

The effect of capital intensity, leverage, liquidity, moderated by company size on tax aggressiveness (Empirical study on energy companies listed on the Indonesia Stock Exchange for the 2018-2022 period)

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Abstract

Purpose: This study examines the effect of capital intensity, leverage, and liquidity on tax aggressiveness and profitability as moderating variables of tax aggressiveness.

Research methodology: This study used energy companies listed on the Indonesia Stock Exchange, selected using the purposive sampling method from 2018 to 2022 and there were 23 companies chosen. The data analysis in this study used panel data regression.

Results: Capital intensity negatively affects tax aggressiveness; leverage and liquidity have no effect on tax aggressiveness; company size can moderate the effect of capital intensity on tax aggressiveness, but company size cannot moderate the effect of leverage and liquidity on tax aggressiveness.

Conclusions: Audit quality is strongly influenced by the competence and professionalism of internal auditors, while independence contributes positively but not significantly. Ensuring high competence and professionalism enhances the credibility and reliability of government audit.

Limitations: The study was limited to one BPKP representative office with a relatively small sample size, which may restrict the generalizability of the findings to other BPKP offices.

Contribution: This research provides empirical evidence for improving audit quality by strengthening the competence and professionalism of internal auditors, offering valuable insights for audit institutions and policymakers to enhance government accountability.

Keywords: *Capital Intensity, Company size, Liquidity, Leverage, Tax Aggressive*

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1. Introduction

Taxes are a source of income that contributed 77% of state income to the realization of the 2022 APBN, namely 2,034.5 trillion rupiah, and contributed 76.9% to the realization of the 2021 APBN, namely 1,547.8 trillion rupiah. The amount of tax revenue increased by 31.4% in 2022 compared to that in 2021. This shows how important and large the role of tax revenue is in state spending needs, so that tax revenue must be further optimized to finance state spending (Chan, Ramly, & Karim, 2017).

In a study (Pramaiswari & Fidiana, 2022), tax avoidance was defined as an explicit reduction in tax payments through various strategies, including tax management, tax planning, tax aggression, tax evasion (tax avoidance), and tax sheltering. According to Payne and Raiborn (2018), tax aggressiveness can be tax avoidance or evasion. Tax avoidance is a scheme that aims to minimize the tax burden by exploiting loopholes in a country's tax provisions (Lathifa, 2022). According to Darma (2019), an example of tax avoidance is determining unreasonable prices so that the reported income or expenses are not reasonable.

Tax aggressiveness often occurs in various sectors in the form of taxpayers' efforts to avoid tax. In 2021, the PWC stated that only 30 percent of the 40 large energy companies had adopted tax transparency reporting in 2020. Meanwhile, for the rest, the tax reports were not transparent (Suwiknyo, 2021). This case proves that some companies are still trying to avoid taxes by implementing tax aggressiveness to minimize and even manipulate their financial reports and fiscal profits (Celestin, 2015). According to Dewi and Oktaviani (2021), the greater the capital intensity ratio, the greater the depreciation burden and tax avoidance measures. Research related to the capital intensity ratio stated by Budiadnyani (2020) that the capital intensity ratio influences tax aggressiveness. The results of this study are consistent with those of previous studies (Utomo & Fitria, 2021). However, Adisamartha and Noviani (2015) show that capital intensity does not affect tax aggressiveness (TA).

Apart from capital intensity, leverage is another variable that can trigger companies to avoid taxes (Sofiamanan & Machmuddah, 2023). Leverage refers to the use of debt or loan funds to increase returns or profits in a business or investment (Idris, 2021). Research related to the effect of leverage on tax aggressiveness states in Andhari and Sukartha (2017) that leverage has a negative effect on tax aggressiveness. However, the results of this research are not in line with those of Purwanto, Yusraini, and Susilatri (2016) which states that leverage has a significant positive effect on tax aggressiveness. In addition to capital intensity and leverage, a company's liquidity is another variable that influences tax aggressiveness (Sumiati & Ainniyya, 2021). Previous research has attempted to identify factors in company conditions that might influence tax aggressiveness (Laguir et al., 2015). One of them is liquidity (Ramadhani, Firdaus, Nurhayati, & Purwanto, 2025). Purwanto et al. (2016) stated that liquidity has a positive effect on tax aggressiveness. The results of this study are consistent with those of Yuliana and Wahyudi (2018).

A high liquidity ratio reflects that a Company can easily pay off its short-term obligations; however, a low liquidity ratio reflects the condition of a company with a low ability to pay off its short-term obligations, including tax debts. This triggers the possibility that the company does not comply with applicable tax regulations (Eberhartinger & Zieser, 2021). Purwanto et al. (2016) found that companies with low ratios tend to engage in tax aggressiveness to maintain their cash flow.

This study has a moderating variable: company size (CS). According to (Sergius Fribontius Bon, 2022), company size is a measurement grouped based on the size of the company and describes its activities and income. Company size can be measured through the company's total assets, which are calculated using logarithmic values (Utomo and Fitria, 2021). Company size was divided into three groups: small, medium, and large (Carlisle et al., 2023). Large companies are said to have a low ETR because they can maximize tax planning to reduce tax expenses (Novita & Fahmy, 2022). However, there is also a theory that states otherwise: because large companies are in the public spotlight, their tax costs tend to be high (Hemrit & Belgacem, 2024).

According to Luke and Zulaikha (2016) and Yuliana and Wahyudi (2018), company size positively affects tax aggressiveness. Utomo and Fitria (2021) state that company size moderates the influence of capital intensity on tax aggressiveness. Based on the background above, the title of this research is "The Effect of Capital Intensity, Leverage and Liquidity on Tax Aggressiveness with Company Size as a Moderating Variable."

