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Explaining Tax Avoidance in the Energy Sector: The Role of Financial Distress, Operating Cash Flow, and Environmental Uncertainty

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Abstract: Tax avoidance is a tax planning strategy used by companies to minimize tax liabilities within applicable regulations. Although legally permitted, this practice may reduce government tax revenue, particularly in the energy sector, where companies often report Cash Effective Tax Rates (CETR) below the statutory tax rate. This study aims to examine the effects of financial distress, operating cash flow, and environmental uncertainty on tax avoidance in energy sector companies listed on the Indonesia Stock Exchange during 2020-2024. This research employed a quantitative approach using the secondary data obtained from the annual financial reports. The sample consisted of 17 energy companies selected through a purposive sampling technique, and it resulted in 85 observations. The data were analyzed using a panel data regression with a fixed effects model. The tax avoidance was measured using the Cash Effective Tax Rate (CETR). The results indicated that financial distress, operating cash flow, and environmental uncertainty simultaneously affected tax avoidance. Partially, financial distress had no significant effect on tax avoidance, while operating cash flow and environmental uncertainty had a significant positive effect. Thus, these findings provided insights for tax authorities in strengthening risk-based tax supervision and for companies in formulating more prudent and transparent tax policies to support corporate sustainability and tax compliance.

Keyword: Environmental Uncertainty, Financial Distress, Operating Cash Flow, Tax Avoidance.

INTRODUCTION

In Indonesia, taxes play a very important role in the functioning of the state. Their role as the primary source of government revenue makes them a vital tool for the government to fund various national development programs and projects. As the largest contributor to state revenue, tax revenue remains a primary focus for the Indonesian government. Various efforts continue to be made to improve tax revenue performance year after year.

The energy sector is one of the strategic sectors in Indonesia because it contributes significantly to the national Gross Domestic Product (GDP). However, the tax revenue generated from this sector is considered not fully proportional to its economic contribution (Nirwasita et al., 2024). This condition indicates potential issues in the tax compliance behavior of energy sector companies, including the possibility of tax avoidance practices. This concern is also supported by Syarif & Koerniawan (2025), who explain that the mining sector is highly vulnerable to tax avoidance because companies in this sector are characterized by high profitability, extensive related-party transactions, and complex cross-border operations. In addition, the energy sector is highly sensitive to commodity price fluctuations, export demand, exchange rate movements, and regulatory changes. These characteristics may affect companies' revenue stability, cash flows, and tax burdens, making tax avoidance in the energy sector a relevant issue to examine.

Although tax revenue has continued to rise in nominal terms, the potential for tax avoidance practices persists, and Indonesia's tax ratio remains at a relatively low level. The problem lies in suboptimal tax revenue, meaning the average tax ratio has yet to reach the expected target (Saputra, 2023). According to data from CNBC Indonesia, Indonesia's tax ratio rose from 8.33% in 2020 to 10.38% in 2022, but still lags behind other ASEAN countries such as Thailand, Vietnam, Singapore, and Cambodia. Subsequently, the tax ratio declined to 10.02% in 2024, a situation reflecting the instability of tax revenue due to shifts in global and domestic economic conditions.

The persistently low tax ratio and significant tax gap indicate that various government policies aimed at increasing tax revenue have not yet been fully implemented optimally. This situation arises due to a conflict of interest between the government and corporations as taxpayers. For the government, taxes are a primary source of revenue used to fund various government programs and activities. However, for corporations, taxes are viewed as a burden that can reduce net profits. This is consistent with Pratomo & Wibowo (2024), who state that taxes are not only a source of state revenue but also a burden that reduces corporate revenue, encouraging companies to minimize tax payments through tax-planning strategies or tax aggressiveness. This situation drives companies to seek ways to minimize their tax liabilities, whether through mechanisms that comply with regulations or those that potentially violate them. Such efforts typically arise when companies identify loopholes or weaknesses in tax regulations, which can ultimately lead to tax avoidance practices (Khairunnisa et al., 2023).

