

The Price of Looking Green: Does Greenwashing Have Multiple Facets?

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ABSTRACT

Sustainability reporting in the Basic Materials sector may present a favorable environmental image, yet such disclosure does not always correspond to actual environmental performance. This study aims to predict and explain the effects of Environmental Costs, Emission Intensity, and Waste Performance on Greenwashing, as well as the economic consequences of Greenwashing for ROA and Tax Avoidance. Using a positivist quantitative approach, this study analyzes firm-year observations of Indonesian Basic Materials companies during 2021–2023. The data were collected from annual reports, sustainability reports, financial statements, PROPER ratings, and ESG databases. The sample was selected using purposive sampling and examined through panel data regression and Sobel mediation testing. The results show that Environmental Costs and Emission Intensity significantly increase Greenwashing, whereas Waste Performance has no significant effect. Greenwashing significantly reduces ROA and lowers GAAP ETR, indicating a higher level of Tax Avoidance. The mediation test further shows that Greenwashing only mediates the relationship between Environmental Costs and ROA. These findings indicate that environmental activities do not automatically represent substantive capabilities when corporate disclosure is not aligned with actual environmental performance. This study contributes by using the GRI-PROPER gap to assess Greenwashing in high-impact listed firms within a broader emerging market regulatory setting.

Keywords: Emission Intensity; Environmental Costs; Greenwashing; ROA; Tax Avoidance; Waste Performance.

INTRODUCTION

Amid increasing sustainability pressure, corporate green claims are no longer sufficient unless they are supported by actual environmental performance (Dorfleitner & Utz, 2024; Lublóy et al., 2025). In the Basic Materials sector, this issue becomes more critical because firms operate with high exposure to resource extraction, emissions, waste, and regulatory scrutiny (Siddique et al., 2026; Treepongkaruna et al., 2024; Wedari et al., 2021). When sustainability disclosure is inconsistent with emission data, waste performance, or PROPER ratings, greenwashing may weaken financial performance and obscure tax avoidance behavior (Birindelli et al., 2024a; Nasih et al., 2024; Velte, 2025). Therefore, this study positions greenwashing as a measurable disclosure–performance gap that may explain variations in Return on Assets (ROA) and tax avoidance (Dorfleitner & Utz, 2024; Lublóy et al., 2025).

This study employs the Resource-Based View (RBV), which explains that competitive advantage arises when firms manage valuable, rare, inimitable, and well-organized resources and capabilities (Barney, 1991; Hart, 1995). In environmental management, environmental costs, emission control, and waste management may become strategic capabilities only when they reflect substantive environmental action rather than symbolic reporting (Benjamin et al., 2023; Firmansyah et al., 2021; Ifada & Jaffar, 2023; Zhang et al., 2023). Previous studies show that environmental cost expenditure supports environmental performance and disclosure, waste performance is associated

with environmental disclosure, and stronger environmental performance reduces greenwashing (Benjamin et al., 2023; Ifada & Jaffar, 2023; Zhang et al., 2023). Other studies find that carbon pressure and ESG disclosure may create space for greenwashing, while greenwashing may reduce financial performance and relate to tax avoidance (Birindelli et al., 2024a; Nasih et al., 2024; Treepongkaruna et al., 2024).

Although previous studies commonly define greenwashing as a gap between environmental claims and actual environmental performance, they tend to examine disclosure, carbon risk, financial performance, or tax avoidance separately. Limited studies simultaneously test environmental costs, emission intensity, and waste performance as determinants of greenwashing. In addition, the use of the gap between GRI-based environmental disclosure and PROPER ratings as a greenwashing proxy remains limited in Indonesian Basic Materials companies. Prior studies also rarely position greenwashing as a mediating mechanism that connects environmental factors with financial performance and tax avoidance.

This study offers theoretical, methodological, and empirical novelty. Theoretically, it extends RBV by treating greenwashing as evidence that environmental resources do not always become substantive capabilities. Methodologically, this study measures greenwashing through the gap between GRI-based environmental disclosure and PROPER performance, allowing corporate green claims to be compared with external regulatory assessment. Empirically, this study examines Indonesian Basic Materials companies during the 2021–2023 period and integrates environmental costs, emission intensity, waste performance, greenwashing, ROA, and tax avoidance in one empirical model.

This study uses a positivist paradigm because corporate sustainability issues are translated into measurable variables and tested statistically. The research asks: what is the effect of environmental costs, emission intensity, and waste performance on greenwashing; what is the effect of greenwashing on ROA and tax avoidance; and what is the mediating role of greenwashing in these relationships? Accordingly, this study aims to predict and explain the effects of environmental factors on greenwashing and the economic consequences of greenwashing. The data are collected from annual reports, sustainability reports, financial statements, PROPER ratings, and ESG databases, then analyzed using panel data regression and mediation testing. Practically, the findings may help managers, investors, and regulators assess whether corporate green claims reflect substantive environmental performance or merely symbolic sustainability narratives.

