

Do green accounting and sustainability performance improve energy firms' financial performance?

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ABSTRACT

This study aims to analyze the effect of green accounting and sustainability performance on the financial performance of energy sector companies listed on the Indonesia Stock Exchange. The research sample consisted of 15 energy sector companies during the 2019–2024 period, with a total of 90 observations obtained through purposive sampling. This study employed a quantitative approach using panel data regression analysis techniques. The results indicate that green accounting has a positive and significant effect on financial performance as measured by ROA and ROE, but a negative and significant effect on market performance as measured by Tobin's Q. These findings suggest that environmental accounting practices provide more evident benefits for the company's internal profitability, although such practices have not yet been fully perceived positively by the market. Meanwhile, sustainability performance, proxied by PROPER, has no significant effect on financial performance as measured by ROA and ROE, nor on market performance as measured by Tobin's Q, indicating that environmental performance has not yet been translated into an increase in the company's economic value. The implications of this study suggest that energy sector companies need to integrate green accounting and sustainability practices more strategically, so that they are not merely compliance-oriented, but are also able to strengthen internal profitability and enhance firm value in the long term.

Keywords: Green Accounting; Sustainability Performance; Financial Performance; ESG; Energy Companies

JEL Classification: M41, Q56, G34

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1. Introduction

The growing global concern over sustainability issues caused by climate change, environmental degradation, and increasing stakeholder pressure on corporations, particularly those operating in the energy sector. Companies are no longer expected to focus only on financial profitability. They are also required to address the social and environmental impacts of their operations (Eccles et al., 2015). Increasing public awareness of environmental responsibility has encouraged companies to disclose sustainability-related information covering economic, social, and environmental dimensions as part of sustainable business practices (Prasetyowati, 2024). This issue is especially relevant to the energy

sector, which contributes substantially to carbon emissions and natural resource exploitation (Laskari & Bandiyono, 2025; Zahira & Fadillah, 2022).

The persistence of environmental degradation indicates that many corporations have not yet developed sufficient awareness of the importance of environmental management. One notable case involved PT Adaro Energy Tbk, which was associated with environmental degradation and flooding in South Kalimantan in 2021 (WALHI Kalimantan Selatan, 2022). Although the company had implemented several corporate social responsibility initiatives and environmental rehabilitation programs, environmental organizations continued to call for greater transparency and more comprehensive evaluations of its ecological impacts (BankTrack, 2021). This situation shows that energy sector companies face strong pressure to improve environmental transparency and accountability through more sustainable business practices.

In this context, non-financial factors such as green accounting and sustainability performance are increasingly viewed as important determinants of a company's long-term financial success (Widjarmiko & Sari, 2024). Green accounting refers to an accounting approach that incorporates the environmental impacts of corporate activities by recording environmental costs and benefits, including energy consumption, waste management, and greenhouse gas emissions (Saragih, 2024). Through green accounting disclosure, companies can improve transparency, reduce environmental risks, and demonstrate their commitment to corporate social responsibility (Juhro et al., 2024; Sasmita, 2023). Meanwhile, sustainability performance reflects the extent to which a company can balance economic, social, and environmental objectives as part of the triple bottom line concept (Aggarwal, 2013; Akbar et al., 2025).

Financial performance is a key indicator for evaluating the effectiveness of sustainability strategies implemented by companies. Companies with strong sustainability practices tend to have better reputations, more stable relationships with investors, and lower long-term risks (Friede et al., 2015). Conversely, companies that neglect environmental responsibility may face financial losses due to sanctions, declining market confidence, and investment restrictions from financial institutions that apply Environmental, Social, and Governance (ESG) principles (Friede et al., 2015). Therefore, green accounting and sustainability performance may influence corporate financial performance, particularly among energy sector companies with substantial environmental impacts.