In the context of taxation, tax avoidance is defined as an effort to save on taxes by exploiting loopholes or flexibilities in regulations without violating legal provisions (Maysaroh & Prasetyo, 2024). Although this practice does not fall under the category of prohibited acts, tax authorities consider that tax avoidance does not fully support the optimization of government revenue. This situation makes tax avoidance a complex issue, as the action is legally permitted but, from the perspective of government revenue, is not what the government desires.

The tax avoidance phenomenon occurring in the energy sector involves alleged transfer pricing practices by PT Adaro Energy Tbk., one of Indonesia's largest coal companies, through its subsidiary, Coaltrade Services International Pte. Ltd., which is based in Singapore. These allegations first surfaced in 2009 and resurfaced in 2019 following a report by the international organization Global Witness indicating the diversion of revenue and profits from Indonesia to Singapore. According to the report, PT Adaro is suspected of selling coal from its mines to Coaltrade at a lower price, which Coaltrade then resells at a higher price. Additionally, a $55 million bonus from a third party was recorded as revenue by Coaltrade, not by PT Adaro. This scheme is suspected of being designed to reduce tax liabilities, given that Singapore's tax rate is around 17% lower than Indonesia's rate. Global Witness estimates that during the 2009-2017 period, PT Adaro may have paid approximately US$125 million, or Rp1.75 trillion, less in taxes than it should have (Tuswandi, 2022).

This study was based on the agency theory proposed by Jensen & Meckling (1976), which explains the contractual relationship between a principal and an agent, in which the principal delegates decision-making authority to the agent. In the context of this study, the government acted as the principal that collected taxes from companies, while company management acted as the agent that calculated, paid, and reported tax obligations to the government. This theory explains that agents tend to act to maximize their own interests, which can lead to conflicts of interest with the principal. This conflict is exacerbated by information asymmetry, where management possesses more comprehensive information regarding the company's condition compared to the government (Laili & Tjaraka, 2024).

Complementing the agency theory, this study also used the legitimacy theory to explain tax avoidance behavior in the energy sector. Legitimacy theory explains that organizational legitimacy depends on the congruence between the values associated with a company's activities and the values or norms accepted in the social environment in which the company operates (Dowling & Pfeffer, 1975). In the energy sector, legitimacy pressure is important because companies are highly exposed to public scrutiny, regulatory pressure, and environmental concerns. Therefore, tax avoidance decisions are not only affected by managerial incentives to reduce tax burdens but also by the need to maintain reputation, stakeholder trust, and regulatory legitimacy.

Based on the above discussion, the factors suspected of influencing tax avoidance in this study were financial distress, operating cash flow, and environmental uncertainty. Financial distress refers to a condition in which a company experiences financial pressure that prevents it from meeting its maturing obligations and may lead the company toward bankruptcy (Farida & Sugesti, 2023). Companies experiencing liquidity pressures often utilize tax avoidance as a means of reducing tax burdens and maintaining cash flow (Santo & Nastiti, 2023). Another factor believed to affect tax avoidance is operating cash flow, which refers to cash generated from a company's core operating activities over a specific period, including cash receipts from customers and cash payments for liabilities, such as accounts payable, employee salaries, interest, taxes, and other operating expenses. Therefore, operating cash flow plays an important role in a company's tendency to engage in tax avoidance as a strategy to preserve liquidity and financial performance (Gazali et al., 2020). The third factor that may affect tax avoidance is environmental uncertainty. Environmental uncertainty arises from changes in business elements, such as market trends, technological developments, and shifts in consumer behavior that are difficult to predict. Under such conditions, the potential for tax avoidance practices may increase as companies attempt to adjust their financial strategies to an uncertain business environment (Mulyati & Pratiwi, 2025).