LITERATURE REVIEW

The Resource-Based View (RBV) provides the theoretical foundation for this study by explaining that competitive advantage arises from resources and capabilities that are valuable, rare, inimitable, and well organized (Barney, 1991). Extending this logic, the natural-resource-based view positions pollution prevention, product stewardship, and sustainable development as environmental capabilities that may create strategic value (Hart, 1995). Environmental costs, emission intensity, and waste performance therefore indicate whether firms possess substantive environmental capabilities or merely construct symbolic sustainability narratives. This argument is consistent with green intellectual capital evidence showing that green human capital and green structural capital can strengthen corporate sustainability performance when environmental knowledge and organizational systems are developed as internal capabilities (Firmansyah et al., 2024). Recent greenwashing literature shows that gaps between environmental disclosure and actual performance can signal decoupling, weaken financial outcomes, and obscure opportunistic behavior (Birindelli et al., 2024; Treepongkaruna et al., 2024; Zhang et al., 2023). Thus, RBV explains how environmental capabilities affect greenwashing, ROA, and tax avoidance.

Environmental costs represent a firm's substantive financial commitment to pollution control, waste treatment, resource efficiency, and compliance. Ifada and Jaffar (2023) show that environmental cost expenditure supports environmental performance and disclosure, while Dorfleitner and Utz (2024) argue that stronger real performance narrows the space for unsupported green claims. Arouri et al. (2021) further indicate that environmental costs can condition the reduction of greenwashing through more reliable information disclosure. In the RBV perspective, environmental spending becomes a strategic resource when it builds valuable and difficult-to-

imitate environmental capabilities. Logically, higher substantive environmental costs should reduce the gap between GRI disclosure and PROPER performance. Based on this explanation, H1 is formulated as follows: environmental costs have a positive effect on greenwashing.

H1: Environmental costs have a positive effect on greenwashing.

Emission intensity reflects the environmental pressure generated by firms relative to their activity scale. Siddique et al. (2026) show that firms with high carbon risk tend to expand ESG disclosure while still facing higher greenwashing risk. Wedari et al. (2021) also identify potential greenwashing in climate-related disclosures among high emitters, while Treepongkaruna et al. (2024) show that high ESG ratings do not necessarily correspond to lower carbon emissions. Under RBV, effective emission control is a strategic environmental capability; therefore, high emission intensity signals weak capability and stronger legitimacy pressure. Logically, firms with higher emissions are more likely to use symbolic disclosure to cover poor environmental performance. Based on this explanation, H2 is formulated as follows: emission intensity has a positive effect on greenwashing.

H2: Emission intensity has a positive effect on greenwashing.

Waste performance reflects the firm's capability to reduce, recover, and recycle waste as evidence of substantive environmental management. Benjamin et al. (2023) find that stronger waste performance is associated with more extensive environmental disclosure, while Zhang et al. (2023) show that better environmental performance is negatively related to greenwashing. Lublóy et al. (2025) also define firm-level greenwashing as a decoupling between environmental communication and actual performance. In RBV logic, effective waste management represents valuable operational routines and environmental capabilities that reduce dependence on symbolic claims. Logically, stronger waste performance should narrow the gap between GRI disclosure and PROPER performance. Based on this explanation, H3 is formulated as follows: waste performance has a negative effect on greenwashing.

H3: Waste performance has a negative effect on greenwashing.

Greenwashing represents a gap between sustainability communication and actual environmental performance, which may reduce financial performance by damaging credibility and increasing reputational risk. Walker and Wan (2012) show that greenwashing negatively affects financial performance because symbolic environmental actions reduce firm value. In the Indonesian context, ESG disclosure has also been shown to have a positive relationship with financial profitability, suggesting that non-financial sustainability information can support firm performance when it reflects substantive organizational resources (Rizqo & Qadri, 2024). Birindelli et al. (2024) similarly find that greenwashing weakens bank financial performance, while Du et al. (2022) document a negative relationship between corporate greenwashing behavior and financial performance. From the RBV perspective, firms can achieve sustainable performance only when their resources are transformed into genuine capabilities. Logically, greenwashing indicates weak environmental capability and inefficient symbolic spending, thereby reducing asset-based profitability. Based on this explanation, H4 is formulated as follows: greenwashing has a negative effect on financial performance.

H4: Greenwashing has a negative effect on financial performance.

Greenwashing reflects symbolic sustainability disclosure that is not fully supported by substantive action and may conceal opportunistic behavior. Indonesian evidence further shows that corporate social responsibility disclosure is relevant in explaining tax avoidance because it may weaken the positive effect of political connections and investment opportunity sets on tax avoidance (Firmansyah et al., 2022). Nasih et al. (2024) show that Indonesian non-financial firms may use sustainability reporting as impression management to obscure tax avoidance. Latif et al. (2023) find that CSR decoupling, as a form of inconsistency between communication and action, increases tax avoidance, while Velte (2025) reports a positive relationship between CSR decoupling and tax avoidance in European firms. Under RBV, greenwashing indicates that firms lack genuine

sustainability capabilities and rely on symbolic legitimacy strategies. Logically, firms that manipulate green narratives may also use similar opportunistic strategies in taxation. Based on this explanation, H5 is formulated as follows: greenwashing has a negative effect on tax avoidance.

