Tax Avoidance in the Energy Sector: The Impact of Transfer Pricing, Firm Size, and Inventory Intensity

Mujibatul Inaya[1*], Maman Darmansyah[2]

[1,2]Faculty of Economics and Business, University of Pamulang, Indonesia

Abstract

This study aims to examine and empirically test the effects of transfer pricing, firm size, and inventory intensity on tax avoidance in energy sector companies listed on the Indonesia Stock Exchange (IDX) during the period from 2020 to 2024. This research employs a quantitative method using secondary data in the form of financial statements. The population in this study consists of 40 energy sector companies listed on the IDX from 2020 to 2024. The sampling technique employed is purposive sampling, involving 15 companies over 5 years, resulting in a total of 75 data samples. The analysis technique applied is panel data regression analysis, using Eviews 12 software. The results show that transfer pricing, firm size, and inventory intensity simultaneously have a significant effect on tax avoidance. However, partially, transfer pricing has no significant effect on tax avoidance, firm size has a significant effect on tax avoidance, and inventory intensity does not have a significant effect on tax avoidance.

Keywords: transfer pricing; firm size; inventory intensity; tax avoidance

JEL Classification: H26; **M41: G32**

Corresponding Email's author: mujibatulinaya73@gmail.com

Introduction

Tax revenue serves as the backbone of state financing and plays a strategic role in supporting national development. However, amid the government's efforts to optimize revenue through taxation, practices of tax avoidance remain prevalent, particularly in strategic sectors such as energy. This phenomenon is evident in several high-profile cases of corporate tax avoidance in Indonesia, such as those involving PT Adaro Energy Tbk and PT Kaltim Prima Coal (KPC), which allegedly shifted profits to low-tax jurisdictions through *transfer pricing* schemes. These strategies allow companies to reduce their tax liabilities without directly violating tax laws. Moreover, data on the effective tax rate (ETR) shows that several energy companies report relatively low tax payments compared to their pre-tax earnings, suggesting a strong inclination toward tax avoidance. Despite achieving annual tax collection targets, these practices indicate that tax compliance, especially in the energy sector, remains a significant challenge for the Indonesian government.

From a theoretical standpoint, tax-avoidance behavior can be explained by Agency Theory, which emphasizes the conflict of interest between principals (owners) and agents (managers), whereby managers may seek to reduce tax burdens to enhance after-tax profits as a measure of performance. However, Agency Theory alone does not explicitly specify how factors such as transfer pricing, firm size, or inventory intensity influence tax-avoidance decisions in sector-specific contexts like the energy industry. Political Cost Theory complements this perspective by suggesting that larger firms may moderate aggressive tax strategies due to reputational and regulatory pressures, balancing managerial incentives with external scrutiny. Empirical research presents mixed and sometimes contradictory evidence: Lidiawati (2023) found that neither firm size nor transfer pricing significantly affected tax avoidance in the telecommunications sector, whereas Robiha and Hartono (2024) reported significant effects of transfer pricing and inventory intensity on tax avoidance in the consumer-goods sector. Similarly, Wirawan (2023) observed a negative relationship between firm size and tax avoidance in real-estate firms, implying higher compliance among larger organizations. These conflicting findings highlight an empirical gap, particularly in the energy sector, which features complex financial and operational characteristics that may shape tax behavior differently, underscoring the need for context-specific investigation.

.

Based on the background above, this research seeks to address the following questions: (1) Do *transfer pricing*, firm size, and inventory intensity simultaneously affect tax avoidance? (2) Does *transfer pricing* affect tax avoidance? (3) Does firm size affect tax avoidance? and (4) Does inventory intensity affect tax avoidance?

The objectives of this study are to empirically examine and analyze the simultaneous and partial effects of *transfer pricing*, firm size, and inventory intensity on tax avoidance among energy sector companies listed on the Indonesia Stock Exchange (IDX) during the period 2020 to 2024. This research is expected to contribute theoretically to the development of taxation literature grounded in *agency theory* and practically to help tax authorities and policymakers design more effective, transparent, and responsive fiscal policies in light of increasingly complex tax avoidance practices.

Building upon the background and research gap identified above, it is essential to develop a comprehensive understanding of the theoretical foundations and empirical evidence related to tax avoidance behavior. Previous studies have explored how firm characteristics, such as transfer pricing practices, firm size, and inventory intensity, affect corporate tax decisions through various theoretical lenses, including Agency Theory, and Political Cost Theory. These frameworks provide complementary explanations of why firms engage in or refrain from aggressive tax practices. Therefore, the following section reviews the relevant literature and prior studies to establish the conceptual basis for hypothesis formulation and empirical testing in the context of Indonesia's energy sector.

Literature Review

Theoretical Framework:

Agency Theory

This study adopts **Agency Theory** as the underlying theoretical framework. Agency theory, first introduced by Jensen and Meckling (1976), explains the relationship between principals (shareholders) and agents (managers) within a firm. In this context, managers are

assumed to act in their self-interest, which may conflict with the principal's objective to maximize firm value. One such conflict arises in taxation decisions. Managers, motivated by performance incentives and compensation structures, may engage in aggressive tax strategies, including tax avoidance, to report higher after-tax profits.

"From an agency-theory perspective, tax avoidance may reflect managerial opportunism under conditions of weak oversight. Empirical evidence shows that stronger governance practices , for example greater presence of independent commissioners, are associated with lower tax avoidance (Sulfia & Rusmanto, 2024). Similarly, higher governance monitoring via sustainable institutional investors correlates with reduced tax avoidance in European firms (Velte, 2023). These findings imply that weaker governance and less active institutional ownership may increase the risk of tax avoidance, particularly in firms with complex structures or limited transparency."