Furthermore, the research conducted by Dang & Tran (2021) and Putri & Yanti (2022) indicates that financial distress has a positive effect on tax avoidance. Meanwhile, the studies by Fauzan et al. (2021) and Kalbuana et al. (2023) suggest that financial distress does not affect tax avoidance. However, the research by Ariff et al. (2023) indicates that financial distress has a negative effect on tax avoidance. The studies conducted by Gazali et al. (2020) and Paramitha & Kurnia (2023) indicate that operating cash flow has a positive effect on tax avoidance. The studies conducted by Wardani & Nugrahanto (2022), Aryanti & Handayani (2023), and Nurmalina (2023) indicate that operating cash flow has a negative effect on tax avoidance. Meanwhile, the research conducted by Yulianawati & Karlina (2025) indicates that operating cash flow does not affect tax avoidance. The research conducted by Iksan & Herawaty (2024) and Arieftiara et al. (2020) indicates that environmental uncertainty has a positive effect on tax avoidance, whereas the research conducted by Septriani et al. (2025) indicates that environmental uncertainty has a negative effect on tax avoidance. However, research conducted by Rahmadhani & Arieftiara (2025) found that environmental uncertainty does not affect tax avoidance.

However, these inconsistent findings may arise from contextual bias, particularly when prior results are generalized across sectors with different business characteristics. The Indonesian energy sector is characterized by high exposure to commodity price fluctuations, export market dynamics, regulatory pressure, and substantial capital-intensive operations. These characteristics may affect the way financial distress, operating cash flow, and environmental uncertainty explain corporate tax avoidance behavior. Therefore, it is important to re-examine the determinants of tax avoidance in this specific sectoral context rather than merely relying on findings from broader cross-industry studies.

A clear research gap remains in understanding how internal financial conditions and external business uncertainty jointly influence tax avoidance in the Indonesian energy sector. Previous studies have largely examined the determinants of tax avoidance separately or across various industries, with limited attention to the integrated role of financial distress, operating cash flow, and environmental uncertainty in a sector that is highly sensitive to global commodity markets and regulatory changes. In addition, environmental uncertainty has received less attention than traditional financial variables, even though uncertainty may shape managerial discretion, cash preservation motives, and corporate tax planning decisions.

Therefore, this study addresses the gap by analyzing the effects of financial distress, operating cash flow, and environmental uncertainty on tax avoidance using evidence from energy sector companies listed on the Indonesia Stock Exchange during the 2020-2024 period. The novelty of this study lies not only in its sector-specific focus but also in its emphasis on environmental uncertainty as a key external factor that may affect managerial tax avoidance decisions. Unlike prior studies that mainly focus on general firm characteristics, this study integrates internal financial pressure, cash flow capacity, and external environmental uncertainty to explain tax avoidance behavior in a highly volatile and strategically important sector. Thus, this study is expected to contribute to the tax avoidance literature by providing more contextualized evidence from a developing economy and by extending the application of agency theory and legitimacy theory in explaining how firm-specific and environmental factors shape corporate tax strategies.

Based on these arguments, this study proposed the following hypotheses:

H_1: Financial distress, operating cash flow, and environmental uncertainty simultaneously affect tax avoidance among energy sector companies listed on the Indonesia Stock Exchange for the 2020-2024 period.

H_2: Financial distress has a positive effect on tax avoidance among energy sector companies listed on the Indonesia Stock Exchange (IDX) for the 2020-2024 period.

H_3: Operating cash flow has a positive effect on tax avoidance among energy sector companies listed on the Indonesia Stock Exchange (IDX) for the 2020-2024 period.

H_4: Environmental uncertainty has a positive effect on tax avoidance among energy sector companies listed on the Indonesia Stock Exchange (IDX) for the 2020-2024 period.

METHOD

This study is a quantitative study employing descriptive and causal approaches. This study aims to analyze the effects of financial distress, operating cash flow, and environmental uncertainty on tax avoidance. The study focuses on energy sector companies listed on the Indonesia Stock Exchange (IDX) during the 2020-2024 period. The study used the secondary data in the form of financial statements and annual reports published on the official website of the Indonesia Stock Exchange (IDX) and the official websites of the respective companies.