The urgency of this study is also supported by global and national sustainability policies, including the Paris Agreement in 2015 and the Glasgow Climate Pact in 2021, both of which emphasize global commitments to achieving net zero emissions by 2050. Indonesia has also set a Net Zero Emissions target for 2060 through the Long-Term Strategy for Low Carbon and Climate Resilience (LTS-LCCR). In addition, the Indonesian government has established a renewable energy mix target of 23 percent by 2025 through the National Energy General Plan (RUEN) and has strengthened regulatory frameworks through Presidential Regulation No. 98 of 2021 concerning Carbon Economic Value and Minister of Energy and Mineral Resources Regulation No. 16 of 2022 concerning emission reductions in the energy subsector. These policies indicate that companies in the energy sector are expected to transform their production practices to become more efficient and sustainable.

Previous studies have examined the influence of green accounting and sustainability performance on financial performance, but their findings remain inconsistent. Dewi & Nurleli (2024) and Saragih (2024) found that environmental performance positively influences financial performance, whereas Afni & Achyani (2023) found that green accounting does not affect corporate profitability. Mustaffa et al. (2023) also reported that sustainability reporting negatively influences corporate profitability. These mixed findings indicate that the relationship among green accounting, sustainability performance, and financial performance remains inconclusive, particularly among energy sector companies in Indonesia.

Based on these phenomena, theoretical perspectives, and research gaps, this study aims to analyze the influence of green accounting disclosure and sustainability performance on the financial performance of energy sector companies listed on the Indonesia Stock Exchange during the 2019 to 2024 period. This study uses a quantitative approach with panel data regression analysis. The 2019 to 2024 period was selected because it reflects increasing pressure on companies to implement sustainability practices, including the post-COVID-19 pandemic period and the emergence of regulations related to energy transition and sustainable finance. This study is expected to provide theoretical and practical contributions to understanding the role of green accounting and sustainability performance in supporting the sustainable financial performance of energy sector companies.

2. Theoretical Framework and Hypotheses Development

Stakeholder Theory

Stakeholder Theory was first introduced by R. Edward Freeman in *Strategic Management: A Stakeholder Approach* in 1984. This theory explains that corporations are not accountable only to shareholders, but also to all stakeholders who can influence or be influenced by corporate activities, including investors, employees, customers, governments, and society (Clark et al., 2015; Manalu et al., 2023). According to Silvana & Khomsyiah (2022), stakeholders have the right to obtain information about corporate activities that are relevant to decision-making processes.

In this study, Stakeholder Theory is used to explain green accounting practices as a form of corporate responsibility toward the environment and society. Companies are expected to maintain positive relationships with stakeholders through transparency and environmental information disclosure in order to gain social legitimacy and sustain business continuity. Green accounting is viewed as a mechanism through which companies demonstrate their commitment to environmental management through transparent and standardized disclosure of environmental activities.

According to Lako (2018), green accounting is the process of recognizing, measuring, recording, reporting, and disclosing financial, social, and environmental activities in an integrated manner to produce relevant information for stakeholders. Along with the development of global sustainability practices, green accounting is no longer limited to recording environmental costs. It also includes the disclosure of corporate policies related to energy efficiency, natural resource use, and carbon emission reduction (Cahyani & Puspitasari, 2023; Nianty, 2023).

The disclosure of green accounting practices through Global Reporting Initiative (GRI) standards helps companies communicate environmental information more transparently and accountably. Such transparency may improve corporate credibility, strengthen reputation, and increase the confidence of investors and society (Rejeki & Nurlatifah, 2024). From the perspective of Stakeholder Theory, companies that can meet stakeholder expectations through environmentally responsible business practices are more likely to gain long-term support, which may positively influence corporate financial performance.

Neo-Institutional Theory

Neo-Institutional Theory was popularized by DiMaggio & Powell (1983) through the concept of institutional isomorphism. This theory explains that organizations do not operate solely based on economic efficiency, but are also influenced by institutional pressures from the external environment. These pressures may include coercive pressure from government regulations, normative pressure from professional and industry standards, and mimetic pressure, which refers to the tendency of companies to imitate organizational practices perceived as successful (Paynter et al., 2018).