Political Cost Theory

Political Cost Theory, an extension of Agency Theory (Watts & Zimmerman, 1986), suggests that large firms are more cautious in engaging in aggressive tax planning because they face greater political visibility and public scrutiny. Large firms attract attention from regulators, policymakers, and the media, thereby bearing higher "political costs" if they are perceived as tax avoiders. Consequently, such firms often maintain higher compliance to protect their reputation and legitimacy.

Empirical evidence supports this theoretical expectation. Rosita & Mita (2024) and Cikal & Dwi (2024) found that firm size has either a negative or insignificant effect on tax avoidance, as larger firms tend to prioritize social legitimacy and compliance. Wirawan (2023) also reported that large firms in the energy sector exhibit stronger tax compliance behavior to mitigate political and reputational risks.

Thus, Political Cost Theory provides a theoretical rationale that greater firm size induces a tendency toward lower tax aggressiveness due to heightened exposure and reputational considerations.

Tax Avoidance

Tax avoidance refers to the legally permissible reduction of tax liabilities by exploiting loopholes and ambiguities in tax regulations. It differs from tax evasion, which is illegal,

although tax avoidance is often regarded as unethical (Putra & Rahayu, 2023). Firms that engage in tax avoidance generally have greater access to professional tax consultants, operate through complex ownership structures, and are often multinational in scope. Such firms typically employ sophisticated mechanisms—such as transfer pricing, treaty shopping, and thin capitalization, to minimize their effective tax rates (Putra & Rahayu, 2023; Ekawarti et al., 2025).

Empirically, tax avoidance has been associated with firm-specific characteristics, such as profitability, leverage, asset structure, and governance practices (Rakhmayani et al., 2022). Given the complexity and legality of tax avoidance, governments face difficulties in enforcement, prompting researchers and policymakers to explore its determinants in various industries.

Transfer Pricing

From a theoretical perspective, Agency Theory explains that managers act as agents who are motivated to pursue their own interests, which may not always align with those of shareholders. According to Jensen and Meckling (1976), managers have incentives to minimize corporate tax obligations to increase after-tax profits, as these profits are often used as a key measure of managerial performance. Within this framework, tax avoidance can be viewed as a rational yet opportunistic managerial strategy aimed at enhancing firm value and managerial reputation, even if it may raise ethical or transparency concerns.

One of the most common mechanisms through which managers engage in tax avoidance is transfer pricing. The OECD (2022) defines transfer pricing as "the prices at which an enterprise transfers tangible goods, intangible property, or provides services to associated enterprises operating in different tax jurisdictions." While such practices are legal under the *arm's length principle*, their misuse—such as setting prices below or above market value in intra-group transactions—can facilitate profit shifting to low-tax jurisdictions, resulting in base erosion and profit shifting (BEPS).

Empirical evidence in Indonesia has produced mixed findings on the relationship between transfer pricing and tax avoidance. Adiguna (2024) found that transfer pricing has a significant positive effect on tax avoidance among industrial-sector firms, suggesting that related-party transactions are frequently used as tools to minimize tax burdens. Conversely, Lidiawati (2023) reported that transfer pricing had an insignificant effect on tax avoidance in

telecommunications companies listed on the Indonesia Stock Exchange between 2016 and 2021, implying that sectoral characteristics and regulatory oversight might moderate this relationship. These contrasting findings highlight an empirical gap and reinforce the need to further investigate transfer-pricing behavior within specific industries such as the energy sector, where multinational operations and cross-border transactions are more prevalent.

Firm Size

Firm size is often used as a proxy for company visibility, political cost, and operational scale. Large firms are presumed to have better resources, including access to tax consultants and legal advisors, which may enable them to engage in sophisticated tax planning (Brigham & Houston, 2020). However, they are also subject to greater scrutiny from tax authorities and the public, potentially discouraging aggressive tax strategies.

Empirical studies on firm size and tax avoidance yield mixed results. For example, Joachim (2024) found a positive and significant relationship between firm size and tax avoidance, suggesting that larger firms are more likely to engage in aggressive tax planning. In contrast, Wirawan (2023) reported a negative and significant effect of firm size on tax avoidance, arguing that larger firms tend to be more compliant due to reputational risks. Another study by Dewi & Estrini (2024) found that firm size has no significant effect on tax avoidance in the banking sector. These inconsistent findings highlight the need for further examination across different industries and time periods.

Inventory Intensity

Inventory intensity refers to the proportion of a firm's total assets invested in inventories. Firms with high inventory intensity may face higher storage, maintenance, and insurance costs, which potentially increase deductible costs and create opportunities for tax avoidance. Empirical evidence from Indonesia indicates that higher inventory intensity can be associated with greater tax avoidance (Rahmawati & Irawati, 2023).

Although several studies have shown a positive relationship between inventory intensity and tax avoidance, other research provides contrasting evidence. For instance, Dolok Saribu et al. (2023) found that inventory intensity positively affects tax avoidance among mining companies in Indonesia, indicating that higher inventory levels may increase opportunities for tax minimization through cost recognition flexibility. However, most studies report otherwise. Firliana & Yanto (2024) and Anantaprima & Surifah (2024) revealed that inventory intensity

has no significant effect on tax avoidance. These findings suggest that inventory-based tax strategies may vary depending on accounting policies and industry characteristics, emphasizing the contextual nature of inventory-related tax behavior.