The population of this study consisted of all of the energy sector companies listed on the Indonesia Stock Exchange during the observation period. The sample of this study was selected using a purposive sampling technique, based on the specific criteria determined by the researcher. The criteria included energy sector companies listed on the Indonesia Stock

Exchange during the 2020-2024 period, consistently listed on the IDX during the observation period, consistently published financial reports during 2020-2024, did not incur losses during the observation period, had complete data required for this study, and had a CETR value of less than 1 or 100%.

Of the 89 energy sector companies listed on the IDX, 19 companies met the criteria, resulting in 95 observations over a 5-year period. However, during the data processing and testing process, the outliers were detected. According to Ghozali (2021), an outlier is a case or observation that has unique characteristics and appears significantly different from other observations, both for a single variable and for a combination of variables. The identification of univariate outliers was conducted by converting data into standardized scores or z-scores. In large samples, an observation can be considered an outlier if the z-score is greater than 3. Based on the outlier test results, two companies were classified as outliers. These data were subsequently removed from the research sample as they could affect the validity of the panel data regression model, resulting in a reduction in the final sample size. Consequently, the sample used in this study consisted of 17 companies, comprising 85 observations from the energy sector listed on the Indonesia Stock Exchange (IDX) over the 2020-2024 period.

The dependent variable in this study was tax avoidance, measured using the Cash Effective Tax Rate (CETR). CETR is calculated by dividing cash tax paid by pre-tax income, which reflects the proportion of pre-tax income actually paid by the company as cash tax. CETR was selected as the proxy for tax avoidance because it represents the actual tax burden borne by the company and has an inverse relationship with tax avoidance. A lower CETR indicates a higher tendency toward tax avoidance, whereas a higher CETR indicates a lower tendency toward tax avoidance.

The independent variables in this study included financial distress, operating cash flow, and environmental uncertainty. Financial distress was measured using the modified Altman Z-Score model, which is appropriate for both manufacturing and non-manufacturing firms. Based on the Z-Score value, companies were classified into three categories: companies with a Z″ below 1.1 were classified in the distress zone, those with a Z″ between 1.1 and 2.6 were classified in the grey zone, and those with a Z″ greater than 2.6 were classified in the safe zone. Operating cash flow was calculated by dividing cash flow from operating activities by total assets, as this ratio reflects the company's ability to generate cash from its core business operations. Meanwhile, environmental uncertainty was measured using sales volatility, represented by the standard deviation of sales divided by total assets, as it reflects revenue fluctuations resulting from changes in the external business environment.

Furthermore, the data analysis was conducted using descriptive statistics to describe the characteristics of each variable. Next, the panel data model selection was performed using the Chow test and the Hausman test to determine the most appropriate regression model. The classical assumption tests, including tests for normality, multicollinearity, and heteroscedasticity, were also conducted to ensure the validity of the regression model. Then, the hypothesis testing was performed using the coefficient of determination (R^2), F-test, and t-test to evaluate the effect of independent variables on the dependent variable.

Table 1. Operational Definitions of Research Variables

No	Variables	Dimension	Indicators	Scale
1	Tax Avoidance (Y) (Hanlon & Heitzman, 2010) and (Asalam & Kusumaningtyas, 2022)	Cash Effective Tax Rate (CETR)	$CETR = \frac{\text{Tax Paid by the Company}}{\text{Earnings Before Tax}}$	Ratio
2	Financial Distress (X_1) (Altman, E. I. 2018) and (Fitri & Dillak, 2020)	Modified Altman Z-Score	Z-Score = 6,56X1 + 3,26X2 + 6,72X3 + 1,05X4 Where: X1 = Working Capital/Total Assets	Ratio