1.1 Problem Formulation

The problem formulation in this study is described in detail as follows:

1. Does capital intensity affect tax aggressiveness?
2. Does leverage affect tax aggressiveness?
3. Does liquidity affect tax aggressiveness?
4. Does company size moderate the effect of capital intensity on tax aggressiveness?
5. Does company size moderate the effect of leverage on tax aggressiveness?
6. Does company size moderate the effect of liquidity on tax aggressiveness?

2. Literature review

2.1 Agency theory

Agency theory, as proposed by Jensen and Meckling (1976), suggests that the separation between the owner (principal) and manager (agent) of a company can give rise to agency problems. The owner is the principal, and the manager is the agent who runs the company; thus, agency problems arise. Each party attempts to maximize its utility function. The difference in interests between management (the agent) and the principal can give rise to agency conflicts. Gene fund principals want large profits. Principals and agents also avoid risks. This conflict is referred to as agency theory.

Based on this, agency theory is closely related to companies' tax avoidance and aggressiveness. The differences in the interests of owners and agents from a tax perspective are similar to those between a company and the state. Companies implement various policies to maximize profits, one of which is reducing their tax burden. Therefore, this study examines whether capital intensity, leverage, and liquidity, with profitability as a moderating variable, affect tax aggressiveness.

2.2 Company Size

Company size classifies a company based on its assets into large and small categories (Utomo & Fitria, 2021). According to Utomo and Fitria (2021), large companies have resources that can be utilized to manage their taxes well, in contrast to small companies. Low company profits mean that the company's tax burden is low and reduces the level of aggressiveness.

According to Utomo and Fitria (2021), when a company grows, its capital and asset intensity increases. With these resources, the depreciation costs borne by the company increase, so the company's taxable profit will decrease, and the income tax borne by the company will decrease. Companies can use it to reduce their tax burden, thereby reducing corporate tax aggressiveness will be reduced.

Many studies have examined the effect of company size on tax aggressiveness based on various research findings. According to there are two theories that discuss company size. These theories include political power and cost. These two theories have different views on company size. The first theory states that large companies tend to have low ETR or tax aggressiveness. However, the second theory states otherwise. This is because, according to the first theory, the larger the company, the more resources it has to carry out good tax planning, thereby reducing its tax aggressiveness. However, according to the second theory, large companies are in the public spotlight, which causes them to pay higher income taxes than they should. The moderating variable in this study is company size, which is measured using the size ratio:

$$SIZE = Ln(Total Asset)$$

Source: Luke dan Zulaikha (2016)

The reason for choosing the SIZE proxy using the natural logarithm as an indicator of company size in this study is to reduce data fluctuations without changing the proportion of the original value (Luke & Zulaikha, 2016).

2.3 Capital intensity

According to Utomo and Fitria (2021), capital intensity is an investment activity carried out by a company linked to investment in the form of fixed assets. High ownership of fixed assets will also result in high depreciation expenses, which will have an impact on the company's profits, which will become

smaller due to these depreciation expenses (Pradipta, Irawan, & Ariefiara, 2024). Thus, a higher number of assets owned by the company encourages aggressive tax action. This research measures capital intensity with the following calculation: The measurement of capital intensity in this research is the capital intensity ratio, namely:

$$\text{Capital Intensity Ratio (CIR)} = \frac{\text{Fixed Assets}}{\text{Total Assets}}$$

Source: Maulidah dan Prastiwi (2019)

Capital intensity measures a company's capital in the form of fixed assets (Mulya, 2022). When capital intensity is high, depreciation expenses arise due to assets. As depreciation expenses increase, taxable profits decrease, resulting in a decrease in tax payable on corporate income tax.

The reason for choosing the capital intensity ratio to measure the capital intensity variable is that the greater the depreciation costs, the greater the deductible expense, and ultimately, the smaller the company's tax liability (Maulidah & Prastiwi, 2019). Depreciation expenses later add to the company's expenses and reduce the profits generated by the company (Simamora and Rahayu, 2020).

2.4 Leverage

According to Adisamartha and Noviani (2015), leverage is a ratio that indicates the amount of external capital a company uses to conduct its operational activities. Debt is included in the category of external capital financing. According to Simamora and Rahayu (2020), leverage is an act of tax aggressiveness carried out by a company, considering the funding policy that will be used by the company. According to Purwanto et al. (2016), companies with high tax liabilities will also have high debt; therefore, they deliberately have high debt to reduce their tax burden. The ideal total debt ratio is 4:1 or 40%. The reason for choosing the debt ratio to calculate leverage is that this ratio shows the amount of debt that a company has. According to Friandi, Soeksin, and Rifai (2020), leverage shows that companies that procure debt are allocated to finance investment. The higher the leverage value of a company, the higher its tax aggressiveness. The measurement of leverage in this study is the debt-to-equity ratio, that is,

$$\text{Debt Ratio} = \frac{\text{Total Liabilities}}{\text{Total Assets}}$$

Source: Purwanto (2016)

2.5 Liquidity

According to Yuliana and Wahyudi (2018), liquidity is defined as having adequate sources of funds to meet maturing needs and obligations and the ability to buy and sell assets quickly. According to Adisamartha and Noviani (2015), a company's ability to carry out short-term obligations can be seen in its liquidity ratio. If a company has a high liquidity ratio, it is in a smooth cash flow condition. According to Purwanto et al. (2016), low liquidity indicates that a company has difficulty meeting short-term obligations.