H5: Greenwashing has a negative effect on tax avoidance.

Environmental costs, emission intensity, and waste performance may influence financial performance through greenwashing because they reflect different levels of environmental capability. Arouri et al. (2021), Treepongkaruna et al. (2024), and Benjamin et al. (2023) show that environmental costs, emissions, and waste management are linked to greenwashing or substantive disclosure, while Walker and Wan (2012), Du et al. (2022), and Birindelli et al. (2024) show that greenwashing weakens performance. In RBV logic, environmental resources improve ROA only when transformed into credible capabilities rather than symbolic claims. Based on this explanation, H6a–H6c are formulated as follows: greenwashing mediates the positive indirect effects of environmental costs and waste performance and the negative indirect effect of emission intensity on financial performance.

H6: Greenwashing mediates the effects of environmental costs, emission intensity, and waste performance on corporate financial performance.

Environmental costs, emission intensity, and waste performance may affect tax avoidance through greenwashing because symbolic environmental disclosure can be connected to broader opportunistic behavior. Prior evidence also indicates that corporate social responsibility disclosure is associated with tax aggressiveness mechanisms, suggesting that sustainability disclosure and tax behavior may interact within broader corporate reporting strategies (Vito et al., 2022). Arouri et al. (2021), Zhang et al. (2023), Treepongkaruna et al. (2024), and Benjamin et al. (2023) show that environmental costs, emissions, and waste performance are relevant to greenwashing risk. Nasih et al. (2024), Latif et al. (2023), and Velte (2025) further link sustainability impression management or CSR decoupling with tax avoidance. Under RBV, firms lacking genuine environmental capability may rely on symbolic legitimacy while preserving private economic benefits. Based on this explanation, H7a–H7c are formulated as follows: greenwashing mediates the negative indirect effects of environmental costs and waste performance and the positive indirect effect of emission intensity on tax avoidance.

H7: Greenwashing mediates the effects of environmental costs, emission intensity, and waste performance on tax avoidance.

The formulated hypotheses are presented in Figure 1, which illustrates the research model of this study.

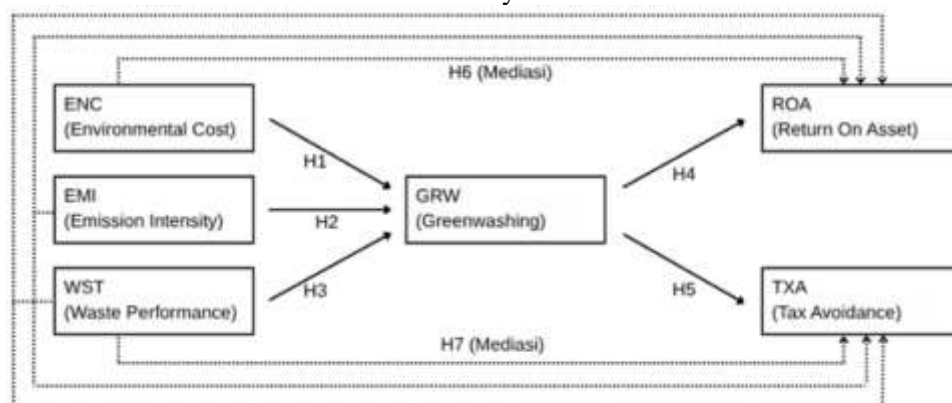


Figure 1. Research Model
Source: Processed by the Authors

METHOD

This study employs a positivist paradigm because it examines causal relationships among objectively measurable variables, namely environmental costs, emission intensity, waste

performance, greenwashing, financial performance, and tax avoidance. This paradigm is appropriate because the study does not focus on subjective interpretation of corporate sustainability behavior, but on empirical testing of whether the gap between environmental disclosure and actual environmental performance indicates greenwashing and generates economic consequences for firms (Bernini et al., 2024; Birindelli et al., 2024; Treepongkaruna et al., 2024). Therefore, each construct is operationalized into measurable proxies and tested using panel data regression and mediation analysis.

The data are collected through documentation of secondary data from annual reports, sustainability reports, financial statements, PROPER ratings issued by the Ministry of Environment and Forestry, and ESG databases. The unit of analysis is firm-year observations of Basic Materials sector companies listed on the Indonesia Stock Exchange during the 2021–2023 period. The population consists of all Basic Materials sector companies listed on the Indonesia Stock Exchange as of December 31, 2023. The sample is selected using purposive sampling based on data availability and report completeness, including the availability of annual or sustainability reports, traceable PROPER ratings at the parent-company or relevant subsidiary level, and sufficient data on environmental costs, emissions, waste, income, assets, tax expense, and income before tax.