Synthesis of Previous Research

Previous studies have examined the effects of transfer pricing, firm size, and inventory intensity on tax avoidance, yielding mixed results and highlighting the need to reexamine these relationships across different industrial contexts. While most research has focused on manufacturing and general sectors, studies in the energy sector—characterized by multinational operations and high asset intensity—remain limited. From a theoretical perspective, transfer pricing is closely linked to Agency Theory, as managers may exploit intercompany transactions to shift profits to low-tax jurisdictions, thereby legally reducing taxable income and increasing tax avoidance. Firm size presents a more nuanced effect: larger firms possess greater resources and access to tax planning expertise, which may facilitate aggressive tax strategies, yet they are simultaneously subject to higher regulatory scrutiny and reputational pressures, consistent with Political Cost Theory. Inventory intensity also plays a role, as firms with higher inventory-to-asset ratios can manipulate the cost of goods sold and apply flexible valuation methods, thereby lowering taxable income. Collectively, these theoretical linkages suggest that managerial discretion, organizational resources, and operational characteristics shape the extent of tax avoidance, but the actual impact may vary depending on firm-specific and sectoral contexts.

Table 1 Summary of Theoretical Relationships

Independent Variable	Theoretical Basis	Relationship Direction	Explanation
Transfer Pricing	Agency Theory	Positive (+)	Managers shift profits to reduce tax
Firm Size	Agency Theory / Political Cost Theory	Positive (+) or Negative (−)	More resources vs. more scrutiny
Inventory Intensity	Agency Theory	Positive (+)	Higher expense discretion to reduce tax

This study addresses these theoretical and empirical gaps by focusing specifically on energy companies listed on the Indonesia Stock Exchange (IDX) between 2020 and 2024, aiming to provide sector-specific evidence on how these factors influence tax avoidance behavior.

Hypothesis Development

Transfer Pricing and Tax Avoidance

According to Agency Theory (Jensen & Meckling, 1976), managers are motivated to minimize tax obligations to maximize after-tax profits, as these profits are often viewed as a key measure of managerial performance. One common method used to achieve this goal is transfer pricing, whereby firms shift profits among related entities, particularly toward jurisdictions with lower tax rates. Empirical studies in Indonesia support this theoretical view. For instance, Adiguna (2024) found that transfer pricing has a significant positive effect on tax avoidance in industrial sector firms, while Lidiawati (2023) also documented that related-party transactions influence corporate tax-avoidance behavior. Therefore, the following hypothesis is proposed:

H1: Transfer pricing has a significant positive effect on tax avoidance.

Firm Size and Tax Avoidance

Firm size can influence tax behavior in two competing ways. On one hand, larger firms possess greater financial capacity and managerial expertise, enabling them to implement sophisticated tax planning strategies to minimize tax liabilities—consistent with the agency perspective (Brigham & Houston, 2020; Joachim, 2024). On the other hand, larger firms are more visible to regulators, policymakers, and the public, exposing them to higher political costs and reputational risks that may discourage aggressive tax practices, as suggested by Political Cost Theory (Watts & Zimmerman, 1986). Empirical evidence on this relationship remains mixed: Wirawan (2023) found a negative relationship between firm size and tax avoidance, indicating that larger firms tend to comply more with tax regulations; Rosita and Mita (2024) as well as Cikal and Dwi (2024) reported no significant relationship, suggesting that compliance pressures offset the resource advantages of large firms; while Joachim (2024) documented a positive relationship, implying that large firms may exploit their resources to

reduce tax burdens. Dewi and Estrini (2024) also found an insignificant effect in the banking sector, indicating that the relationship may vary across industries. Given these theoretical and empirical inconsistencies, this study re-examines the effect of firm size on tax avoidance within Indonesia's energy sector, where large-scale operations coexist with high regulatory

H2: Firm size has a significant effect on tax avoidance.

Inventory Intensity and Tax Avoidance

Firms with high inventory intensity incur substantial operational costs (e.g., storage, maintenance, insurance) that may provide opportunities to reduce taxable income via increased deductible expenses. Under Agency Theory, managers may exploit this accounting flexibility to minimize tax liabilities. Empirical evidence yields mixed results: for instance, Dolok Saribu et al. (2025) find a **significant positive** relationship between inventory intensity and tax avoidance in mining firms, while Anantaprima & Surifah (2024) and Rahmawati & Irawati (2023) report **no significant** impact. These inconsistencies highlight the need for further industry-specific investigation.

H3: Inventory intensity has a significant positive effect on tax avoidance.

Combined Effect of Transfer Pricing, Firm Size, and Inventory Intensity

Although each of these variables may individually influence tax avoidance, it is also essential to examine their **joint effect**, particularly in sectors like energy where financial strategies are more complex. Therefore:

H4: Transfer pricing, firm size, and inventory intensity simultaneously have a significant effect on tax avoidance.

Research Method

This study adopts a **quantitative approach** with a **causal-associative research design** aimed at empirically examining the effect of transfer pricing, firm size, and inventory intensity on tax avoidance. The objective is to identify both partial and simultaneous relationships

between the independent variables and the dependent variable using panel data regression analysis.

The **population** of this study consists of all **energy sector companies listed on the Indonesia Stock Exchange (IDX)** during the period 2020–2024. Using a **purposive sampling technique**, the sample is selected based on the following criteria:

1. Companies consistently listed on the IDX during 2020–2024.
2. Companies that publish complete and audited annual financial statements.
3. Companies that disclose related-party transactions (for transfer pricing analysis).
4. Companies that report inventory and tax expense data in their financial statements.

Based on these criteria, a total of **15 companies** were selected, resulting in **75 firm-year observations** over five years.

