveness in running a business efficiently.

Profitability is a major concern for investors and creditors because this indicator reflects the rate of return on invested funds. Return on Assets is one of the ability parameters commonly used in empirical research.

Return on Assets (ROA)

"Return on Assets is a profitability metric used to determine how well a company can generate net income using all of its managed assets." This ratio provides a broad overview of management effectiveness in utilizing corporate resources to produce profits. The more successful a business is in converting its assets into profits, the higher its return on assets, according to Hery (2018).

In this study, ROA is applied as a dependent variable because it effectively reflect a company overall financial perform, particularly in assessing the effectiveness of asset management in coal sub-sector companies that are capital intensive.

Tax Expense Efficiency

"Tax Expense Efficiency describes a company's ability to manage tax expenses so that they do not excessively reduce net profit." Taxes are binding obligations that directly affect a company's profits, so they need to be managed efficiently. Waluyo (2017) explains that tax efficiency can be achieved through proper tax planning and compliance without violating applicable regulations.

Tax Expense Efficiency is generally measured by comparing pre-tax profit and tax expenses, where a lower figure indicates more effective tax management. In the coal industry, which has complex tax regulations and royalty obligations, efficient tax management has the potential to affect the financial position of a business entity.

Debt to Equity Ratio

"Debt to Equity Ratio is a ratio used to assess a company's funding structure by comparing total debt to total capital." This ratio reflects the extent to which a company relies on debt financing to support its operational activities. According to Kasmir (2019), a company's high dependence on debt is reflected in a high DER value, which has the potential to cause financial risks due to interest costs and fixed obligations.

In capital-intensive coal sub-sector companies, debt is often necessary to support exploration and production activities. However, suboptimal funding structures can negatively impact the stability and performance of business entities.

Firm Size

In general, the size of a company is determined by its total assets. The number of employees, sales volume, equity value, total assets, and other parameters can be used as benchmarks in determining the scale of an entity. These measures are often used as indicators to determine the financial health of a company and its ability to continue operations (Saifudin & Yunanda, 2016).

Company size is also related to operational capacity, business stability, and the company's power to access funding sources. Usually, a company financial performance can be improved with greater scale, which gives it greater potential and opportunities for increased operational efficiency (Hery, 2018).

In general, businesses with larger assets have advantages in terms of risk diversification, operational efficiency, and access to a wider range of funding sources. These advantages make it easier for large companies to obtain funds to support business expansion and increase the confidence of external parties, both investors and creditors, because large-scale companies are often perceived as having lower levels of stability and risk (Astivasari & Siswanto, 2018).

This condition enables large-scale companies to achieve more consistent financial results and superior profit margins compared to small-scale business entities (Dang et al., 2018).

Nevertheless, large assets do not always conduct improved finance performance if they dont managed effectively. Therefore, the effect of firm size on financial performance greatly depends on how effectively business entities utilize their managed assets.

Research Hypothesis

Tax Expense Efficiency (TEE) indicates a company's capacity to manage tax expenses arising from operational activities so that they do not put excessive pressure on net profit. Taxes are binding obligations that directly reduce a company's profits, so the level of efficiency in managing them has direct implications for profitability. Substantial tax expenses relative to pre-tax profits risk reducing a business corps capacity to derive profits from its managed assets.

Empirically, the relationship between tax burden efficiency and profitability produces contradictory results. According to Hamdani & Prastiyanti (2022), ROA shows a significant negative correlation with ETR, which is commonly used as a marker of tax efficiency. This conclusion suggests that an increase in tax burden related to profits can weaken the company's ability to maximize profits from its assets, as companies with higher profitability tend to be better at managing their tax liabilities.

However, according to Panggabean & Kasir (2023), firm characterized by a high profitability lean to be more aggressive in their tax management, thereby reducing their tax burden. This shows that

the relationship between TEE and ROA is not always linear, as it is influenced by companies' strategies in managing their tax liabilities. These differing findings confirm that the relationship between Tax Expense Efficiency and Return on Assets is still relevant for further research, especially in industrial sectors with high tax complexity.