No	Variables	Dimension	Indicators	Scale
			X2 = Retained Earnings/ Total Assets X3 = Earning before Interest and Tax/Total Assets X4 = Book value of Equity/Total Liabilities	
3	Operating Cash Flow (X_2) (Halim & Novianty, 2025)	Operating Cash Flow (OCF)	$OCF = \frac{\text{Operating Cash Flow}}{\text{Total Assets}}$	Ratio
4	Environmental Uncertainty (X_3) (Yopie & Tanniono, 2024)	Sales Volatility	$EU = \frac{\text{Standard Deviation of Sales}}{\text{Total Assets}}$	Ratio

RESULT AND DISCUSSION

Table 2. Descriptive Statistics

Description	Tax Avoidance	Financial Distress	Operating Cash Flow	Environmental Uncertainty
Mean	0.274861	6.086771	0.173451	0.303721
Maximum	0.908010	16.65592	0.656720	1.263920
Minimum	0.001860	0.983630	-0.145000	0.029410
Std. Dev.	0.227850	3.865344	0.145995	0.267974
Observation	85	85	85	85

Source: EVIEWS 12 output processed, (2026)

This study began with a descriptive statistical analysis to provide an overview of the characteristics of each research variable. The measures applied in this analysis included the mean, maximum, minimum, and standard deviation. The results of the descriptive statistical analysis in Table 2 show that the mean of the tax avoidance variable, proxied by CETR, is 0.27486, which is greater than the standard deviation of 0.22785. This result indicated that the dispersion of the tax avoidance variable data was relatively low or that the data tended to cluster. The mean of the financial distress variable was 6.08677, which was greater than the standard deviation of 3.86534. This result indicated that the dispersion of financial distress data tended to be low. Furthermore, the mean of the operating cash flow variable was 0.173451, which was greater than the standard deviation of 0.145995. This result indicated that the operating cash flow data tended to cluster and were not widely dispersed. Meanwhile, the mean of the environmental uncertainty variable was 0.30372, which was greater than the standard deviation of 0.267974. This result indicated that the dispersion of environmental uncertainty data was relatively low.

Table 3. Model Selection and Data Quality Testing

Testing	Prob	Description
Chow	0.0000	FEM
Hausman	0.0038	FEM
Normality	0.0619	Passed
Multicollinearity	0.249 - 0.534	Passed
Heteroskedasticity	0.0903	Passed

Source: EVIEWS 12 output processed, (2026)

Table 4. Hypothesis Testing

Variables	Coefficient	t-Statistic	Prob.	Description
FD => CETR	-0.003771	-0.398674	0.6914	H_2 Rejected
OCF => CETR	-0.732407	-3.568029	0.0007	H_3 Accepted
EU => CETR	-0.379847	-2.591373	0.0118	H_4 Accepted
Adjusted R-squared			0.463557	
Prob(F-statistic)			0.000001	

Source: EVIEWS 12 output processed, (2026)

Table 3 shows the results of the model selection procedure and data quality tests used in this study. The Chow test yielded a p-value of 0.0000, indicating that the Fixed Effects Model (FEM) was more appropriate than the Common Effects Model (CEM). Furthermore, the Hausman test yielded a probability value of 0.0038. This result indicated that the Fixed Effects Model (FEM) was more appropriate than the Random Effects Model (REM). Thus, the Fixed Effects Model (FEM) was selected as the most suitable estimation model for panel data analysis in this study. The classical assumption tests also showed that the model met the requirements of normality, multicollinearity, and heteroscedasticity tests.