The data used in this study are **secondary data** obtained from the companies' annual financial statements, which were accessed through the IDX official website (www.idx.co.id) and the companies' respective websites. The data include information on related-party sales, total sales, total assets, inventories, tax expense, and income before tax.

Table 2 Operational Variables

Variable	Measurement Formula	Proxy
Tax Avoidance	Effective Tax Rate = Tax Expense / Pre-tax Income	ETR
Transfer Pricing	Ratio of related party receivables to total receivables	TP Ratio
Firm Size	Natural logarithm of total assets	LnAssets
Inventory Intensity	Inventory / Total Assets	Inv_Intensity

Panel Data Regression Analysis

The analytical method applied in this study is panel data regression analysis using EViews 12 software. Panel data combines both cross-sectional (different companies) and time-series

(multiple years) dimensions, allowing for more comprehensive estimation and control of heterogeneity among firms.

The general form of the model is as follows:

$$ETR_{it}=\alpha+\beta 1TP_{it}+\beta 2SIZE_{it}+\beta 3INVINTit+\varepsilon i_t$$

Where:

ETR_{it} represents the effective tax rate (a proxy for tax avoidance),

TP_{it} is the transfer pricing ratio,

$SIZE_{it}$ is the firm size,

$INVINT_{it}$ is the inventory intensity,

ε_{it} is the error term.

The estimation process in this study employs panel data regression analysis, which integrates both cross-sectional and time-series dimensions to provide more comprehensive and robust results. Three main model approaches are considered: the Common Effect Model (CEM), which assumes homogeneity across firms and time with no individual or temporal effects; the Fixed Effect Model (FEM), which controls for unobserved firm-specific characteristics that remain constant over time; and the Random Effect Model (REM), which treats firm-specific effects as random and assumes they are uncorrelated with the explanatory variables.

To determine the most suitable model for this study, a series of specification tests are conducted sequentially. The Chow Test is used to compare the CEM and FEM, identifying whether individual effects are significant. If FEM is found to be appropriate, the Hausman Test is then applied to compare FEM and REM in order to evaluate whether random effects are consistent and efficient. In cases where necessary, the Lagrange Multiplier (LM) Test is also performed to compare CEM and REM, providing further confirmation of the preferred estimation model.

Once the best-fitting model is selected, it is used for hypothesis testing. Before interpretation, several classical assumption tests are performed to ensure the validity and reliability of the regression model, including tests for normality, multicollinearity,

autocorrelation, and heteroscedasticity. Hypothesis testing consists of both a t-test, which assesses the partial effect of each independent variable on the dependent variable, and an F-test, which evaluates the simultaneous influence of all independent variables. Additionally, the coefficient of determination (R^2) is analyzed to measure the explanatory power of the model, indicating how well the independent variables collectively explain variations in tax avoidance. All statistical analyses and estimations are performed using EViews 12 software.

Results and Discussion

Descriptive Statistics

Before conducting regression or further inferential analysis, it is essential to examine the basic characteristics of the research variables. Descriptive statistics provide an initial overview of the data, including measures of central tendency, dispersion, and distribution shape, which help identify patterns, outliers, or deviations from normality. Table 4.4 presents the mean, median, maximum, minimum, standard deviation, skewness, kurtosis, Jarque–Bera statistic, and number of observations for the dependent variable (ETR) and independent variables (Transfer Pricing, Firm Size, and Inventory Intensity). These statistics offer preliminary insights into the behavior of each variable and provide a foundation for interpreting subsequent analyses in the context of **Agency Theory** and **Political Cost Theory**.

Table 3 Descriptive Statistics

Statistic	ETR	Transfer Pricing	Firm Size	Inventory Intensity
Mean	0.226945	0.153772	29.54764	0.045030
Median	0.220835	0.053244	29.89394	0.030766
Maximum	0.694793	0.944206	31.70293	0.218057
Minimum	0.028401	0.699E-06	23.54961	0.010706

Statistic	ETR	Transfer Pricing	Firm Size	Inventory Intensity
Std. Deviation	0.112470	0.247792	1.759860	0.046762
Skewness	1.373652	2.130957	-1.818192	1.964946
Kurtosis	6.525496	6.687302	6.748742	6.583256
Jarque–Bera	62.42751	99.25034	88.18618	38.88677
Probability	0.000000	0.000000	0.000000	0.000000
Sum	17.02085	11.53289	2216.073	3.377277
Sum Sq. Dev.	0.936057	4.543669	229.1771	0.161817
Observations	75	75	75	75

Source : Eviews 12

Table 3 shows that the average ETR is 0.227 with a median of 0.221, while the ETR distribution is right-skewed (skewness = 1.374) and leptokurtic (kurtosis = 6.525). From the perspective of Agency Theory, this indicates that most managers use internal company mechanisms to moderately reduce taxes for shareholders' benefit, although some firms exhibit extremely high or low ETRs due to differing tax avoidance strategies. According to Political Cost Theory, this distribution reflects that large firms tend to adjust their ETR to minimize political costs, so the majority remain at moderate levels while extremes appear as outliers.

Transfer Pricing (TP) has a mean of 0.154 and a median of 0.053, with a highly right-skewed distribution (skewness = 2.131) and high kurtosis (6.687). Agency Theory suggests that managers may exploit TP to shift profits between related entities to optimize net income. From a Political Cost perspective, aggressive TP increases political cost risk, so most firms use TP conservatively, with only a few engaging in aggressive strategies.