In this study, Neo-Institutional Theory is used to explain the sustainability performance of companies operating in the energy sector. Sustainability performance reflects a company's ability to manage economic, social, and environmental aspects in a balanced manner as part of the triple bottom line or quadrangle bottom line concept (Khatri & Kjørland, 2023). In the energy sector, companies face substantial pressure related to climate change, carbon emission reduction, renewable energy transition, and the implementation of Environmental, Social, and Governance (ESG) principles.

Regulatory pressures and social demands encourage energy sector companies to improve transparency and social responsibility through stronger sustainability performance. Neo-Institutional Theory explains that companies implement sustainability practices to gain legitimacy and maintain their reputation in the eyes of stakeholders (Haque & Ntim, 2022). By improving sustainability performance, companies may gain better access to investment opportunities, strengthen customer loyalty, and enhance long-term competitiveness.

Buallay (2019) found that sustainability practices positively influence financial performance because they can improve corporate reputation and attract investors. Hussain et al. (2018) also explained that sustainability performance supported by sound corporate governance can improve economic, social, and environmental performance in a balanced manner. Therefore, sustainability performance can be understood as a corporate strategy for responding to institutional pressures while also improving the financial performance of energy sector companies.

Numerous studies have examined the influence of green accounting and sustainability performance on financial performance, but previous findings remain inconsistent. Syaputra & Arsjah (2024), Rofi'ah & Anggraini (2024), and Pinem & Aulia (2023) found that green accounting and sustainability performance have positive effects on corporate financial performance. In contrast, Budi & Zuhrohtun (2023) and Husna et al. (2025) found that green accounting has no effect or even a negative effect on financial performance.

These inconsistent findings indicate that the relationship among green accounting, sustainability performance, and financial performance remains inconclusive, particularly in Indonesian energy sector companies. Therefore, this study re-examines the influence of green accounting and sustainability performance on the financial performance of energy sector companies listed on the Indonesia Stock Exchange during the 2019 to 2024 period.

The Influence of Green Accounting on Financial Performance

Stakeholder Theory explains that companies are expected to fulfill stakeholder expectations through environmentally responsible business practices. Green accounting serves as a mechanism through which companies demonstrate their commitment to environmental issues through transparent and accountable information disclosure. Green accounting practices may improve corporate legitimacy, strengthen reputation, and increase the confidence of investors and society, which may ultimately have a positive influence on corporate financial performance (Permatasari & Widianingsih, 2020; Riyadh et al., 2020).

H1: Green accounting has a positive effect on financial performance.

The Influence of Sustainability Performance on Financial Performance

Neo-Institutional Theory explains that companies face regulatory, social, and market pressures to improve sustainability practices. Strong sustainability performance may enhance legitimacy, reputation,

stakeholder loyalty, and long-term corporate competitiveness. Bualay (2019) and Hussain et al. (2018) found that sustainability performance can improve corporate financial performance through greater operational efficiency and investor confidence.

H2: Sustainability performance has a positive effect on financial performance.

3. Methodology

This study uses a quantitative research approach with a causal associative design to examine the effect of green accounting and sustainability performance on corporate financial performance. According to Sugiyono (2014), associative research aims to identify relationships and causal effects between two or more variables. A quantitative approach was selected because this study relies on numerical data analysis to measure the relationship between the independent and dependent variables. The independent variables are green accounting and sustainability performance, while the dependent variable is financial performance.

This study focuses on energy sector companies listed on the Indonesia Stock Exchange (IDX). The energy sector was selected for its strategic role in national economic development and significant contributions towards energy consumption and environmental emissions. Furthermore, energy companies face substantial pressure from stakeholders to implement sustainable business practices, including sustainability reporting and green accounting disclosure. Consequently, this sector is highly relevant for examining the relationship between sustainability-related practices and financial performance.