Table 4 shows the results of hypothesis testing using the Fixed Effects Model (FEM). The results showed that the financial distress did not have a significant effect on tax avoidance, as reflected by a p-value of 0.6914, leading to the rejection of H_2. Conversely, the operating cash flow and environmental uncertainty had significant negative effects on CETR. Since CETR was used as an inverse proxy for tax avoidance, these findings indicated that the operating cash flow and environmental uncertainty had positive effects on tax avoidance. The regression model was statistically significant, as shown by the Prob(F-statistic) value of 0.000001. Therefore, was H_1 accepted, indicating that financial distress, operating cash flow, and environmental uncertainty simultaneously affected tax avoidance. The Adjusted R-squared value of 0.463557 indicated that 46.36% of the variation in tax avoidance could be explained by financial distress, operating cash flow, and environmental uncertainty. Meanwhile, the remaining 53.64% was affected by other variables outside the research model, such as profitability, leverage, firm size, capital intensity, sales growth, corporate governance, transfer pricing, and political connections.

Discussion

1. The Effects of Financial Distress, Operating Cash Flow, and Environmental Uncertainty on Tax Avoidance

Based on the simultaneous test results, financial distress, operating cash flow, and environmental uncertainty simultaneously affected the tax avoidance among the energy sector companies listed on the Indonesia Stock Exchange during the study period. This finding indicated that the tax avoidance behavior was not determined by a single factor, but by the combined effects of the companies' financial pressure, cash flow capacity, and external business uncertainty. However, the Adjusted R-squared value showed that the explanatory power of the model was limited. It indicated that the tax avoidance might also be affected by other variables outside the research model, such as profitability, leverage, firm size, capital intensity, sales growth, corporate governance, transfer pricing, and political connections.

2. The Effect of Financial Distress on Tax Avoidance

Based on the results of the partial regression test (t-test), the financial distress did not have a significant effect on tax avoidance. This result did not support the hypothesis and indicates that financial distress does not consistently determine tax avoidance among energy sector companies. These findings were supported by the distribution of observations, which showed that most companies in the sample were classified in the safe zone category.

This condition suggested that most energy sector companies remained in relatively sound financial condition, so the financial distress was not strong enough to encourage aggressive tax avoidance. In addition, the high levels of financial distress might cause companies to focus more on financial recovery and operational sustainability rather than engaging in tax avoidance. Companies experiencing financial pressure generally face declining profits and might even incur losses, thereby reducing the incentive to conduct tax avoidance. Additionally, loss-making companies could utilize tax loss carryforwards to reduce their tax burden without taking additional risks through aggressive tax avoidance practices. Under such conditions, companies were more likely to choose other alternatives to maintain business continuity, such as seeking additional funding, obtaining support from affiliates, or implementing operational efficiencies. Companies facing financial difficulties also tended to avoid aggressive tax avoidance because such actions may reduce investor confidence, damage the company's reputation in the eyes of stakeholders, and hinder the company's recovery process.

In relation to agency theory, the relationship between the government as the principal and corporate management as the agent creates information asymmetry, as management possesses more comprehensive internal information regarding the company's condition than the government. Although this situation could theoretically create opportunities for tax avoidance, companies experiencing financial distress might avoid overly aggressive tax policies because the risk of penalties, audits, and regulatory scrutiny could worsen their financial condition. From the perspective of the legitimacy theory, companies under financial pressure might also avoid aggressive tax avoidance to maintain reputation, stakeholder trust, and regulatory legitimacy, particularly in the energy sector, which is highly exposed to public and regulatory scrutiny. The findings of this study aligned with research conducted by Kalbuana et al. (2023), which states that companies experiencing financial distress are not always driven to increase tax avoidance practices. However, this finding contradicts the findings of Dang & Tran (2021) and Fadhila & Andayani (2022), who stated that financial distress affects tax avoidance. Thus, financial distress in this study was not found to be a factor affecting companies' propensity to engage in tax avoidance.

3. The Effect of Operating Cash Flow on Tax Avoidance

The results of the partial regression test indicated that the operating cash flow variable had a negative coefficient with a probability value below the significance level. This indicated that the operating cash flow had a significant effect on tax avoidance, with a negative relationship with CETR. Since CETR was used as an inverse proxy for tax avoidance, a decrease in CETR reflected an increase in tax avoidance. Thus, the results of this study were consistent with the hypothesis formulated by the researcher: the operating cash flow had a positive effect on tax avoidance.