Table 1. Sampling Procedure

Criteria	Total
Basic Materials sector companies listed on the Indonesia Stock Exchange as of December 31, 2023	105
Basic Materials sector companies not included in the PROPER assessment by the Ministry of Environment and Forestry	(58)
Companies without complete sustainability reports for the 2021–2023 period	(35)
Number of companies included in the sample each year	12
Number of research years	3
Total sample size	36

Source: Processed by Authors

The independent variables consist of environmental costs, emission intensity, and waste performance. Environmental costs (ENC) are measured using environmental expenditure intensity, calculated as environmental expenditure divided by total revenue and multiplied by 100%, following the use of environmental expenditure proxies in prior studies (Albitar et al., 2023; Karim et al., 2021).

$$\text{Environmental Cost Ratio (\%)} = \left(\frac{\text{Environmental Costs}}{\text{Total Revenue}} \right) \times 100\% \dots \dots \dots (1)$$

Furthermore, the independent variable of emissions (carbon) intensity is measured as the ratio of total greenhouse gas emissions (tCO₂e) to total revenue.

$$\text{Emission Intensity} = \frac{\text{Total Carbon Emissions}}{\text{Operating Revenue}} \dots \dots \dots (2)$$

Waste performance reflects a firm's actual capability to manage waste. Referring to Benjamin et al. (2023), waste performance is proxied by the waste recycle ratio, measured as the ratio of total recycled waste to total waste generated, or expressed using the following formula:

$$\text{Waste Performance Score} = \frac{\text{Total Recycled Waste}}{\text{Total Waste Generated}} \dots \dots \dots (3)$$

The higher the ratio, the better the firm's waste management performance. Conversely, a lower ratio indicates that the proportion of waste successfully recycled remains small relative to the total waste generated.

Greenwashing (GRW) is used as the mediating variable and is measured as the gap between the environmental disclosure score and the normalized PROPER performance score. The environmental disclosure score (EDS) reflects corporate environmental claims disclosed through sustainability reporting, while the PROPER score (PRP) reflects actual environmental performance

assessed by the regulator. A larger positive gap indicates stronger greenwashing because the firm's environmental disclosure appears more favorable than its actual environmental performance. This proxy follows the disclosure–performance gap logic commonly used in firm-level greenwashing measurement (Dorfleitner & Utz, 2024; Lublóy et al., 2025). The formula is as follows:

$$GW = EDS - PRP \dots\dots\dots(4)$$

Where:

GRW = the firm's level of greenwashing

EDS = the firm's environmental GRI disclosure score

PRP = the firm's PROPER performance score

The dependent variables are financial performance and tax avoidance. Financial performance is measured using Return on Assets (ROA), calculated as net income divided by total assets. Tax avoidance (TXA) is proxied by the Generally Accepted Accounting Principles Effective Tax Rate (GAAP ETR), calculated as income tax expense divided by income before tax. A lower ETR value, relative to other firms in the same year, indicates a higher level of tax avoidance. This approach is consistent with studies showing that greenwashing practices or CSR decoupling are associated with increased corporate tax avoidance (Latif et al., 2023; Velte, 2025). The formulas are as follows:

$$GAAP\ ETR = \frac{Income\ Tax\ Expense}{EBT} \dots\dots\dots(5)$$

The use of ROA as an indicator of financial performance is also adopted in the studies of (Albitar et al., 2023; Karim et al., 2021) which show that greenwashing may influence corporate financial performance through enhanced corporate reputation and legitimacy.

$$ROA = \frac{Earnings\ Before\ Tax}{Total\ Assets} \dots\dots\dots(6)$$

Regression Model.

(1) Mediation Equation: $X \rightarrow Z$ (testing H1–H3)

$$GRW_{it} = \alpha + \beta_1 ENC_{it} + \beta_2 EMI_{it} + \beta_3 WST_{it} + e_{it}$$

(2) Outcome Equation1: $Z \rightarrow Y1$ (testing H4)

$$ROA_{it} = \alpha + \beta_1 ENC_{it} + \beta_2 EMI_{it} + \beta_3 WST_{it} + e_{it} + \beta_4 GRW_{it}$$

(3) Outcome Equation 2: $Z \rightarrow Y2$ (testing H5)

$$TXA_{it} = \alpha + \beta_1 ENC_{it} + \beta_2 EMI_{it} + \beta_3 WST_{it} + e_{it} + \beta_4 GRW_{it}$$

Description:

X1/ENC = Environmental Costs

X2/EMI = Emission Intensity

X3/WST = Waste Performance

Z/GRW = Greenwashing, as the mediating variable

Y1/ROA = Financial Performance

Y2/TXA = Tax Avoidance

$\epsilon_{it}/\mu_{it}/\nu_{it}$ = error term (residual / disturbance term)