Liquidity difficulties can trigger companies to disobey tax regulations (Fachrian & Hidayat, 2023). The current ratio (current ratio) was used in this study to measure liquidity. This variable is measured using the current ratio, which compares current assets with current liabilities. This ratio shows the extent to which a company can meet its short-term obligations with its current assets. The lower the ratio, the lower the company's ability to fulfill its obligations. The current ratio variable was chosen because, according to Wahhab (2022), a good current ratio is in the range of 1.5 3. However, the ideal current ratio depends on the industry. A good current ratio figure shows that the company can pay all its short-term debt with its current assets; therefore, there is little risk of delay. In this study, liquidity is measured using the current ratio (current ratio) as follows:

$$\text{Current Ratio (CR)} = \frac{\text{Current assets}}{\text{Current Liabilities}}$$

Source: Purwanto (2016)

2.6 Theoretical Framework

According to Maulidah and Prastiwi (2019), the capital intensity ratio is the amount of capital owned by a company in the form of fixed assets used as company investments. Companies use fixed assets to generate profit. However, a company's large investment in assets triggers an increase in depreciation expenses, which reduces its taxable profit. Companies use depreciation expenses to minimize corporate income taxes. The higher the depreciation expense, the greater the expenses that can be deducted, which means that the company's tax payables are smaller. This research is in line with Budiadnyani's (2020) finding that capital intensity has a positive effect on tax aggressiveness. This finding is consistent with Yuliana and Wahyudi (2018), who state that capital intensity influences tax aggressiveness.

Leverage is the ratio that indicates the amount of external capital used by a company to conduct its operations. Debt is included in the category of external capital (Simamora and Rahayu, 2020). Debt funding is a burden for companies. These expenses take the form of loan interest expenses on debts. This burden reduces a company's taxable income. The higher the company's leverage, the higher the risk of managing its debt. The lower the company's leverage ratio, the better it can manage its debt, and its funding does not depend on debt; therefore, it does not incur costs on loan interest. This study is consistent with Purwanto et al. (2016), who stated that leverage influences tax aggressiveness. The results of this study are also in line with those of Friandi et al. (2020), who state that leverage influences tax aggressiveness.

According to Adisamartha and Noviri (2015), a company's ability to carry out short-term obligations can be seen in its liquidity ratio. If a company has a high liquidity ratio, it has a smooth cash flow. A high liquidity ratio reflects that a Company can easily pay off its short-term obligations; however, a low liquidity ratio reflects the condition of a company with a low ability to pay off its short-term obligations, including tax debts. This triggers the possibility that the company does not comply with the applicable tax regulations. Companies with low liquidity ratios tend to be aggressive in maintaining cash flow. This study is in line with Purwanto et al. (2016), who state that liquidity influences tax aggressiveness. This is in line with Adisamartha and Noviri (2015), who state that liquidity influences tax aggressiveness. The results of this study are also in line with those of Yuliana and Wahyudi (2018), who stated that liquidity influences tax aggressiveness.

2.7 Development of Research Hypothesis

2.7.1 The Effect of Capital Intensity on Tax Aggressiveness

Capital intensity is the ratio of investment activities carried out by a company associated with investments in fixed assets and inventory. Investing in fixed assets is considered more profitable from the company's perspective because depreciation costs can be allocated over several future periods. By allocating depreciation costs, taxable income and fiscal profit also decrease or minimize corporate tax payable.

Budiadnyani (2020) states that capital intensity has a positive effect on tax aggressiveness. The results of this study are also in line with Andhari and Sukartha (2017); however, according to Utomo and Fitria (2021), capital intensity negatively affects tax aggressiveness. This study re-examines the effect of capital intensity on tax aggressiveness and formulates the following hypothesis:

H1: Capital intensity has a positive effect on tax aggressiveness.

2.7.2 The Effect of Leverage on Tax Aggressiveness

Leverage measures the percentage of a company's debt used as a funding source. The higher the company's leverage value, the higher the possibility of a company engaging in tax aggressiveness. Companies can use debt to minimize income tax by paying interest on loans.

Putri and Halmawati (2023) state that leverage positively affects tax aggressiveness. The results of this study are consistent with those of Purwanto et al. (2016) and Friandi et al. (2020). This study re-examines the effect of leverage on tax aggressiveness and formulates the following hypothesis:

H2: Leverage positively affects tax aggressiveness.

2.7.3 The Effect of Liquidity on Tax Aggressiveness

The liquidity ratio shows a company's ability to pay off its short-term obligations. A higher liquidity ratio indicates that the company has more assets than liabilities and implies that the company has a smooth cash flow. The higher the company's liquidity, the higher the possibility of avoiding tax burdens to maintain cash flow.

Yuliana and Wahyudi (2018) stated that liquidity has a positive effect on tax aggressiveness. This study is consistent with that of Adisamartha and Noviori (2015). However, Purwanto et al. (2016) state that liquidity has a significantly negative effect on corporate tax aggressiveness. This study re-examines the effect of liquidity on tax aggressiveness and formulates the following hypothesis:

H3: Liquidity has a positive effect on tax aggressiveness.

2.7.4 Company Size Moderates the Effect of Capital Intensity on Tax Aggressiveness

According to Utomo and Fitria (2021), capital intensity is an investment activity carried out by a company linked to investment in the form of fixed assets. The higher the fixed assets owned, the higher the depreciation costs that the company must bear. These depreciation costs reduce the company's profits, thereby decreasing income tax costs.

A high capital intensity ratio triggers high company depreciation costs. Depreciation costs are the allocation of the economic benefit value of assets during the accounting period (Maulidah & Prastiwi, 2019). The higher the depreciation costs, the higher the costs that the company can use to reduce its profit. A company in the large company size category indicates that it is in a good condition. Large companies tend to minimize tax costs, one of which is by using fixed asset depreciation costs. The research results of Utomo and Fitria (2021) state that company size moderates capital intensity on tax aggressiveness. Yuliana and Wahyudi (2018) stated that company size influences tax aggressiveness. However, Malau (2021) states that company size does not affect tax aggressiveness.