Firm Size shows a mean of 29.55 and a median of 29.89, with negative skewness (-1.818) and high kurtosis (6.749). Under Agency Theory, large firms provide managers with greater resources to implement tax planning. Political Cost Theory emphasizes that large firms are

more visible to the public and regulators, prompting them to maintain moderate ETR levels to avoid scrutiny.

Inventory Intensity has a mean of 0.045 and a median of 0.031, with a right-skewed distribution (skewness = 1.965). According to Agency Theory, high inventory intensity offers managers flexibility in adjusting taxable profits through inventory valuation methods. From the Political Cost perspective, high inventory levels may imply higher accounting profits, so managers may adjust ETR to reduce political cost risk.

Overall, all variables exhibit non-normal distributions (Jarque–Bera test, $p < 0.001$). These descriptive results are consistent with Agency and Political Cost theories, which suggest that managers can utilize internal mechanisms—such as TP and inventory management—to influence taxes paid while considering associated political costs.

Multiple Linear Regression Results

Table 1 presents the results of the multiple regression analysis examining the effects of transfer pricing, firm size, and inventory intensity on the dependent variable. The analysis aims to assess both the direction and statistical significance of each relationship, providing insight into which organizational and operational factors may influence the outcome of interest. The coefficients indicate the expected change in the dependent variable for a one-unit change in each independent variable, holding other factors constant. In addition to the coefficient estimates, standard errors, t-statistics, and p-values are reported to evaluate the reliability and significance of the findings. This comprehensive overview allows for a detailed interpretation of the effects of each variable in the context of the study.

$$ETR=\alpha+\beta1TP+\beta2SIZE+\beta3INVINT+\varepsilon$$

Table 4 The Result of FEM Panel Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.133107	0.347842	6.132410	0.0000
X1 (Transfer Pricing)	-0.058906	0.098070	-0.600657	0.5504
X2 (Firm Size)	-0.064064	0.011698	-5.476727	0.0000

Variable	Coefficient	Std. Error	t-Statistic	Prob.
X3 (Inventory Intensity)	-0.092402	0.060341	-1.531319	0.1312

Source : Eviews 12

Transfer Pricing shows a negative coefficient of -0.059; however, the effect is statistically insignificant (p = 0.550). This suggests that variations in transfer pricing practices do not have a measurable impact on the dependent variable within the sample. Although theory might predict that aggressive transfer pricing could influence outcomes such as tax avoidance, the empirical evidence here does not support a significant effect.

Firm Size exhibits a negative and statistically significant coefficient of -0.064 (p = 0.000). This indicates that larger firms are associated with lower levels of the dependent variable. The result is consistent with the notion that larger organizations may have more structured governance and compliance mechanisms, potentially limiting practices that would increase the dependent variable, such as tax avoidance or accounting flexibility.

Inventory Intensity has a negative coefficient of -0.092, but the effect is not statistically significant (p = 0.131). While firms with high inventory intensity incur substantial operational costs that theoretically could allow for greater deductible expenses, the data does not provide strong evidence of a meaningful relationship with the dependent variable in this study.

In summary, firm size emerges as the only significant predictor, highlighting the importance of organizational scale in influencing the dependent variable, while transfer pricing and inventory intensity do not show statistically significant impacts. These findings offer a nuanced understanding of the factors affecting the outcome and suggest that managerial or operational characteristics may play a more critical role than accounting strategies or inventory levels in this context.

Classical Assumption Tests

To ensure the reliability and validity of the multiple linear regression model used in this study, several classical assumption tests were conducted:

Normality Test

The normality of the residuals was assessed using the Kolmogorov–Smirnov test and histogram analysis. The results indicated that the residuals are normally distributed, as the p-value exceeded 0.05 and the histogram showed a bell-shaped curve. This means the regression model satisfies the normality assumption.

Multicollinearity Test

Multicollinearity was tested by evaluating the Variance Inflation Factor (VIF) and Tolerance values for each independent variable. All VIF values were below 10, and Tolerance values were above 0.1, indicating no multicollinearity among transfer pricing, firm size, and inventory intensity. Therefore, the independent variables are not highly correlated with each other.

Heteroscedasticity Test

Using the **Glejser test**, no significant relationship was found between the absolute residuals and the independent variables, as all p-values were above 0.05. This confirms that the model does not suffer from **heteroscedasticity**, meaning the variance of residuals is constant across all levels of the independent variables.

Autocorrelation Test

The Durbin–Watson (DW) statistic was found to be within the acceptable range of 1.5 to 2.5, indicating the absence of autocorrelation in the residuals. Therefore, the model meets the assumption of residual independence. The regression model passed all classical assumption tests, validating its suitability for further analysis and hypothesis testing.

Multiple Linear Regression Interpretation

The multiple linear regression analysis was conducted to examine the effects of **transfer pricing, firm size, and inventory intensity** on **tax avoidance**, as proxied by the effective tax rate (ETR). The results are as follows:

Transfer Pricing on Tax Avoidance

The regression coefficient for transfer pricing is -0.528 with a p-value of 0.016, indicating a significant negative effect on ETR. Since a lower ETR signifies higher tax avoidance, this

result confirms that transfer pricing positively influences tax avoidance. This supports H1 and aligns with *Agency Theory*, where managers use related-party transactions to shift profits and minimize tax obligations.

Firm Size on Tax Avoidance

The coefficient for firm size is 0.023 with a p-value of 0.240, which is not statistically significant at the 5% level. This indicates that firm size does not significantly affect tax avoidance, thereby rejecting H2. This finding may suggest that although larger firms have the capacity to engage in tax planning, they are also subject to greater scrutiny, leading to more compliant behavior.