Subskrip i = firm/entity i

Subskrip t = year/period t

RESULT

Descriptive Statistics

The descriptive statistics are used to identify the characteristics of the data based on the minimum, maximum, mean, and standard deviation values. This explanation provides an initial overview of the data distribution of Basic Materials sector companies during the observation period. The results of the descriptive statistical analysis of the research variables are presented as follows:

Table 2. Descriptive Statistics

Variabel	Obs	Mean	Std. Dev.	Min	Max
ROA	36	0.0492108	0.0413072	-0.035	0.1471

Variabel	Obs	Mean	Std. Dev.	Min	Max
TXA	36	0.2733989	0.1158995	-0.0066577	0.5795157
GRW	36	0.7777778	0.421637	0	1
ENC	36	0.0036519	0.0040903	0.0001509	0.0171144
EMI	36	3.12e-07	4.27e-07	1.61e-09	1.37e-06
WST	36	0.490733	0.4044152	0	0.9999883

Source: Processed data

Based on Table 1, all research variables have 36 observations. The ROA variable has a mean value of 0.0492, with a minimum value of -0.035, a maximum value of 0.1471, and a standard deviation of 0.0413. The TXA variable has a mean value of 0.2734, with a minimum value of -0.0067, a maximum value of 0.5795, and a standard deviation of 0.1159. Meanwhile, the GRW variable has a mean value of 0.7778, with a minimum value of 0, a maximum value of 1, and a standard deviation of 0.4216. Furthermore, the ENC variable has a mean value of 0.00365, with a minimum value of 0.0001509, a maximum value of 0.0171, and a standard deviation of 0.00409. The EMI variable has a mean value of 3.12e-07, with a minimum value of 1.61e-09, a maximum value of 1.37e-06, and a standard deviation of 4.27e-07. Finally, the WST variable has a mean value of 0.4907, with a minimum value of 0, a maximum value of 0.9999, and a standard deviation of 0.4044.

Model Selection Test

This study employs panel data path analysis processed using STATA. Before conducting hypothesis testing, the most appropriate model is selected from the available panel data estimations. The model selection test is conducted using statistical procedures such as the Chow test, Hausman test, and Lagrange Multiplier test to compare the suitability of the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM). The summary of the model selection results is presented below.

Table 3. Panel Data Model Selection Test

Model Test	Prob. Structure 1	Prob. Structure 2	Prob. Structure 3
Chow	0.7144	0.3437	0.3115
Hausman	0.9756	0.9741	0.0314
LM	0.0875	0.0063	0.2913
Kesimpulan	CEM	REM	CEM

Source: Processed data

Structure 1 in this study examines the effects of environmental costs (ENC), emission intensity (EMI), and waste performance (WST) on greenwashing (GRW) as the mediating variable. Based on the model selection test results, the Chow test probability value of 0.7144 (> 0.05) indicates that the Common Effect Model (CEM) is more appropriate than the Fixed Effect Model (FEM). Furthermore, the Lagrange Multiplier (LM) test value of 0.0875 (> 0.05) indicates that CEM is also more suitable than the Random Effect Model (REM). Therefore, the best model used for Structure 1 is the Common Effect Model (CEM).

Structure 2 examines the effects of environmental costs (ENC), emission intensity (EMI), waste performance (WST), and greenwashing (GRW) on financial performance, which is proxied by ROA. The Chow test result of 0.3437 (> 0.05) indicates that CEM is more appropriate than FEM; however, the Lagrange Multiplier (LM) test result of 0.0063 (< 0.05) indicates that REM is more appropriate than CEM. Furthermore, the Hausman test produces a probability value of 0.9741 (> 0.05), indicating that REM is more suitable than FEM. Therefore, the best model used for Structure 2 is the Random Effect Model (REM).

Structure 3 examines the effects of environmental costs (ENC), emission intensity (EMI), waste performance (WST), and greenwashing (GRW) on tax avoidance (TXA). Based on the Chow test, with a probability value of 0.3115 (> 0.05), CEM is more appropriate than FEM. The Lagrange Multiplier (LM) test result of 0.2913 (> 0.05) also indicates that CEM is more suitable than REM. Although the Hausman test shows a probability value of 0.0314 (< 0.05), based on the results of

the other two tests, the model selection process supports the use of CEM. Thus, the best model used for Structure 3 is the Common Effect Model (CEM).

Classical Assumption Tests

Classical assumption tests are conducted to ensure that the model used meets the required criteria and is free from statistical bias. This stage includes testing data normality, as well as examining the presence or absence of multicollinearity and heteroscedasticity. The classical assumption tests are performed on the selected panel data estimation models. The summary of the classical assumption test results is presented below.