H4: Company size strengthens the positive effect of capital intensity on tax aggressiveness.

2.7.5 Company Size Moderates the Effect of Leverage on Tax Aggressiveness

Leverage is the ratio that indicates the amount of external capital used by a company to conduct its operations. Debt is included in the category of external capital (Adisamartha and Noviori, 2015).

Companies with a high leverage ratio experience a decrease in profits due to loan interest costs. As income profits decrease, the company's payable income tax decreases. Large companies have a high level of leverage because debt is used to finance their operational activities. The higher the value of the debt a company has, the higher the loan interest burden it will bear, which will affect the amount of income tax or the company's costs. Thus, companies use leverage to avoid paying taxes.

The research results of Suyanto and Kurniawati (2022) state that company size weakens the effect of leverage on tax aggressiveness.

H5: Company size strengthens the positive influence of leverage on tax aggressiveness.

2.7.6 Company Size Moderates the Effect of Liquidity on Tax Aggressiveness

Based on agency theory, the relationship between shareholders and management depends on shareholder research on performance; if management is unable to manage liquidity, it will reduce creditors' trust in the company (Malau, 2021). Creditor trust influences whether a company can easily obtain funding as additional capital to invest in R&D.

A high liquidity ratio indicates that the company can meet its short-term obligations (Chika, Promise, U, & Werikum, 2022). Companies with a high liquidity ratio tend to be tax aggressive to maintain their cash flow. A company's high profitability ratio influences its liquidity. Companies with good liquidity have more current assets than their liabilities. A company's size can be used to assess its financial capability. Companies with large sizes provide a high credibility value to investors in the hope that they will provide large profits.

Purwanto et al. (2016) research results show that liquidity influences tax aggressiveness. The research results of Rahmadian et al. (2023) stated that company size moderates the effect of liquidity on tax aggressiveness.

H6: Company size strengthens the positive influence of liquidity on tax aggressiveness.

Based on the above explanation, the framework of this study can be described as follows:

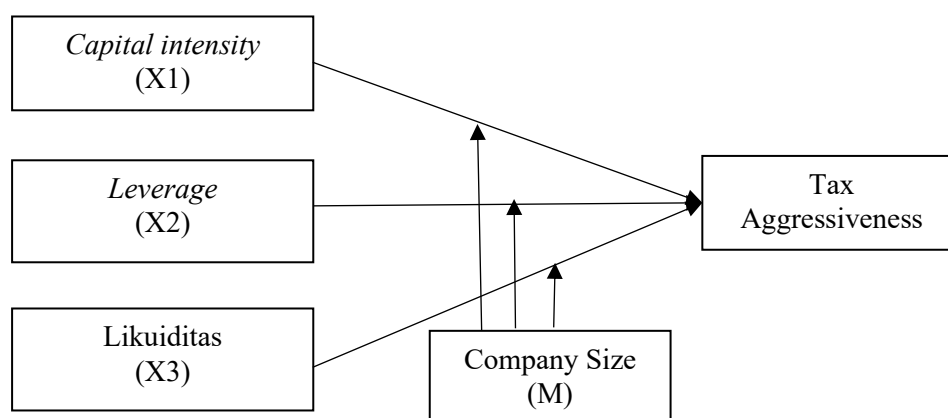


Figure 1. Structural Model

3. Research methodology

3.1 Research Sample

This study used secondary data, namely, the financial reports of energy sector companies listed on the Indonesia Stock Exchange from 2018 to 2022. The sample in this study was selected using the following criteria:

1. The company did not have any restitution or tax refund transactions during the study period.
2. The company reports financial reports for 2018-2022 in full and is not delisted.
3. The company uses December 31, 2022, as the final financial reporting period.
4. The company does not experience losses
5. These criteria were selected based on the general criteria in research models and the financial reports of each company.

3.2 Variable Operationalization

This study has three main variables: dependent, independent, and moderating variables. The dependent variable in this study is tax aggressiveness, which is calculated using the following ETR formula:

$$\text{Effective Tax Rates} = \frac{\text{Income Tax Expense}}{\text{Profit Before Income Tax}}$$

Source: Modjo, et al (2023)

Information:

ETR_{it} = Effective tax rate of company i in period t-th
 Income tax expense_{it} = the amount of company i's income tax expense in the t-th period
 Profit before income tax_{it} = profit before income tax of company i in the t-th period

3.3 Data Analysis Techniques

The analysis technique used in this research was multiple linear regression analysis, using EVIEWS 12.

3.3.1 Multiple Linear Regression Analysis

Multiple linear regression analysis was used to test whether the independent variable influenced the dependent variable simultaneously (together) or partially. This analysis determines the direction of the relationship between the independent and dependent variables, whether each independent variable is

positively or negatively related, and predicts the value of the dependent variable if the value of the independent variable increases or decreases. The multiple linear regression model used in this study is described as follows:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 M_1 + \beta_5 M_1 X_1 + \beta_6 M_1 X_2 + \beta_7 M_1 X_3 \varepsilon$$

Note:

Y = Tax Aggressiveness
 X_1 = Capital intensity
 X_2 = Leverage
 X_3 = Liquidity
 M_1 = Company Size
 $\beta_1 - \beta_7$ = Regression Coefficient
 α = Constant
 ε = Error term

3.3.2 Moderated Regression Analysis Test (MRA)

According to Ghazali (2018), MRA is an analytical approach that maintains sample integrity and provides a basis for controlling the influence of moderator variables. The regression equation model that will be tested is

$$\text{Equality1: } Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 M_1 + \varepsilon$$

$$\text{Equality2: } Y = \alpha + \beta_5 M_1 X_1 + \beta_6 M_1 X_2 + \beta_7 M_1 X_3 + \varepsilon$$