H1: Tax Expense Efficiency has a significant association with Return on Assets.

DER describes the proportion of a company's operational financing that comes from loans compared to its own capital. A high DER ratio indicates the dominance of debt use in the financing structure, which has the potential to increase financial risk due to periodic interest and principal payments. If this condition is not balanced with improved operational performance, the company's net profit has the potential to decline.

According to research by Zannati & Ginting (2022),DER has an adverse impact on financial performance, as measured by ROE. Based on these findings, the profitability of an entity can be hampered by higher leverage. Although using different profitability indicators, these findings illustrate that a suboptimal capital structure has the potency to suppress the firm overall profit performance.

On the other hand, (Astuti & Sjarif, 2022) show that the 'Debt to Equity Ratio" does not had a direct effect on "Return on Assets", but rather its effect occurs through financial distress conditions. This indicates that the impact of debt on profitability is highly dependent on financial stability and the firm ability to manage debt risk. Similar findings were also presented by Hamdani & Prastiyanti (2022), that the effect of DER on financial performance is not direct, but is influenced by the company's financial condition. Therefore, the relationship between DER and ROA still shows inconsistent empirical results.

H2: Debt to Equity Ratio negatively affects Return on Assets.

Firm gauge reflects the scale of an entity, which is often proxied by the company's total asset base. Firm Size is often associated with operational capacity, business stability, and ease of access to funding sources. In theory, larger companies may be able to generate more consistent income than smaller companies.

Arismutia (2024) research shows that Firm Size functions as a moderator that strengthens the influence of Return on Assets on company valuation. These results indicate that companies operating on a larger scale tend to be able to maximize their financial performance, so that the resulting profitability has a stronger implication on the overall performance of the company.

Conversely, Zannati & Ginting (2022) show that Firm Size does not always have a direct influence on profit performance, but rather plays a role in increasing or weakening the relation among financial ratios and profitability. These find out denote that company asset size does not always result in higher ROA if not managed properly. As a result, empirical evidence on the relation among company gauge and ROA remains contradictory.

H3: Firm Size positively affects Return on Assets.

The financial performance of a business entity as reflected in ROA can be influenced by the interaction of various interrelated internal factors. ROA represents the level of the extent to which

a firm efficiently utilizes its total assets in producing earnings , so that the efficiency of tax burden management, financing decisions, and the scale of the company's operations become important determinants in determining the level of profitability.

Arismutia (2024) research shows a correlation between capital structure and company profitability, where Firm Size plays a role in strengthening this relationship. In general, larger companies have wider access to funding and increased operational effectiveness, enabling them to manage assets more optimally to generate profits.

Hamdani & Prastiyanti (2022), reveal that tax expense efficiency and funding structure contribute to a company's financial condition through the mechanism of financial distress, although the study does not directly test the effect of tax expense efficiency on ROA. These findings indicate that ineffective tax management and suboptimal capital structure can suppress a company's financial performance.

Furthermore, Panggabean & Kasir (2023) emphasize that company characteristics, including profitability and company size, influence tax management policies that will ultimately impact financial performance.

Based on the synthesis of theory and empirical findings, it can be concluded that "Tax Expense Efficiency (TEE), Debt to Equity Ratio, and Firm Size simultaneously contribute to Return on Assets." However, differences in previous research results indicate inconsistencies in empirical findings, suggesting a research gap that requires further study. Therefore, testing the simultaneous effect of these three variables is relevant, especially in coal sub-sector companies that have high risk levels, high capital intensity, and relatively high financial performance fluctuations.

H4: Tax Expense Efficiency, Debt to Equity Ratio, and Firm Size jointly affect Return on Assets.