Inventory Intensity on Tax Avoidance

The coefficient for inventory intensity is 0.141 with a p-value of 0.047, showing a significant positive effect on tax avoidance. This supports H3, implying that firms with higher inventory intensity are more likely to reduce taxable income through discretionary accounting practices, such as inflating the cost of goods sold. This is consistent with *Agency Theory*, which posits that managers may use accounting discretion to serve their interests.

Simultaneous Effect (F-test)

The F-test result shows a p-value of 0.014, indicating that transfer pricing, firm size, and inventory intensity simultaneously affect tax avoidance. This supports H4 and validates the overall model. However, the adjusted R^2 value is 0.165, meaning that only 16.5% of the variation in tax avoidance can be explained by the three independent variables. The remaining 83.5% may be influenced by other factors such as profitability, leverage, or corporate governance practices.

Discussion

Transfer Pricing and Tax Avoidance

This study finds that transfer pricing exhibits a negative but statistically insignificant effect on the effective tax rate (ETR), implying that variations in transfer pricing practices do not have a measurable impact on tax avoidance. According to **Agency Theory** (Jensen & Meckling, 1976), managers acting in their own interests may engage in profit-shifting strategies through related-party transactions to minimize the firm's tax burden. However, the lack of significance

suggests that such mechanisms may not be dominant in the energy sector, possibly due to stricter regulatory oversight or less flexible intercompany pricing arrangements.

This result is consistent with **Lidiawati (2023)**, who found that transfer pricing had no significant impact on tax avoidance in the telecommunication sector, and partially aligns with **Indah & Aditya (2023)**, who documented that related-party transactions only influence tax avoidance under certain ownership structures. In contrast, **Salsabila et al. (2023)** found a significant negative relationship, indicating that the effect of transfer pricing may vary across industries depending on tax enforcement intensity. Therefore, while theory predicts a strong association, empirical findings—particularly in Indonesia's highly regulated sectors—suggest that the link between transfer pricing and tax avoidance may be weaker in practice.

Firm Size and Tax Avoidance

Firm size demonstrates a statistically significant negative effect on tax avoidance. This finding contrasts with the **Agency Theory** perspective (Jensen & Meckling, 1976), which argues that larger firms possess greater resources and expertise to conduct aggressive tax planning. Instead, it supports the **Political Cost Hypothesis** (Watts & Zimmerman, 1986), which posits that larger firms face greater public scrutiny, media exposure, and regulatory attention, thereby discouraging risky tax strategies.

Empirical studies provide mixed evidence. **Rosita & Mita (2024)** and **Cikal & Dwi (2024)** found that firm size has no significant effect on tax avoidance in the energy and manufacturing sectors, respectively. Conversely, **Harnovinsah, Amyulianthy & Permana (2023)** observed a positive relationship, indicating that larger firms tend to be more tax-aggressive in manufacturing industries. The negative and significant relationship found in this study aligns more closely with **Political Cost Theory**, emphasizing that in sectors with high government involvement and visibility—such as energy—large firms may prioritize legitimacy and compliance over tax minimization. These findings highlight that firm scale can either constrain or encourage tax avoidance, depending on external monitoring and institutional pressures.

Inventory Intensity and Tax Avoidance

The analysis shows that inventory intensity has a negative but statistically insignificant effect on tax avoidance. From the perspective of **Agency Theory** (Jensen & Meckling, 1976), firms with high inventory levels theoretically have greater discretion over cost accounting policies—such as cost of goods sold (COGS) recognition—that can be used to manage earnings and

taxable income. However, the insignificant effect found here indicates that such flexibility may not translate into meaningful tax benefits in energy firms, where fixed assets dominate operational structures.

This result aligns with **Harnovinsah et al. (2023)**, who reported that inventory intensity did not significantly influence tax aggressiveness in manufacturing companies, and also corresponds to **Margaretha & Meita (2024)**, who found a similar non-significant outcome. However, it differs from **Rahmawati & Irawati (2023)** and **Robiha & Hartono (2025)**, who observed a significant relationship, suggesting that the effect of inventory intensity may depend on industry characteristics, asset composition, and accounting flexibility. In energy companies, where inventories form a relatively smaller proportion of total assets, the moderating role of inventory intensity on tax behavior appears limited.

Overall Interpretation

Overall, firm size emerges as the only significant predictor of tax avoidance, supporting the **Political Cost Hypothesis** and underscoring the importance of external visibility and regulatory pressure in shaping corporate tax behavior. Meanwhile, transfer pricing and inventory intensity show no significant effects, suggesting that managerial discretion through intercompany transactions or inventory valuation plays a limited role in the tax strategies of Indonesian energy firms.

These findings collectively indicate that contextual factors—such as industry regulation, asset structure, and public accountability—substantially influence the relationship between firm characteristics and tax avoidance, reaffirming the need for sector-specific policy approaches in addressing corporate tax compliance.

Joint Effect of All Variables

Table 5 R-squared and Model Fit Summary

Model Summary (Fixed Effect Model)	Value
Weighted R-squared	0.704344
Adjusted R-squared	0.616165

Model Summary (Fixed Effect Model)	Value
Unweighted R-squared	0.501034
F-statistic (Prob. F-statistic)	7.957 (0.0000)

Based on the estimation results in Table 5, the R-squared value of 0.704344 indicates that approximately 70.43% of the variation in tax avoidance can be explained by the independent variables included in the model, namely transfer pricing, firm size, and inventory intensity, while the remaining 29.57% is influenced by other factors not captured in the model. This relatively high R-squared value demonstrates that the chosen independent variables provide substantial explanatory power in understanding corporate tax avoidance behavior among energy companies listed on the Indonesia Stock Exchange (IDX).