Note:

Y = Tax Aggressiveness
 X_1 = Capital intensity
 X_2 = Leverage
 X_3 = Liquidity
 M_1 = Company Size
 $\beta_1 - \beta_7$ = Regression Coefficient
 α = Constant
 ε = Error term

3.4 Hypothesis Testing

1. T test

The t-test shows the extent to which the influence of an independent variable explains the variations in the dependent variable. The error rate used in this study was 5% (0.05). The conclusions of the t-test were drawn by comparing the t statistical value with the critical point according to the label. Under the condition:

- 1) If significance < error level, then the independent variable has a partially significant effect on the dependent variable.
- 2) If significance > error level, the independent variable has no partial effect on the dependent variable.

2. Model Fit Test (F Test)

According to Ghazali (2013), the F-test shows whether all independent or free variables included in the model have a simultaneous influence on the dependent variable. To test this hypothesis, the F statistic was used with the following decision-making criteria:

- 1) Quick look: If the F value is greater than 4, H_0 can be rejected at an error rate of 5%.
- 2) The calculated F value was compared with the F value according to the table below. If the calculated F value is greater than the Table F value, H_0 is rejected and H_a is accepted.

Information:

H_0 = There is no significant influence of independent variables on the dependent variable.

H_1 = There is a significant relationship between the independent and dependent variables.

3. Coefficient of Determination

The coefficient of determination (R^2) was used to measure the model's ability to explain the variations in the dependent variable. The R^2 value ranged between zero and one. A small coefficient of determination indicates that the ability of the independent variable to explain the dependent variable is very limited. If the R^2 value is less than 0.5, variable X can explain variable Y to be less than 50% (weak correlation). An R^2 value equal to 0.5 indicates that the coefficient of determination is moderate, whereas an R^2 value greater than 0.5 indicates a strong ability to explain variable Y.

4. Results and discussions

4.1 Description of Research Sample

The objects in this study include Capital Intensity (CIR), leverage (RH), and liquidity (CR) as independent variables, Company Size (size) as the moderating variable, and Tax Aggressiveness (ETR) as the dependent variable. The sample in this study comprised 23 companies operating in the energy sector listed on the Indonesia Stock Exchange between 2018 and 2022. Thus, the total sample used in this study comprised 115 observations. Data collection in this research used purposive sampling, that is, data were collected using certain criteria.

Table 1. Research Sample Results

No	Criteria	Number of Companies
1	Energy sector companies listed on the Indonesia Stock Exchange (BEI) for the 2018 – 2022 period.	76
2	The company reported financial reports for 2018-2022 in full and was not delisted.	(22)
3	The company uses December 31, 2022, as the final financial reporting period.	
4	The company did not suffer any losses	(31)
	Total research data	23
	Number of data observations 2018 – 2022	115

4.2 Data Analysis

In this study, the author used a multiple linear regression test with Tax Aggressiveness as the dependent variable, Company Size as the moderating variable, and capital intensity, leverage, and liquidity as the independent variables. The collected research data were processed using the Statistical Package for the Social Sciences (SPSS) version 22 and Eviews version 12.

4.3 Classic Assumption Test

According to Sugiyono (2019:148), inferential analysis is a statistical technique used to analyze sample data, and the results can be interpreted as a population sample. In this inferential analysis, researchers used data collection techniques such as Multiple Linear Regression and Moderated Regression Analysis (MRA), which are parametric statistical methods. Therefore, before carrying out regression estimates, classic assumption tests are first conducted, including normality, heteroscedasticity, and multicollinearity tests, which are described as follows:

4.3.1 Normality Test

The normality test aims to determine whether the regression of the dependent and independent variables has a normal distribution. A good regression model has a normal or approximately normal distribution. The Kolmogorov–Smirnov–Monte Carlo test was used in this study. The decision-making criteria for the Kolmogorov Smirnov–Monte Carlo test are that if the significance value is > 0.05 , then the residuals are normally distributed, which means they meet the normality assumption (Ghozali, 2018). The results of the Kolmogorov–Smirnov Monte Carlo test are as follows.

Table 2. Kolmogorov Smirnov - Monte Carlo Test Results
One-Sample Kolmogorov-Smirnov Test

			Unstandardized Residual
N			115
Normal Parameters ^{a,b}	Mean		-1,4411396
	Std. Deviation		12,32335950
Most Extreme Differences	Absolute		,101
	Positive		,101
	Negative		-,057
Test Statistic			,101
Asymp. Sig. (2-tailed)			,006 ^c
Monte Carlo Sig. (2-tailed)	Sig.		,183 ^d
	99% Confidence Interval	Lower Bound	,173
		Upper Bound	,193

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

d. Based on 10000 sampled tables with starting seed 299883525.

Source: SPSS Processed Data version 26, 2023

Based on the normality test results in accordance with Table 2, the Kolmogorov-Smirnov Significance (Sig.) A value of 0.183 (> 0.05) was obtained, indicating that the model had a normal distribution. Thus, it can be concluded that the normality assumption has been met, and that the panel data regression model is suitable for use.

4.3.2 Multicollinearity Test

The multicollinearity test aims to test the regression model to determine whether there is a correlation between the independent variables. This test can be seen from the Tolerance Value number and the variance inflation factor (VIF) value, namely, if the Value Variance Inflation Factor (VIF) value is > 10 or if the tolerance value is < 0.1 , multicollinearity occurs.