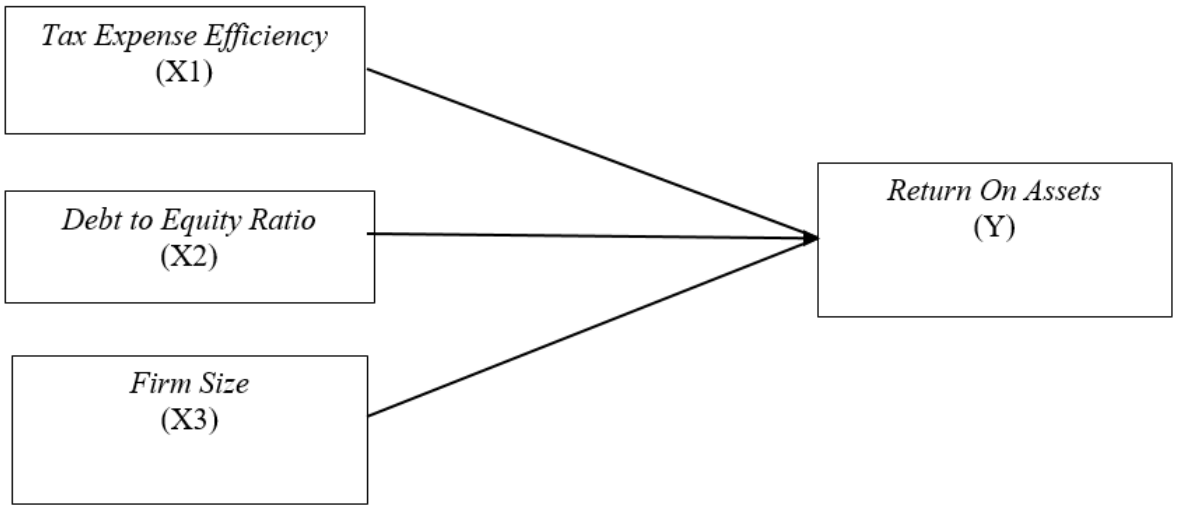

Figure 1. Research Method

METHOD

This study adopts a quantitative methodology using secondary data obtained from the published annual financial reports of coal sub-sector entities listed on the IDX. The data were statistically analyzed to test the causalty relationship among the research variables.

"Data processing and tabulation were used for data analysis, which was followed by traditional assumption diagnostics, such as multicollinearity and heteroscedasticity testing". The analysis concentrates on finding statistical associations rather than causal effects because the data is observational in nature. The relationship between Tax Expense Efficiency, Debt to Equity Ratio, Firm Size, and Return on Assets was then evaluated using pooled ordinary least squares (OLS) regression, with inference interpreted using suitable robustness considerations.

Purposive sampling was used to choose the sample, which was made up of coal subsector businesses who published full annual financial statements and were consistently listed on the IDX between 2017 and 2024. Seven firms make up the final sample, which yields 56 firm-year observations based on these criteria.

Table 1. Operational Variables

No	Variable	Description	Variable Measurement
1	Return on Assets (ROA)	"Return on Assets (ROA) is a measure of profitability that serves to assess how well a company can generate net income from all managed assets. This ratio shows the extent to which management has succeeded in maximizing the use of company assets to generate profits" (Hery, 2018).	**ROA** = Net Income / Total Assets
2	Tax Expense Efficiency	"Tax Expense Efficiency (TEE) shows a company's ability to manage its tax burden so that it does not put excessive pressure on the profits generated. The lower the percentage of tax liability to income before tax, the greater the efficiency in tax management by the company" (Waluyo, 2017).	**TEE** = Beban Pajak / Laba Sebelum Pajak
3	Debt to Equity Ratio DER	"Debt to Equity Ratio is a measure that shows how a company funds its operations by comparing the amount of debt it has with its equity. This ratio is used to assess the level of financial risk arising from the use of debt-based funding in a company's capital structure" (Kasmir, 2019).	**DER** = Total Debt / Total Equity
4	Firm Size	"Firm Size describes the size of the entity being evaluated based on the amount of assets it owns. The application of a natural logarithm to the amount of assets aims to standardize data distribution and minimize scale variations between companies, so that the analysis results are more consistent and can be analyzed statistically." (Hery, 2018)	Firm Size = In (Total Aset)

Note: The Measurement of Variables chapter contains specific measurement formulas, financial-

statement line items, and data treatment processes for each variable.