These findings indicated that companies with strong operating cash flow did not necessarily pay cash taxes in a high proportion relative to pre-tax profit. In general, high operating cash flow reflected that a company's operational activities were running smoothly and could generate sufficient cash to finance business activities, meet obligations, and maintain operational continuity. In the energy sector, the operating cash flow was particularly important because companies generally required substantial funding for capital-intensive operations, exploration, production, transportation, and other operational activities. Therefore, companies with higher operating cash flow might have greater flexibility to conduct tax planning in order to maintain cash efficiency and financial stability.

Furthermore, the strong operating cash flow provided companies with greater liquidity and flexibility. It ensured that they had sufficient resources to develop tax planning and implement more efficient tax strategies. Companies with high operating cash flow also tend to have the ability to obtain professional tax advice, structure more profitable transactions, and take advantage of available tax loopholes. Conversely, when operating cash flow is low, companies tend to be more limited in implementing complex tax strategies because their primary focus is on maintaining operations and meeting short-term obligations.

These findings were consistent with agency theory, which explains the conflict of interest between the government as the principal and corporate management as the agent. Management possesses more comprehensive internal information regarding the company's cash flow and profit conditions than the government does. This information asymmetry may encourage management to exploit loopholes in tax policy to minimize tax payments, thereby creating a conflict of interest between the government, which seeks optimal tax revenue, and management, which strives to maintain the company's cash efficiency. From the perspective of legitimacy theory, companies with strong operating cash flow must also balance tax efficiency with stakeholder expectations, because firms with greater financial capacity are expected to contribute fairly to state revenue and maintain compliance. The results of this study are aligned with the research by Paramitha & Kurnia (2023) and Gazali et al. (2020), who state that operating cash flow has a positive effect on tax avoidance. However, this contradicts the research conducted by Aryanti & Handayani (2023), which states that operating cash flow has a negative effect on tax avoidance.

4. The Effect of Environmental Uncertainty on Tax Avoidance

The results of the partial regression test indicated that environmental uncertainty had a significant negative effect on CETR. Since CETR was used as an inverse proxy for tax avoidance, this finding indicated that environmental uncertainty had a positive effect on tax avoidance. Thus, the results of this study were consistent with the hypothesis formulated in this study: higher environmental uncertainty increased the tendency of companies to engage in tax avoidance.

In addition, these findings indicated that environmental uncertainty was one of the factors that could affect corporate tax policy decisions. Environmental uncertainty may arise from changes in business elements, particularly changes in product markets, customer consumption patterns, product competition structures, technological developments, and unpredictable economic conditions. In the energy sector, this uncertainty becomes more relevant because companies are highly exposed to external pressures such as fluctuations in global coal demand, commodity price volatility, geopolitical conditions, changes in benchmark coal prices, regulatory changes, and the energy transition. These conditions may affect revenue stability, cash flows, and financial performance, making tax decisions an important part of managerial strategy.

Moreover, high environmental uncertainty can encourage companies to reduce cash-based expenditures, including tax expenses. As the business environment becomes increasingly uncertain, companies strive to maintain after-tax profits, rates of return, and cash flows. In this situation, taxes are viewed as a cost component that can be managed as efficiently as possible. Therefore, the higher the level of environmental uncertainty, the greater the likelihood that management will utilize tax policy flexibility to minimize tax payments. Under these conditions, limited managerial ability to predict environmental changes may give rise to opportunistic behavior. When managers face limited information and difficulty in anticipating external and internal environmental conditions, they may rely more heavily on discretion and personal judgment in formulating financial and tax strategies. Under such conditions, tax avoidance may be used strategically to preserve liquidity, stabilize financial performance, and reduce uncertainty-related pressure.