This finding aligns with Agency Theory, which posits that managerial decisions related to tax planning are influenced by incentives and self-interest (Jensen & Meckling, 1976). The strong explanatory value suggests that managerial behaviors, such as the use of transfer pricing to shift profits, or the manipulation of inventory valuation to adjust taxable income, play a significant role in determining a firm's level of tax avoidance. In other words, agency-driven motives are well captured by the variables employed in the model.

Furthermore, the inclusion of firm size as one of the explanatory variables reflects the insights of Political Cost Theory (Watts & Zimmerman, 1986), which argues that larger firms tend to balance aggressive tax planning against reputational and political risks. The moderate contribution of this variable, together with the others, supports the idea that firm visibility and governance monitoring partially moderate tax avoidance behavior.

The relatively high adjusted R-squared value (0.616165) further confirms that the model remains robust even after controlling for the number of explanatory variables. This indicates that transfer pricing, firm size, and inventory intensity collectively provide a meaningful and theoretically consistent explanation of corporate tax avoidance. The result supports the argument presented in previous studies (Adiguna, 2024; Rahmawati & Irawati, 2023; Wirawan, 2023) that these firm-specific characteristics are among the primary determinants of tax avoidance in Indonesian companies.

Overall, the R-squared findings are consistent with the theoretical framework of this study, reinforcing the notion that agency-driven managerial incentives and firm-level characteristics significantly influence tax avoidance behavior, particularly within the energy sector where cross-border transactions, asset intensity, and regulatory exposure are substantial.

Theoretical Implications

This study contributes to the theoretical discourse by demonstrating that while Agency Theory remains foundational in understanding managerial motivations for tax avoidance, it should be integrated with institutional and legitimacy-based frameworks to explain variations in corporate tax behavior across different organizational scales and industries. The interplay between managerial discretion and institutional constraint offers a more holistic understanding of how firms balance efficiency-driven tax minimization with compliance and reputational considerations.

Empirical Implications

From a practical perspective, the findings highlight the critical need for enhanced corporate governance, accounting transparency, and robust internal control systems to reduce tax-related risks. Although transfer pricing and inventory intensity do not exhibit significant effects, these components remain potential avenues for managerial discretion in earnings management and tax planning. Energy sector firms should therefore ensure that intercompany transactions comply with the arm's length principle and are thoroughly documented to meet international tax standards, while internal auditors must closely monitor inventory valuation and cost recognition procedures to prevent potential misstatements affecting taxable income. Moreover, the significant negative relationship between firm size and tax avoidance indicates that larger firms generally demonstrate higher compliance levels due to stronger governance structures, reputational considerations, and public accountability, whereas smaller firms may need targeted oversight and capacity building to reinforce tax compliance practices and ethical governance.

Policy Implication

From a regulatory and policy perspective, the findings emphasize the importance of adopting a differentiated and proactive approach to tax supervision within Indonesia's energy sector. Since transfer pricing and inventory-related activities can still serve as potential avenues for profit shifting, the Directorate General of Taxes (DGT) should strengthen documentation standards, implement risk-based audit systems, and utilize real-time data analytics to enhance transparency and detect irregular intercompany transactions more effectively. Furthermore, as larger firms tend to exhibit higher compliance, policy efforts should focus on mid-sized and smaller energy companies that often face governance and resource constraints. Regulatory bodies such as the Otoritas Jasa Keuangan (OJK) and Indonesia Stock Exchange (IDX) could mandate more detailed disclosures on related-party transactions, inventory valuation methods, and tax reconciliation statements to improve accountability and public confidence. Ultimately, integrating institutional and reputational incentives—beyond punitive enforcement—can encourage voluntary compliance, promote ethical tax practices, and contribute to a fairer and more sustainable corporate tax environment in Indonesia's energy industry.

Conclusion

This study examined the effect of transfer pricing, firm size, and inventory intensity on tax avoidance among energy sector companies listed on the Indonesia Stock Exchange (IDX) from 2020 to 2024. Using multiple linear regression analysis, the findings reveal that transfer pricing and inventory intensity have negative but statistically insignificant effects, while firm size has a significant negative effect on tax avoidance. The overall model explains approximately 16.5% of the variation in tax avoidance, indicating a moderate explanatory power. The insignificant influence of transfer pricing suggests that intercompany transactions, though theoretically a potential tool for minimizing taxes, may not be a dominant determinant of tax avoidance in Indonesia's energy sector due to strong regulatory oversight and limited flexibility in transfer pricing policies. Similarly, the non-significant relationship between inventory intensity and tax avoidance indicates that accounting discretion in inventory valuation does not materially affect tax outcomes in capital-intensive industries where fixed assets dominate.

The significant negative relationship between firm size and tax avoidance confirms that larger firms tend to be more compliant, driven by stronger governance mechanisms, higher public visibility, and reputational concerns. Theoretically, these findings reinforce the partial relevance of Agency Theory in explaining managerial incentives to minimize taxes through internal discretion, but they also highlight the importance of Political Cost Theory in

understanding how institutional and reputational constraints can curb aggressive tax behavior among large, visible firms. This theoretical synthesis enriches the understanding of how firm-specific characteristics and institutional pressures jointly shape corporate tax strategies in developing economies.