Measurement of Variables

The ability of a company to make money from its asset base is reflected in return on assets (ROA), which is calculated as the ratio of net income to total assets. Total assets are the total assets at the end of the year, whereas net income is the profit after taxes as shown in the annual financial statements.

The ratio of corporate income tax expense to earnings before tax is known as Tax Expense Efficiency, or TEE. The current income tax expense shown in the profit or loss statement is referred to as the tax expense. Winsorization at the first and 99th percentiles is used to regulate extreme TEE values in order to reduce distortions caused by extremely low or negative earnings before taxes. This process maintains the data's overall distribution while lessening the impact of outliers.

The Debt to Equity Ratio (DER), which shows how much a company depends on debt financing in relation to shareholders' equity, is computed by dividing total liabilities by total equity. The statement of financial situation is the source of both elements.

The natural logarithm of total assets serves as a proxy for firm size. The logarithmic transformation is used to lessen heterogeneity brought on by significant variations in asset values and to standardize the firm size scale across businesses.

RESULTS AND DISCUSSION

Descriptive statistical analysis was used to describe the characteristics of the research data being analyzed. The test was conducted on four research variables, namely Tax Efficiency (TEE), Debt to Equity Ratio (DER), Firm Size, and Return on Assets (ROA) in business entities in the coal sub-sector listed on the IDX during the period 2017 to 2024. Descriptive statistics provide an overview of the data distribution, mean values, and the level of variation between observations for each variable. The results of this analysis form the basis for understanding the data conditions before further testing is carried out through inferential analysis and regression modeling.

Descriptive Statistics

	N	Minimun	Maximum	Mean	Std. Deviation
TEE	56	.07	.49	.2714	.07698
DER	56	-.40	3.17	.7186	.8173
Firm Size	56	.97	22.01	13.9695	4.80365
ROA	56	-9.84	29.40	10.8173	7.92701
Valid N (listwise)	56				

Following a thorough data audit and the use of outlier control techniques, Table 2 displays the descriptive statistics of the research variables. The audit ensures the dependability of the descriptive and inferential analyses by verifying that all variables are accurately calculated,

consistently defined, and produced from the relevant firm-year observations.

56 firm-year observations are used to measure Tax Expense Efficiency (TEE), which ranges from 0.07 to 0.49. With a standard deviation of 0.07698 and a mean TEE value of 0.2714, there is comparatively little variation around the mean. Because winsorization was applied at the first and 99th percentiles to reduce the impact of extreme values brought on by extremely low or negative earnings before taxes, the distribution of TEE is far more stable than it was in the initial results. According to this updated distribution, tax expense efficiency among companies in the coal subsector varies moderately and is not dominated by powerful outliers.

The Debt to Equity Ratio (DER) has an average of 0.7186 and a standard deviation of 0.81738, with a range of −0.40 to 3.17. These numbers show that companies in the coal subsector have varying capital structures, which reflects their varying reliance on loan funding. The degree of dispersion indicates that, in line with the capital-intensive nature of the coal sector, some businesses use more conservative finance techniques, while others rely more heavily on borrowing.

The natural logarithm of total assets, or firm size, has a mean of 13.9695 and a standard deviation of 4.80365, with a range of 0.97 to 22.01. For publicly traded companies, this range is economically feasible and verifies that previous extreme results were the consequence of data calculation errors that have since been entirely fixed. The updated data show significant variance in firm size, which reflects variations in asset ownership and operational capability among enterprises in the coal subsector.