Table 4. Classical Assumption Tests

Model Test	Normality Test	Multicollinearity Test	Heteroscedasticity Test
Structure 1	Prob. = 0.0983	Mean VIF = 1.28	Prob > chi2 = 0.0601
Structure 2	Prob. = 0.8776	Mean VIF = 1.37	Prob > chi2 = 0.1157
Structure 3	Prob. = 0.3145	Mean VIF = 1.37	Prob > chi2 = 0.0536

Source: Processed data

Based on the results of the classical assumption tests for Structure 1, the normality test produces a probability value of 0.0983 (> 0.05), indicating that the data are normally distributed. The mean VIF value of 1.28 (< 10) indicates the absence of multicollinearity among the independent variables. In addition, the heteroscedasticity test produces a probability value of 0.0601 (> 0.05), indicating that the model does not suffer from heteroscedasticity problems. Therefore, the model in Structure 1 satisfies the classical assumptions.

In Structure 2, the normality test probability value of 0.8776 (> 0.05) indicates that the data are normally distributed. The mean VIF value of 1.37 (< 10) indicates the absence of multicollinearity. Furthermore, the heteroscedasticity test probability value of 0.1157 (> 0.05) also indicates that the model is free from heteroscedasticity. Accordingly, the model in Structure 2 is considered to satisfy the classical assumptions.

In Structure 3, the normality test probability value of 0.3145 (> 0.05) indicates that the data are normally distributed. The mean VIF value of 1.37 (< 10) indicates that there is no multicollinearity among the variables. Meanwhile, the heteroscedasticity test probability value of 0.0536 (> 0.05) indicates that there is no heteroscedasticity problem. Thus, the model in Structure 3 also satisfies the classical assumptions and is appropriate for further analysis.

Hypothesis Testing

This section presents the results of the statistical tests conducted to empirically verify the research hypotheses. The main focus of the testing includes the analysis of regression coefficients, the level of partial significance through the t-test, and the evaluation of the model's simultaneous explanatory power through the F-test. In addition, this section also presents the results of the mediation effect test using the Sobel test to confirm the role of greenwashing in mediating the relationship between the independent variables and the dependent variables.

Table 5. Regression Test

	Structure 1 (CEM)			Structure 2 (REM)			Structure 3 (CEM)		
	Coeff.	t-Stat	Prob.	Coeff.	t-Stat	Prob.	Coeff.	t-Stat	Prob.
C	0.744	6.27	0.000	0.020	3.76	0.000	0.084	4.40	0.000
ENC	0.272	2.52	0.017	0.012	2.28	0.023	0.026	3.12	0.004
							-	-0.74	0.467
EMI	0.341	2.60	0.014	0.018	-0.76	0.446	0.011		
							-	-0.37	0.713
WST	-0.351	-1.78	0.085	0.011	-0.53	0.595	0.006		
							-	-2.32	0.027
GRW				-0.040	-2.56	0.010	0.048		
R-Squared			0.2122			0.2118			0.2573

	Structure 1 (CEM)			Structure 2 (REM)			Structure 3 (CEM)		
	<i>Coeff.</i>	<i>t-Stat</i>	<i>Prob.</i>	<i>Coeff.</i>	<i>t-Stat</i>	<i>Prob.</i>	<i>Coeff.</i>	<i>t-Stat</i>	<i>Prob.</i>
F-stat			3.43			-			5.31
Prob(F-stat)			0.0286			-			0.0022

Source: Processed data

In Structure 1 (CEM), which examines the effects of ENC, EMI, and WST on GRW, environmental costs (ENC) have a coefficient of 0.272 with a probability value of 0.017 (< 0.05), indicating a positive and significant effect on greenwashing (H1 is confirmed). Emission intensity (EMI) also shows a positive and significant effect (H2 is confirmed), with a coefficient of 0.341 and a probability value of 0.014 (< 0.05). Meanwhile, waste performance (WST) has a negative coefficient of -0.351 with a probability value of 0.085 (> 0.05), indicating that it has a negative and significant effect at 0.010 (H3 is confirmed). The R-squared value of 0.2122 indicates that the model explains 21.22% of the variation in greenwashing, while the Prob (F-stat) value of 0.0286 (< 0.05) indicates that the model is statistically significant simultaneously.

In Structure 2 (REM), which examines the effects of ENC, EMI, WST, and GRW on ROA, ENC has a positive and significant effect, with a coefficient of 0.012 and a probability value of 0.023 (< 0.05). EMI and WST do not have significant effects on ROA, as their probability values are 0.446 and 0.595 (> 0.05), respectively. Greenwashing (GRW) has a negative and significant effect on ROA (H4 is confirmed), with a coefficient of -0.040 and a probability value of 0.010 (< 0.05). The R-squared value of 0.2118 indicates that the model explains 21.18% of the variation in ROA.

In Structure 3 (CEM), which examines the effects of ENC, EMI, WST, and GRW on TXA, ENC has a positive and significant effect, with a coefficient of 0.026 and a probability value of 0.004 (< 0.05). Meanwhile, EMI and WST do not have significant effects, with probability values of 0.467 and 0.713 (> 0.05), respectively. Greenwashing (GRW) has a negative and significant effect on TXA (H5 is confirmed), with a coefficient of -0.048 and a probability value of 0.027 (< 0.05). The R-squared value of 0.2573 indicates that the model explains 25.73% of the variation in tax avoidance, while the Prob(F-stat) value of 0.0022 (< 0.05) indicates that the model is statistically significant simultaneously.