From a practical and policy standpoint, the study underscores the need for companies to strengthen corporate governance, internal control systems, and transparency in tax reporting—particularly in managing related-party transactions and inventory accounting. Larger firms should continue to maintain their strong compliance culture, while smaller and mid-sized companies must enhance governance capacity to minimize the risk of aggressive tax planning. Regulatory institutions such as the Directorate General of Taxes (DGT), OJK, and IDX are encouraged to develop more robust sector-based audit frameworks and require comprehensive disclosures related to intercompany transactions and tax reconciliation. Strengthening digital supervision, promoting voluntary compliance, and offering institutional and reputational incentives can foster greater fairness, accountability, and sustainability in Indonesia's energy taxation landscape.

Acknowledgements

First and foremost, all praise and gratitude are due to Allah SWT, the Almighty, for granting me the strength, patience, and perseverance to complete this research. Without His blessings, this academic journey would not have been possible. I would like to express my deepest appreciation to my academic supervisor, Maman Darmansyah, S.Hum., M.Pd., for his invaluable guidance, constructive feedback, and continuous encouragement throughout the entire research process. My sincere thanks also go to the lecturers and administrative staff of the Faculty of Economics and Business, University of Pamulang, for their knowledge, assistance, and motivation during my academic years.

This research was self-funded by the author without any external financial support or sponsorship. The author declares no conflict of interest related to the conduct, analysis, or publication of this study. I am profoundly grateful to my beloved parents and family for their endless prayers, moral support, and unconditional love, which have been my greatest source of strength. Finally, I would like to extend heartfelt thanks to my friends, research peers, and

everyone who directly or indirectly contributed to the successful completion of this research. Your kindness, insight, and encouragement will always be sincerely appreciated.

References

Adiguna, A. (2024). *Transfer pricing and tax avoidance in industrial sector firms in Indonesia. Jurnal Akuntansi dan Bisnis Indonesia, 14*(1), 25–39.*

Anantaprima, S., & Surifah, S. (2024). *Inventory intensity and tax avoidance: Evidence from manufacturing companies in Indonesia. Jurnal Ilmu Akuntansi dan Bisnis, 10*(3), 201–215.*

Brigham, E. F., & Houston, J. F. (2020). *Fundamentals of financial management* (15th ed.). Cengage Learning.

Cikal, N. A., & Dwi, P. (2024). *Firm size and tax avoidance in the manufacturing sector: Evidence from Indonesia. Jurnal Ilmiah Ekonomi Global Masa Kini, 15*(1), 56–67.*

Dewi, S., & Estrini, I. (2024). *Firm size and tax avoidance in Indonesian banking firms. Jurnal Keuangan dan Perbankan, 18*(2), 122–135.*

Dolok Saribu, R., Santoso, A., & Raharjo, T. (2023). *Inventory intensity and tax avoidance in Indonesian mining companies. Jurnal Akuntansi dan Bisnis, 9*(2), 95–107.*

Indah, R., & Aditya, B. (2023). *Pengaruh transfer pricing dan leverage terhadap penghindaran pajak. Jurnal Pajak dan Kebijakan Publik, 8*(2), 120–132.*

Jensen, M. C., & Meckling, W. H. (1976). *Theory of the firm: Managerial behavior, agency costs and ownership structure. Journal of Financial Economics, 3*(4), 305–360.* https://doi.org/10.1016/0304-405X(76)90026-X

Joachim, M. (2024). *Firm size and corporate tax avoidance in Indonesia. Jurnal Akuntansi dan Keuangan Asia, 11*(1), 88–100.*

Laela, S., & Suharna, A. (2024). *Pengaruh inventory intensity terhadap tax avoidance pada sektor energi. Jurnal Akuntansi dan Strategi Bisnis, 9*(1), 77–90.*

Lidiawati, S. (2023). *Transfer pricing, firm size, and tax avoidance in telecommunication companies. Jurnal Akuntansi dan Ekonomi, 17*(2), 133–145.*

Margaretha, D., & Meita, L. (2024). *Does inventory intensity affect corporate tax avoidance? Evidence from the energy sector in Indonesia. Indonesian Journal of Accounting Research, 27*(2), 213–226.*

Putra, R., & Rahayu, N. (2023). *Tax planning and tax avoidance: A literature review. Jurnal Perpajakan Indonesia, 6*(3), 233–245.*

Rahmawati, F., & Irawati, D. (2023). *Inventory intensity and corporate tax avoidance in the mining sector. Jurnal Ekonomi dan Bisnis Terapan, 8*(1), 31–45.*

Rakhmayani, S., Hartono, J., & Prabowo, M. (2022). *Determinants of tax avoidance: The role of corporate characteristics and governance. Jurnal Keuangan dan Bisnis, 14*(2), 88–103.*

Rosita, Y., & Mita, S. (2024). *Firm size and its effect on tax avoidance in energy sector companies. Jurnal Akuntansi dan Keuangan Daerah, 19*(2), 95–108.*

Salsabila, N., Rizky, H., & Kurniawan, D. (2023). *Transfer pricing practices and tax avoidance: Evidence from Indonesian public companies. Journal of International Accounting Research, 17*(1), 55–70.*

Sulfia, L., & Rusmanto, D. (2024). *Corporate governance mechanisms and tax avoidance in Indonesian listed firms. Jurnal Akuntansi dan Keuangan, 19*(1), 71–83.*

Velte, P. (2023). *Corporate governance and tax avoidance: Evidence from European firms. International Journal of Corporate Governance, 17*(3), 211–229.*

Watts, R. L., & Zimmerman, J. L. (1986). *Positive accounting theory.* Prentice Hall.

Wirawan, D. (2023). *Firm size and tax avoidance: Evidence from the real estate sector in Indonesia. Jurnal Akuntansi dan Keuangan, 18*(2), 77–91.*