To ensure that the empirical findings are not driven by extreme observations, regression analyses were re-estimated using winsorized data. The results remain qualitatively consistent with the baseline estimations, indicating that the relationships among Tax Expense Efficiency, Debt to Equity Ratio, Firm Size, and Return on Assets are robust and not sensitive to outlier effects.

Table 3. Multicollinearity Test Results
Collinearity Statistics

Model		Tolerance	VIF
1	TEE	.885	1.130
	DER	.993	1.007
	Firm Size	.885	1.129

a. Dependent Variable: ROA

The results of the multicollinearity analysis on the regression model are presented in Table 3. Based on this analysis, all independent variables applied, namely "Tax Efficiency (TEE), Debt to Equity Ratio (DER), and Firm Size, show a Variance Inflation Factor (VIF)" value below the specified threshold. These findings suggest that there is no serious multicollinearity issue, as the independent variables do not exhibit strong intercorrelations within the regression model.

The absence of multicollinearity indicates that each the independent variable demonstrates explanatory power over the dependent variable relatively independently. With this assumption fulfilled, the regression model used can be considered valid, so that the estimated regression coefficient results obtained have a sufficient level of accuracy to be used in further analysis.

Table 4. Heteroscedasticity Test Results

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.006	1.843		1.088	.281
	TEE	-1.611	4.367	-.051	-.369	.714
	DER	-.736	.388	-.249	-1.896	.064
	Firm Size	.096	.070	.190	1.368	.177

a. Dependent Variable: LN_RES2

The findings of the Park test for heteroscedasticity, which regresses the natural logarithm of the squared residuals (LN_RES2) on the independent variables, are shown in Table 4. The test seeks to determine whether Tax Expense Efficiency (TEE), Debt to Equity Ratio (DER), and Firm Size systematically affect the variance of the residuals.

According to the regression results, at the five percent significance level, none of the independent variables have statistically significant coefficients. In particular, Firm Size provides a significance value of 0.177, TEE reports a significance value of 0.714, and DER displays a significance value of 0.064. There is no statistical evidence of heteroscedasticity in the regression model because all p-values are higher than the standard cutoff of 0.05.

These results show that the error term's variance is homoscedastic and does not depend on the independent variables in a systematic way. As a result, the regression estimates can be regarded as effective and trustworthy for additional inference since the assumption of constant variance is met.

Table 5. Autocorrelation Test Results

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watsomn
1	.530[a]	.281	.240	6.91207	1.254

a. Predictors: (Constant), firm Size, DER, TEE
b. Dependent Variable: ROA

The overall fit of the pooled OLS regression model analyzing the impact of Firm Size, Debt to Equity Ratio (DER), and Tax Expense Efficiency (TEE) on Return on Assets (ROA) is shown in Table X. The model's R-square value of 0.281 and modified R-square of 0.240 show that the explanatory variables included account for about 24.0% of the variation in ROA among coal sub-sector businesses. For firm-level financial data, which are usually impacted by a variety of unobserved firm-specific and macroeconomic factors, this degree of explanatory power is deemed reasonable.

A substantial dispersion of the observed ROA values around the fitted regression line is suggested by the estimate's standard error of 6.91207. This suggests that even if the model accounts for significant variance in profitability, a significant amount of ROA dynamics can still be attributed to external factors such changes in commodity prices, operational effectiveness, and coal industry regulations.

The reported Durbin-Watson statistic is 1.254. This statistic is only provided as an additional diagnostic and should be evaluated cautiously due to the firm-year structure of the data. The Durbin-Watson test is not the main method for drawing conclusions about serial correlation

because it was not created especially for pooled firm-year observations. As a result, rather than depending solely on the Durbin–Watson heuristic, the interpretation of the regression findings prioritizes coefficient stability and resilience.