The observation period covers 2019 to 2024. This period was chosen because it reflects important developments in sustainability practices, ESG implementation, and environmental transparency in Indonesia. The year 2019 represents the period before the COVID-19 pandemic, while the post-pandemic period reflects increasing attention to Environmental, Social, and Governance (ESG) issues among regulators and investors. In addition, the PROPER innovation framework introduced in 2019 strengthened environmental assessment criteria through beyond-compliance principles, circular economy initiatives, and sustainability-oriented corporate practices.

The population of this study consists of all publicly listed energy sector companies on the Indonesia Stock Exchange during 2019–2024, totaling 89 companies.

The sampling method used in this study is purposive sampling. The sample selection criteria were as follows: (1) Energy sector companies listed on the IDX and actively operating until December 2024; (2) Companies that consistently disclosed green accounting information and published sustainability reports during 2019 to 2024; and (3) Companies that actively participated in the PROPER environmental performance assessment during 2019 to 2024. Based on these criteria, 15 energy sector companies were selected as the final sample, resulting in 90 panel observations over six years.

This study uses secondary data collected through documentation techniques. The data sources include annual reports, financial statements, sustainability reports, and PROPER ratings published by the companies and the Ministry of Environment and Forestry of Indonesia (KLHK). These documents were obtained from company websites and the official PROPER website.

This study applies content analysis to evaluate green accounting disclosure and sustainability reporting practices. Content analysis was conducted by examining environmental disclosure information presented in annual reports and sustainability reports. This method allows researchers to analyze disclosure practices objectively across a large number of observations while maintaining consistency in the measurement process.

Table 1. Measurement of variables

Variable		Measurements	Reference
Green Accounting (GA)	Analysis Content	$\frac{\text{The total number of indicators disclosed}}{\text{Total indicators (19)}} \times 100\%$	Al-Tuwaijri et al. (2004); Apriwandi & Herycson (2022); Perello-Marin et al. (2022); Pramudito et al. (2022)
Sustainability Performance (SP)		PROPER performance rating category	https://proper.men-lhk.go.id
Financial Performance	ROA	$\frac{\text{Net Profit After Tax}}{\text{Total Assets}}$	Budi & Zuhrohtun (2023); Muthmainnah et al. (2024); Prasetyowati (2024); Wahyuningsih et al. (2016)
	ROE	$\frac{\text{Net Profit After Tax}}{\text{Total Equity}}$	Muthmainnah et al. (2024); Wahyuningsih et al. (2016); Yulianingtyas (2016)
	Tobins's Q	$\frac{(\text{Market Price per share} \times \text{outstanding shares}) + \text{total debt}}{\text{Total Assets}}$	Husna et al. (2025); Hussain et al. (2018); Pinem & Aulia (2023)
Control Variable	PAF Reputation	A value of 0 is assigned if the firm is audited by a non-Big Four accounting firm. A value of 1 is assigned if the firm is audited by a Big Four accounting firm.	Abdillah et al. (2019); Agustine & Darmawati (2024); Sari & Hwihanus (2023)
	Leverage	$\text{DER} = \frac{\text{total liabilities}}{\text{total equity}}$	Elizabeth (2022); Puspitaningrum & Indriani (2021); Sugeng (2020)

Data Analysis Technique

This study uses panel data regression analysis with the assistance of EViews 13 software. Panel data analysis was selected because it combines cross-sectional and time-series data, allowing for more comprehensive and efficient analysis compared to ordinary regression methods. The regression model used in this study is formulated in Equation 1, 2, and 3 (Eq.1, Eq.2, Eq.3).

$$\text{Model 1: } ROA_{it} = \alpha + \beta_1 GA_{it} + \beta_2 SP_{it} + \beta_3 PAF_{it} + \beta_4 DER_{it} + \beta_5 AGE_{it} + \varepsilon_{it} \quad (\text{Equation 1})$$

$$\text{Model 2: } ROE_{it} = \alpha + \beta_1 GA_{it} + \beta_2 SP_{it} + \beta_3 PAF_{it} + \beta_4 DER_{it} + \beta_5 AGE_{it} + \varepsilon_{it} \quad (\text{Equation 2})$$

$$\text{Model 3: } \text{Tobin's } Q_{it} = \alpha + \beta_1 GA_{it} + \beta_2 SP_{it} + \beta_3 PAF_{it} + \beta_4 DER_{it} + \beta_5 AGE_{it} + \varepsilon_{it} \quad (\text{Equation 3})$$