Table 3. Multicollinearity Test Results

		Coefficients ^a					Collinearity Statistics	
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Tolerance	VIF
		B	Std. Error	Beta				
1	(Constant)	-20,258	30,163		-,672	,503		
	CIR	-,077	,046	-,170	-1,693	,093	,836	1,196
	RH	,019	,090	,026	,212	,832	,583	1,715
	CR	-,001	,008	-,008	-,065	,948	,561	1,784
	size	,015	,010	,152	1,570	,119	,902	1,109

a. Dependent Variable: ETR

Source: SPSS Processed Data version 26, 2023

Based on the table above, it can be stated that the independent variable, namely capital intensity, which is proxied by the code CIR, has a VIF value of 1.196, where the value is < 10 and the tolerance value is > 0.1 , the leverage variable, which is proxied by the code RH, has a VIF value of 1,715, where the value is < 10 and the tolerance value is > 0.1 , the liquidity variable which is proxied by the CR code has a VIF value of 1.784 where the value is < 10 and the tolerance value is > 0.1 , and the profitability variable which is proxied by Size has a VIF value of 1.109 where the value is < 10 and the tolerance

value is > 0.1 . Thus, it can be concluded that the panel data regression model used in this study does not exhibit multicollinearity. Therefore, this can be continued in future studies.

4.3.3 Heteroscedasticity Test

According to Ghazali (2016), one way to detect the occurrence of homoscedasticity or heteroscedasticity is through the results of graphic analysis, namely, scatterplot charts. For decision-making using a scatterplot graph, that is, the points formed must be spread randomly (not patterned) and spread both above and below the number 0 on the Y-axis. If this condition is met, heteroscedasticity does not occur, and the regression model is suitable.

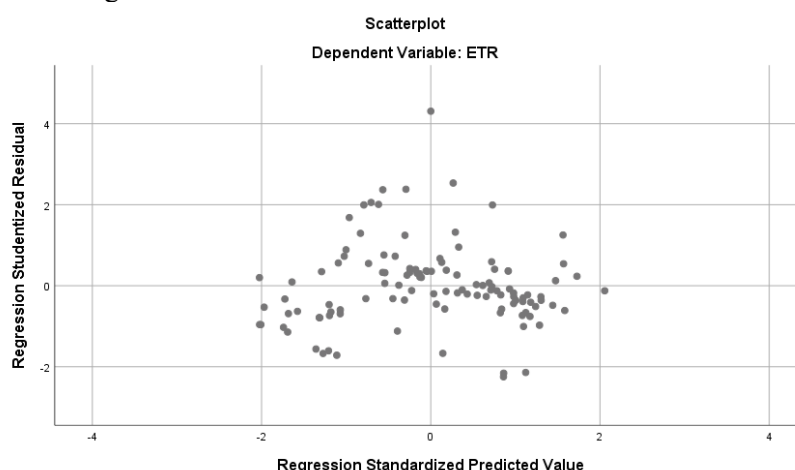


Figure 2. Heteroscedasticity Test Scatterplot Graph
Source: SPSS Processed Data version 26, 2023

Based on the image above, the heteroscedasticity test scatter plot graph shows that the points are spread randomly and are spread both above and below 0 on the Y-axis. Thus, it can be concluded that there is no heteroscedasticity in this research model; therefore, it is appropriate to conduct further testing.

4.3.4 Autocorrelation Test

The autocorrelation test aims to determine whether there is a correlation between confounding errors in period t and confounding errors in period $t-1$ (previous) in the linear regression model. Thus, the autocorrelation test can only be carried out on time series data because what is meant by autocorrelation is a value in a particular sample or observation that is greatly influenced by the value of the previous observation. Based on the explanation above, this study only conducted three classical assumption tests: the normality, multicollinearity, and heteroscedasticity tests.

4.4 Feasibility Test of Panel Data Regression Model

In this study, panel data path analysis calculations were performed using the statistical software, Eviews Version 12. To determine the best estimation of the parameters of the regression equation, Chow, Hausman, and Lagrange Multiplier (LM) tests were performed.

4.4.1 Chow Test

The Chow test was used to compare or choose the best model between the Common Effect Model and the Fixed Effect Model. The hypotheses in the Chow test are as follows.

H0: The right model is the Common Effect Model

H1: The correct model is the Fixed Effect Model

This study uses a significance level or alpha of 5% so that the hypothesis decision is made, namely, if the probability value (Prob.) of the chi-square cross-section ≤ 0.05 , then reject H0 or accept H1, which means that the selected model is the Fixed Effect Model. However, if the cross-sectional chi-square probability (Prob.) value is > 0.05 , then accept H0 or reject H1, which means that the selected model is a Common Effect Model. The following are the results of the Chow Test in this study:

Table 4. Chow Test Results

Redundant Fixed Effects Tests
Equation: JENDELAEQ
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	3.319171	(22,85)	0.0000
Cross-section Chi-square	71.309366	22	0.0000

Source: Eviews Data Processing Results Version 12, 2023

Based on the above table, the probability value (Prob.) of the cross-sectional chi-square model is 0.0000 (≤ 0.05), which means that H0 is rejected or H1 is rejected, respectively. Thus, based on the Chow test, we chose the fixed-effects model. Therefore, the Hausman test was used to compare the fixed and random effect models and determine which is the best.