Table 6. t-Test Results

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	8.808	5.432		1.622	.111		
	TEE	-7.270	12.869	-.071	-.565	.575	.885	1.130
	DER	-3.952	1.144	-.408	-3454	.001	.993	1.007
	Firm Size	.488	.206	.296	2.368	.022	.885	1.129

a. Dependent Variable: ROA

The findings of the partial regression analysis looking at the individual effects of Firm Size, Debt to Equity Ratio (DER), and Tax Expense Efficiency (TEE) on Return on Assets (ROA) in coal sub-sector enterprises are shown in Table 6.

According to the findings, ROA is negatively but statistically insignificantly impacted by Tax Expense Efficiency (TEE). With a t-value of −0.565 and a significance level of 0.575, the predicted coefficient for TEE is −7.270, exceeding the standard 5 percent cutoff. This result implies that the profitability of coal sub-sector companies as determined by ROA is not significantly impacted by differences in tax expense efficiency. The outcome suggests that industry-specific fiscal requirements and regulatory frameworks may limit the direct influence of tax management measures on asset-based profitability in this sector.

On the other hand, ROA is negatively and statistically significantly impacted by the Debt to Equity Ratio (DER). A significance level of 0.001 and a t-value of −3.454 are linked to the coefficient estimate of −3.952. This finding suggests that organizations' capacity to earn returns from their assets likely to be diminished by a greater reliance on debt financing. The result is in line with capital structure theory, which contends that more leverage can reduce profitability in capital-intensive sectors like coal mining by raising interest costs and financial risk.

Table 7. F-Test Result

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	971.674	3	323.891	6.779	.001[b]
	Residual	2484.387	52	47.777		
	Total	3456.060	55			

a. Dependent Variable: ROA
b. Predictors: (Constant), Firm Size, DER, TEE

According to the simultaneous F-test findings shown in Table 7, the computed F-statistic is 6.779 at a significance level of 0.001. The regression model used in this study is statistically significant because this value is less than the traditional significance criterion of 0.05. Therefore, over the study period, changes in Return on Assets (ROA) in coal sub-sector enterprises are simultaneously explained by Tax Expense Efficiency (TEE), Debt to Equity Ratio (DER), and Firm Size.

The regression model's statistical significance indicates that there is a significant correlation between firm profitability and the combination of funding structure, tax management effectiveness, and company size. This result suggests that differences in return on assets (ROA) among companies in the coal subsector are a result of the interplay of several financial attributes rather than a single internal factor. As a result, the regression model offers a sufficient empirical foundation for making inferences about the factors influencing coal sector profitability.

Partial testing (t-test) results indicate that Tax Expense Efficiency (TEE) has no statistically significant impact on ROA. The TEE variable's significance level is higher than the 0.05 cutoff, suggesting that asset-based profitability is not directly impacted by the efficiency of tax burden management. The results of this study suggest that fiscal efficiency is not a major factor in determining profitability in coal sub-sector enterprises, despite the theoretical expectation that effective tax management would increase net profit. This outcome is in line with the conclusions of Panggabean & Kasir (2023), who contend that external factors like tax laws, fiscal provisions, and industry-specific tax responsibilities have a significant impact on company tax management methods. As a result, managerial flexibility in maximizing tax expenditures is restricted and may not always result in better financial performance. This requirement is especially pertinent to the Indonesian coal industry, where corporate taxation is controlled by sector-specific fiscal regulations, royalty schemes, and statutory tax rates. These regulations limit the flexibility of tax planning for businesses and erode the direct correlation between profitability and tax expense efficiency (Waluyo, 2017)

On the other hand, ROA is negatively and statistically significantly impacted by the Debt to Equity Ratio (DER). Higher reliance on debt financing tends to lower a firm's ability to create returns from its assets, as confirmed by the negative regression coefficient and significance level below 0.05. This result suggests that a higher percentage of debt in the capital structure increases financial risk and interest costs, which in turn reduces profitability. This outcome is in line with the trade-off theory of capital structure, which contends that while debt financing offers tax benefits, excessive leverage raises agency costs and financial distress. The marginal costs of taking on more debt typically exceed the benefits in capital-intensive sectors like coal mining, which lowers the asset-based profitability of businesses (Zeitun & Tian, 2018).