Furthermore, to examine the direct and indirect effects of the independent variables on the dependent variables, mediation testing is conducted using the Sobel test, as presented below.

Table 6. Sobel Test

Mediation Relationship	Sobel Test Prob.	Conclusion
ENC > GRW > ROA	0.036	Significant
EMI > GRW > ROA	0.125	Not significant
WST > GRW > ROA	0.373	Not significant
ENC > GRW > TXA	0.257	Not significant
EMI > GRW > TXA	0.302	Not significant
WST > GRW > TXA	0.531	Not significant

Source: Processed data

Based on the Sobel test results for the mediation relationships leading to ROA, only the path from environmental costs (ENC) through greenwashing (GRW) shows a significant result, with a probability value of 0.036 (< 0.05). This indicates that greenwashing is proven to mediate the effect of ENC on financial performance. Meanwhile, the relationships of emission intensity (EMI) and waste performance (WST) through greenwashing on ROA are not significant, with probability values of 0.125 and 0.373 (> 0.05), respectively. These results indicate that greenwashing does not serve as a mediating variable in these two relationships (H6 is not confirmed).

Furthermore, in the mediation relationships leading to tax avoidance (TXA), all mediation paths show insignificant results. This is reflected in the probability values of ENC > GRW > TXA at 0.257, EMI > GRW > TXA at 0.302, and WST > GRW > TXA at 0.531, all of which are greater

than 0.05. Thus, greenwashing does not act as a mediating variable in linking environmental costs, emission intensity, or waste performance to tax avoidance (H7 is not confirmed).

DISCUSSIONS

Comparison of Hypothesis Testing Results with Prior Greenwashing, Financial Performance, and Tax Avoidance Studies

The hypothesis testing indicates all support for the proposed relationships. **First**, environmental costs have a positive and significant effect on greenwashing, while the hypothesis predicted a positive effect. This result suggests that higher environmental spending increase the disclosure–performance gap. Alas, it may become part of corporate impression management when expenditure is followed by equally strong environmental outcomes. This finding aligns with Ifada and Jaffar (2023), who show that environmental cost expenditure supports environmental performance and disclosure, and from Arouri et al. (2021), who indicate that environmental costs may reduce greenwashing through more reliable disclosure. However, the result remains consistent with greenwashing literature arguing that firm-level greenwashing emerges when apparent environmental performance exceeds real environmental performance, as explained by Dorfleitner and Utz (2024) and Lublóy et al. (2025). **Second**, emission intensity has a positive and significant effect on greenwashing, supporting the hypothesis and aligning with Treepongkaruna et al. (2024), who find that high ESG-rated firms do not necessarily have lower carbon emissions, and with Wedari et al. (2021), who identify potential greenwashing among high-emitting firms. **Third**, waste performance has a negative and significant effect on greenwashing, indicating that better waste management tends to reduce greenwashing. This finding is still consistent with Benjamin et al. (2023) and Zhang et al. (2023), who show that stronger environmental performance is associated with more substantive disclosure and lower greenwashing. **For the economic consequences**, greenwashing has a negative and significant effect on ROA, supporting Walker and Wan (2012), Du et al. (2022), and Birindelli et al. (2024), who find that symbolic environmental actions weaken financial performance through reputational and credibility risks. Greenwashing also has a negative and significant effect on tax avoidance, this result supports the hypothesis that greenwashing decreases tax avoidance and is consistent with Nasih et al. (2024), Latif et al. (2023), and Velte (2025), who link sustainability impression management or CSR decoupling with tax avoidance. **For mediation**, only the ENC → GRW → ROA path is significant, while the EMI and WST paths toward ROA and all paths toward tax avoidance are insignificant. This means that greenwashing acts as a limited mediating mechanism, mainly transmitting the effect of environmental costs to financial performance, while tax avoidance is likely influenced by other governance, fiscal, and regulatory factors.

The Conditional Role of RBV in Explaining Environmental Resources, Greenwashing, and Firm Outcomes

When generalized to Basic Materials sector companies, these findings tend to weaken the empirical validity of the Resource-Based View (RBV) in this research context rather than fully strengthen it. RBV assumes that resources generate competitive advantage only when they are valuable, rare, difficult to imitate, and well organized. In environmental management, environmental costs, emission control, and waste management should become strategic capabilities when they produce credible environmental performance and improve firm outcomes. However, the findings show that environmental costs and emission intensity increase greenwashing, while waste performance is not statistically significant. This pattern indicates that environmental resources and activities in the observed firms have not been fully transformed into substantive capabilities. This interpretation is supported by Zhang et al. (2023), who find that stronger environmental performance reduces greenwashing, and by Treepongkaruna et al. (2024), who show that high ESG ratings do not necessarily reflect lower carbon emissions. Lu et al. (2025) also explain that corporate greenwashing may represent illusory environmental tactics rather than effective environmental strategy, while Gregory (2024) shows that greenwashing can lead to risk and resource misallocation. Therefore, this study suggests that RBV is conditional: environmental resources support competitive advantage only when firms can organize them into credible, measurable, and

performance-based capabilities. Without such capability, environmental spending and disclosure may become symbolic instruments rather than strategic assets.