4.4.2 Hausman Test

The Hausman test is used to compare or choose the best model between the random effects model and the fixed effects model. The Hausman test hypotheses are as follows:

H0: The right model is the Random Effect Model

H1: The correct model is the Fixed Effect Model

This study uses a significance level or alpha of 5% so that the hypothesis decision is made, namely, if the random cross-section probability (Prob.) If the value is ≤ 0.05 , then reject H0 or accept H1, which means that the selected model is a fixed-effects model. However, if the probability value (prob.) is If of a random cross-section is > 0.05 , then accept H0 or reject H1, which means that the selected model is the Random Effect Model. The following are the results of the Hausman Test in this study:

Table 5. Hausman Test Results

Correlated Random Effects - Hausman Test
Equation: JENDELAEQ
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	8.748626	7	0.2712

Based on this table, the probability value (Prob.) of the cross-sectional random model is 0.2712 (> 0.05), which means that H0 is accepted, or H1 is rejected. Thus, based on the Hausman test, the selected model was a random-effects model. Therefore, the best model was tested using the Lagrange Multiplier test to compare or choose the best model between the Common Effect Model or Random Effect Model.

4.5 Results of Panel Data Regression Analysis

4.5.1 Structure of Model Equations

Table 6. Random Effect Model Panel Data Test Results

Dependent Variable: ETR
Method: Panel EGLS (Cross-section random effects)
Date: 02/09/24 Time: 16:14
Sample: 1 115
Periods included: 5
Cross-sections included: 23
Total panel (balanced) observations: 115
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	172.0261	174.9549	0.983260	0.3277
CIR	-6.377894	1.738357	-3.668922	0.0004
CR	-0.072729	0.250152	-0.290740	0.7718
RH	1.784255	2.736883	0.651929	0.5158
SIZE	-0.048422	0.058301	-0.830538	0.4081
CIRXSIZE	0.002127	0.000585	3.633755	0.0004
CRXSIZE	2.08E-05	8.33E-05	0.249598	0.8034
RHXSIZE	-0.000589	0.000918	-0.642428	0.5220

Source: Eviews Data Processing Results Version 12, 2023

The results of the panel data regression using the random effects model method obtained the following equation:

$$\text{ETR} = 172,0261 + -6,377894\text{CIR} + 1,784255\text{RH} + -0,072729\text{CR} - 0,048422\text{Size} - 0,002127\text{CIR*Size} - 0,000589\text{RH*Size} + 2,08\text{CR*Size}$$

The regression equation is as follows.

1. The ETR constant value is 172.0261, which can be interpreted as if all the independent variables, namely RH, CR, CIR, ROA, RH*Size, CR* Size, and CIR* Size, are considered constant or have not changed, then, the ETR is 30.23280. In the positive constant value equation model, this means that there is an increase in Tax Aggressiveness, as proxied by the ETR code, in energy sector companies for the 2018-2022 period, amounting to 172.0261.
2. The coefficient value of the capital intensity variable proxied by the CIR code is -6.377894, indicating that for every 1% increase in the value of the CIR, assuming the other independent variables remain constant, the ETR will decrease by 6.377894.
3. The coefficient value of the leverage variable proxied by the code RH is -1.784255, indicating that for every 1% increase in the value of RH, assuming the other independent variables are fixed/constant, the ETR will decrease by 1.784255.
4. The coefficient value of the liquidity variable proxied by the CR code is -0.072729, indicating that for every 1% increase in the value of CR, assuming the other independent variables remain constant, the ETR will experience a decreases by 0.072729.
5. The coefficient value of the profitability variable proxied by the Size code is -0.048422, indicating that for every 1% increase in the value of Size, assuming the other independent variables remain constant, the ETR will decrease by 0.048422.
6. The coefficient value of the independent variable capital intensity with profitability as a moderator, with the code CIR*Size (0.002127), states that for every 1% increase in the value of the interaction of CIR and Size, assuming the other independent variables are fixed or constant, the ETR will experience an increase of 0.002127.
7. The coefficient value of the independent variable leverage with profitability as moderation, with the code RH* Size of -0.000589, states that for every 1% increase in the value of the interaction of RH and Size, assuming the other independent variables are fixed or constant, the ETR will decrease by 0,000589.
8. The coefficient value of the independent variable liquidity with profitability as a moderator, with the CR*Size code of 2.08, states that for every 1% increase in the value of the CR and Size interaction, assuming the other independent variables are fixed or constant, the ETR will experience an increase of 2, 08.

4.5.2 Analysis of Determination Coefficient

Table 7. R-Square Coefficient Results

	Model REM
R-squared	0.27

Source: Eviews Data Processing Results Version 12, 2023

Based on Table 3, the R-squared value is 0.27, indicating that capital intensity, leverage, liquidity, profitability, the interaction of capital intensity with profitability, the interaction of leverage with profitability, and the interaction of liquidity with profitability simultaneously influence tax aggressiveness by 0.27 or 27. % while the remaining 73% is influenced by other factors that are not included in this research's panel data model.

4.5.3 Hypothesis Testing

In this study, a significance test was performed at a 5% significance level. Thus, if the t-statistic value is < 0.05 , hypothesis (H_a) is accepted. Conversely, if the t-statistic value is ≥ 0.05 , the hypothesis is (H_a). The t-table value in this study (number of observations = 60; number of variables in the model = 8) was 2.006. The results of the hypothesis testing in this study are as follows.

Table 8. Testing the Direct Effect Hypothesis

Panel Data Regression Model	Hypothesis	Connection	Regression Coefficients	T-Statistic	P-Value	Information
Direct Influence	H1	CIR $\rightarrow$ ETR	-6,377894	-3.668922	0.0004	Significant negative effect
	H2	RH $\rightarrow$ ETR	1,784255	0,651929	0.5158	Not significant
	H3	CR $\rightarrow$ ETR	-0,072729	0,290740	0,7718	Not significant
	H4	Size $\rightarrow$ ETR	-0,048422	0,830538	0,4081	Not significant
Moderating Influence	H5	CIR*Size $\rightarrow$ ETR	0,002127	3,633755	0,0004	Significant
	H6	RH*Size $\rightarrow$ ETR	-0,000589	0,642428	0,5220	Not significant
	H7	CR*Size $\rightarrow$ ETR	2.08	0,249598	0,8034	Not significant

Source: Eviews Data Processing Results Version 12, 2023

Based on the results of hypothesis testing directly based on the t-test, the following conclusions were obtained:

1. Hypothesis 1: Capital Intensity (CIR) Has a Significant Influence on Tax Aggressiveness (ETR)

Based on the results in Table 4, the CIR $\rightarrow$ ETR t-statistic value is -3.6689 (< 2.006) with a p-value of 0.0004 (< 0.05). Thus, it can be interpreted that capital intensity has a negative effect on the tax aggressiveness of energy sector companies for the 2018-2022 period. Therefore, the first hypothesis (H1) was rejected, and the data did not support the hypothesis.