These findings were consistent with agency theory, which explains the relationship between the government as the principal and corporate management as the agent. Management possesses more comprehensive information regarding the company's internal conditions and business risks than the government. This information asymmetry creates opportunities for management to make tax decisions that are more beneficial to the company, including through tax avoidance, particularly when the company operates in an unstable business environment. From the perspective of legitimacy theory, environmental uncertainty increases the pressure on energy companies to maintain reputation, stakeholder trust, and regulatory legitimacy, as they operate in a strategic sector that is highly exposed to public scrutiny, commodity price fluctuations, and regulatory changes. Therefore, tax planning may be used as a strategy to manage cash flow and financial stability, but companies must also ensure that their tax decisions do not threaten their legitimacy in the eyes of stakeholders. The results of this study were consistent with Arieftiara et al. (2020) and Iksan & Herawaty

(2024), who state that environmental uncertainty has a positive effect on tax avoidance. However, this finding contradicts Septriani et al. (2025), who states that environmental uncertainty at the national level has a significant negative effect on tax avoidance, whereas environmental uncertainty at the firm level has no significant effect on tax avoidance.

CONCLUSION

This study aims to empirically examine the effects of financial distress, operating cash flow, and environmental uncertainty on tax avoidance among the energy sector companies listed on the Indonesia Stock Exchange (IDX) during the 2020-2024 period. Based on the research results, the financial distress, operating cash flow, and environmental uncertainty simultaneously had a significant effect on tax avoidance. Partially, the financial distress did not affect tax avoidance. This result indicated that a company's level of financial distress was not a determining factor in its tendency to engage in tax avoidance. Conversely, the operating cash flow and environmental uncertainty had a significant positive effect on tax avoidance. Since tax avoidance was proxied by the Cash Effective Tax Rate (CETR), a decrease in CETR reflected an increase in tax avoidance. Thus, the higher the operating cash flow and environmental uncertainty, the greater the company's tendency to engage in tax avoidance.

Theoretically, this study contributed to the tax avoidance literature by providing sector-specific evidence from Indonesia's energy sector. The findings extended the application of agency theory by showing that tax avoidance was not only affected by conflicts of interest and information asymmetry between the government and corporate management but also by firms' internal financial conditions and external business uncertainty. In addition, this study also supported legitimacy theory by showing that tax avoidance decisions in the energy sector were not only related to managerial efforts to reduce tax burdens but also to the need to maintain reputation, stakeholder trust, and regulatory legitimacy. In particular, the significant effect of environmental uncertainty indicates that unstable business conditions may encourage management to use tax planning as a strategy to maintain cash flow, stabilize financial performance, and manage tax burdens. This finding strengthens the relevance of environmental uncertainty as an important factor in explaining tax avoidance behavior in capital-intensive and highly volatile sectors such as energy.

This study has several limitations. *First*, the sample was limited to energy sector companies listed on the Indonesia Stock Exchange, with 17 companies and 85 observations, so the findings might not be generalizable to other sectors. *Second*, this study used only CETR as a proxy for tax avoidance, which might not fully capture all forms of corporate tax avoidance. *Third,* this study did not conduct robustness or sensitivity tests using alternative tax avoidance proxies. *Fourth*, potential endogeneity issues, such as omitted variable bias, reverse causality, and measurement error, had not been fully addressed. Therefore, future research is recommended to expand the sample to other sectors, extend the observation period, and include additional variables such as profitability, leverage, firm size, capital intensity, sales growth, corporate governance, transfer pricing, and political connections. Future studies are also encouraged to use alternative tax avoidance proxies, such as GAAP ETR, Book-Tax Differences (BTD), long-run ETR, or abnormal BTD, to provide more robust results.

Practically, these findings can serve as a basis for the Directorate General of Taxes (DJP) to strengthen risk-based supervision of companies with high operating cash flow and high environmental uncertainty, particularly in the energy sector. For companies, the results suggest the importance of implementing prudent tax policies, strengthening tax governance, improving internal controls, and increasing reporting transparency so that tax decisions remain aligned with compliance principles and business sustainability.

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