Practical Implications of Greenwashing in the Basic Materials Sector under Environmental and Legitimacy Pressures

Practically, the findings can be understood from the characteristics of the Basic Materials sector, which faces high environmental pressure because its operations are closely related to resource extraction, emissions, waste, and regulatory scrutiny. Firms in this sector have strong incentives to appear environmentally responsible before investors, regulators, and the public. When environmental costs rise, management may feel pressure to justify those costs through stronger sustainability narratives, even when actual environmental performance has not improved proportionally. Similarly, high emission intensity can create legitimacy pressure that encourages firms to expand environmental disclosure to soften negative stakeholder perceptions. This explains why environmental costs and emission intensity are positively associated with greenwashing in this study. The insignificant role of waste performance may indicate that waste issues are perceived as more technical and compliance-oriented than carbon emissions, which receive broader public and investor attention. The negative effect of greenwashing on ROA shows that stakeholders may penalize firms when sustainability narratives are not supported by credible environmental performance. Meanwhile, the effect of greenwashing on tax avoidance suggests that symbolic sustainability reporting may coexist with other opportunistic strategies, although the insignificant mediation results imply that tax behavior is also shaped by tax regulation, governance quality, fiscal incentives, and capital structure rules such as thin capitalization regulation (Anindita et al., 2022). Consequently, managers should not treat sustainability reports as reputational instruments alone, investors should compare disclosure with external environmental performance indicators such as PROPER, and regulators should strengthen the integration between sustainability disclosure oversight and actual environmental performance evaluation.

Practical Implications, Limitations, and Recommendations

The findings imply that firms, especially in the Basic Materials sector, should not treat sustainability reporting merely as a reputational instrument, but should align environmental disclosure with actual environmental performance. Managers need to ensure that environmental spending, emission control, and waste management generate measurable environmental improvements. Investors may use these findings to evaluate firms more critically by comparing sustainability reports with external performance indicators such as PROPER. Regulators should also strengthen supervision over the consistency between sustainability disclosure and verified environmental performance. This study is limited by its relatively small sample, which consists only of Basic Materials companies with complete PROPER and sustainability data during the observation period. The use of secondary data and a disclosure–performance gap proxy may also not fully capture all forms of greenwashing. Future research may expand the sample across sectors and years, apply textual analysis or alternative ESG-based greenwashing measures, and include governance disclosure, ownership, or regulatory pressure variables to obtain a more comprehensive explanation of greenwashing and its consequences (Rahmithasari & Qadri, 2024).

CONCLUSION

This study concludes that environmental costs and emission intensity significantly increase greenwashing, whereas waste performance yields no significant effect. In turn, greenwashing behavior is proven to erode financial performance and intensify tax avoidance activities, as evidenced by its negative impact on GAAP ETR. Beyond these direct mechanisms, greenwashing acts as a critical mediating variable that links environmental expenditures to diminished financial returns. The novelty of this study lies in measuring greenwashing through the gap between GRI-based environmental disclosure and PROPER performance, simultaneously examining its environmental determinants and economic consequences in Indonesian Basic Materials companies.

These findings offer profound conceptual contributions by viewing corporate behavior through the lens of RBV Theory and the concept of ESG hypocrisy. The empirical results expose

a strategic shift where basic materials companies utilize high green disclosures merely as a defensive façade to achieve symbolic legitimacy and placate public pressure. This decoupling behavior fundamentally illustrates that corporate sustainability reporting often serves as a rhetorical shield rather than an ethical commitment. From a governance perspective, when disclosure is uncoupled from actual ecological capabilities, it signals deep-seated corporate ethical failures. The resulting economic penalties, reduced profitability and aggressive tax planning, suggest that the market increasingly recognizes this opportunism as an agency risk that damages long-term corporate value.

To address these practices, sustainability governance and policy frameworks must move beyond voluntary compliance. Regulators, such as the Indonesian Financial Services Authority (OJK) and the Ministry of Environment and Forestry, should mandate integrated auditing systems that cross-reference sustainability reports with empirical performance evaluations like PROPER to curb information asymmetry. While this study provides a novel framework for the Basic Materials sector, its primary limitation lies in its specific industry scope. Future research directions should expand this empirical model to other carbon-intensive sectors, such as energy and mining, and investigate internal governance mechanisms, like board diversity or green intellectual capital, that can effectively suppress corporate ESG hypocrisy and foster authentic environmental stewardship.

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