2. Hypothesis 2: Leverage (RH) has a significant effect on tax aggressiveness (ETR)

Based on the results in Table 4, the t-Statistic $RH \rightarrow ETR$ value is 0.651929 (< 2.006) with a p-value of 0.5158 (> 0.05). Thus, it can be interpreted that leverage has no effect on the tax aggressiveness of energy sector companies in the 2018-2022 period. Therefore, the second hypothesis (H2) was rejected, and the data did not support the hypothesis.

3. Hypothesis 3: Liquidity has a significant influence on tax aggressiveness

Based on the results in Table 4, the $CR \rightarrow ETR$ t-statistic value is -0.290740 (≤ 2.006) with a p-value of 0.7718 (≥ 0.05). Thus, it can be interpreted that liquidity has no significant effect on the tax aggressiveness of energy sector companies for the 2018-2022 period. Therefore, the third hypothesis (H3) was rejected, and the data did not support this hypothesis.

4. Hypothesis 4: Company Size Moderates the Effect of Capital Intensity on Tax Aggressiveness

Based on the results in Table 4, the $CIR*Size \rightarrow ETR$ t-statistic value is -3.633755 (> 2.006) with a p-value of 0.0004 (< 0.05). Thus, it can be interpreted that company size moderates the influence of capital intensity on the tax aggressiveness of energy sector companies for the 2018-2022 period. Therefore, the fourth hypothesis (H4) in this study was accepted, and the data supported the hypothesis.

5. Hypothesis 6: Company Size Moderates the Effect of Leverage on Tax Aggressiveness

Based on the results in Table 4, the t-Statistic $RH*Size \rightarrow ETR$ value is -0.642428 (≤ 2.006) with a p-value of 0.5220 (≥ 0.05). Thus, it can be interpreted that company size cannot moderate the influence of leverage on the tax aggressiveness of energy sector companies for the 2018-2022 period. Thus, the fifth hypothesis (H5) was rejected, and the data did not support this hypothesis.

6. Hypothesis 6: Company Size Moderates the Effect of Liquidity on Tax Aggressiveness

Based on the results in Table 4, the $CR*Size \rightarrow ETR$ t-statistic value is 0.249598 (≤ 2.006) with a p-value of 0.8034 (≥ 0.05). Thus, it can be interpreted that profitability does not moderate the effect of liquidity on the tax aggressiveness of energy sector companies for the 2018-2022 period. Therefore, the seventh hypothesis (H6) was rejected, and the data did not support the hypothesis.

5. Conclusion

5.1 Conclusions

Based on the research results, data analysis, and interpretation, the following conclusions were drawn.

1. Capital Intensity negatively affects Tax Aggressiveness.
2. Leverage has no effect on Tax Aggressiveness.
3. Liquidity has no effect on Tax Aggressiveness.
4. Company size moderates the effect of Capital Intensity on Tax Aggressiveness.
5. Company size does not moderate the influence of Leverage on Tax Aggressiveness.
6. Company size cannot moderate the influence of liquidity on tax aggressiveness.

5.2 Implications of Research Results

This study is expected to provide information to management for consideration when analyzing companies that have the potential to be aggressive in tax matters by examining the influence of capital intensity, leverage, liquidity, and profitability. Managerial implications

1. Management is expected to provide information about a company's main financial performance to the public to create accurate information about the company.
2. Company management is expected to be more effective and efficient in managing a company's fixed assets in all aspects of tax. Management is expected to comply with regulations regarding the procedures for the depreciation and amortization of fixed assets in accordance with applicable regulations.
3. Company management is expected to increase company income to make current assets more efficient so that they do not depend on other sources of funds, such as loan debts to third parties.
4. Management must always control the company's leverage level so that it does not exceed applicable regulations and increase investor confidence in the company.

5.3 Research Limitations

This study had the following limitations.

1. This research is limited to a sample of energy sector companies, and further research can be conducted by increasing the number of samples, such as banking, property, and real estate companies, to obtain more accurate results.
2. This study uses only three independent variables, namely capital intensity, leverage, and liquidity; one moderating variable, profitability; and one dependent variable, tax aggressiveness. Meanwhile, there are other variables and factors that can add variables outside the variables in this research, which may influence tax aggressiveness.
3. This study only considered a period of five years, and future research is expected to use a research period longer than that to obtain more accurate results.

5.4 Suggestions for Further Researchers

Based on the conclusions, implications of the research results, and limitations of the research, the author provides the following suggestions:

1. As capital intensity, leverage, and liquidity have no effect on tax aggressiveness, further research can use other variables or factors that can influence tax aggressiveness. These include earnings management (Purwanto 2016), inventory intensity (Adisamartha and Noviani 2015), and transfer pricing.
2. Future researchers are expected to make observations in other sectors to describe the trend of the tax aggressiveness of companies outside the energy sector.
3. In connection with several variables that do not have a significant effect on tax aggressiveness, future researchers can add years to the research period so that the research results are more representative and depict the actual conditions.

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