Additionally, there is a statistically significant positive correlation between Firm Size and ROA. Businesses with larger asset bases typically generate higher profitability, according to the positive regression coefficient and significance level below 0.05. According to this research, large businesses have better operating capability, better resource management, and more stable finances, all of which contribute to higher asset returns. Theoretically, this relationship can be explained by economies of scale and the resource-based view, which holds that larger companies can more effectively spread fixed costs, absorb operational risks, and use strategic resources to increase profitability (Dang et al., 2018). This outcome is in line with the findings of Arismutia (2024), who claims that through asset utilization efficiency and operational optimization, business size enhances financial performance.

The overall test results indicate that while Tax Expense Efficiency, Debt to Equity Ratio, and Firm Size all significantly affect Return on Assets at the same time, only Debt to Equity Ratio and Firm Size have a statistically significant partial effect on ROA. In the meanwhile, the profitability of the

company is not significantly impacted by tax expense efficiency. These results demonstrate that funding composition and operational scale have a greater impact on the profitability of coal sub-sector enterprises than does the effectiveness of tax expense management.

CONCLUSION

According to the study's empirical findings, Return on Assets (ROA) in coal subsector companies listed on the Indonesia Stock Exchange between 2017 and 2024 is correlated with Tax Expense Efficiency (TEE), Debt to Equity Ratio (DER), and Firm Size. This result suggests that rather than being influenced by a single factor pertaining to taxation, capital structure, or operational size, company profitability in the coal industry is determined by the interaction of several internal financial features.

Partially speaking, the findings indicate that ROA is not statistically significantly impacted by Tax Expense Efficiency. This implies that tax expense efficiency is not a significant factor in determining asset-based profitability in coal sub-sector enterprises, despite theoretical assumptions that efficient tax management should increase net profit. The institutional features of Indonesia's coal industry, where corporate taxation is primarily controlled by statutory tax rates, royalty schemes, and sector-specific fiscal restrictions that restrict managerial flexibility in tax planning, are reflected in this result. As a result, increased profitability does not always follow from increases in tax efficiency.

On the other hand, there is a statistically significant negative correlation between ROA and the Debt to Equity Ratio. This conclusion suggests that enterprises' capacity to create returns from their assets likely to be weakened by a greater reliance on debt financing because of higher financial risk and higher interest costs. The outcome is consistent with the trade-off theory of capital structure, which holds that while debt offers tax benefits, excessive leverage raises agency costs and financial distress. The marginal costs of taking on more debt typically exceed the advantages in capital-intensive sectors like coal mining, which lowers profitability.

Additionally, ROA is positively and statistically significantly impacted by firm size. This finding suggests that businesses with bigger asset bases typically have higher profitability, which is indicative of better operational capability, more efficient use of resources, and more stable finances. Theoretically, this relationship can be explained by economies of scale and the resource-based view, which highlight how company size and strategic resources can improve asset-based returns and operational efficiency.

Overall, the results of this analysis show that only capital structure and firm size have a statistically significant direct impact on Return on Assets, even though Tax Expense Efficiency, Debt to Equity Ratio, and Firm Size all affect profitability. These findings imply that funding choices and operational scale have a greater impact on the profitability of coal subsector businesses than does the effectiveness of tax expense management.

However, there are a number of drawbacks to this study. The results may not be as broadly applicable as they may be because the sample is restricted to seven companies in the coal subsector. Furthermore, ratio-based variables are still susceptible to measurement problems despite efforts

to account for extreme values, and the use of pooled firm-year regression imposes methodological limitations. To further improve understanding of profitability dynamics in the coal industry, future research is encouraged to increase the sample size, use different econometric techniques, and include additional variables like operational efficiency, corporate governance mechanisms, and macroeconomic factors.

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