Where:

ROA, ROE, Tobin's Q = Financial performance proxies (dependent variables in Models 1, 2, and 3)

α = Constant (Intercept)

$\beta_1 - \beta_5$ = Regression coefficients of the independent and control variables

GA = Green Accounting

SP = Sustainability Performance

PAF = Public Accounting Firm Reputation

DER = Leverage

AGE = Firm Age

ε = error term

i = The i entity (Cross-sectional unit)

t = The t time period

In order to determine the most appropriate panel regression model, this study applies the Chow test, Hausman test, and Lagrange Multiplier test to select among the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM). Classical assumption tests, including normality, multicollinearity, and heteroscedasticity tests, are also conducted to ensure the validity of the regression model. In addition, this study applies the Goodness of Fit test (F-test), coefficient of determination (Adjusted R²), and t-test to evaluate the significance of the hypotheses. Finally, robustness testing is conducted using Two Stage Least Squares (2SLS) and Generalized Method of Moments (GMM) to ensure that the regression results remain consistent under different estimation specifications.

4. Results

Descriptive Statistics

This study uses 90 firm-year observations from 15 energy sector companies listed on the Indonesia Stock Exchange during the 2019–2024 period. The sample was selected using purposive sampling based on the availability of sustainability reports, green accounting disclosure, and PROPER participation.

Table 2. Descriptive statistics

Variables	Observations	Mean	Median	Maximum	Minimum	Std. Dev.
ROA	90	0.0834	0.0521	0.5852	-0.0983	0.1061
ROE	90	0.1425	0.1094	2.0805	-2.5433	0.4200
Tobins'Q	90	0.7910	0.6332	4.2333	0.1041	0.6916
GA	90	93.8596	100.0000	100.0000	21.0523	14.0971
DER	90	1.6038	0.6585	24.8489	0.09653	2.9513
AGE	90	20.2666	21.5000	34.0000	0.0000	9.4033

The descriptive statistics indicate that the average Return on Assets (ROA) is 0.0834, meaning that energy sector companies generate approximately 8.34 percent profit from their total assets. Return on Equity (ROE) has an average value of 0.1425, indicating that companies provide an average shareholder return of 14.25 percent. Meanwhile, Tobin's Q has an average value of 0.7911, suggesting that, on average, the market value of energy companies remains lower than their asset replacement value.

Green accounting disclosure has a mean value of 93.8597, which indicates that most companies have disclosed environmental accounting information at a relatively high level. However, the minimum value of 21.0526 demonstrates that several companies still exhibit low levels of environmental disclosure

The Debt-to-Equity Ratio (DER) has an average value of 1.6038, indicating that the financing structure of energy sector companies tends to rely more heavily on debt than equity. The maximum value of 24.8489 suggests the existence of companies with extremely high leverage levels. Meanwhile, the standard deviation of 2.9513 indicates substantial variation in corporate capital structures across the sample. This condition implies that the financial risk of energy sector companies is relatively high and unevenly distributed, making DER an important control variable in this study. From a regulatory and sectoral perspective, the leverage level of energy companies can be associated with compliance obligations and financing requirements inherent within the industry.

Table 3. Descriptive statistical results for dummy variables – frequency distribution

Rank	Sustainability Performance (PROPER)		PAF Firm Size	Public Accounting Firm Reputation	
	Frequency	Percent (%)		Frequency	Percent (%)
1 = Black	0	0	0 = non big 4	31	34
2 = Red	0	0	1 = big 4	59	66
3 = Blue	23	26		90	100
4 = Green	47	52			
5 = Gold	20	22			
Total	90	100	Total	90	100

The sustainability performance variable is measured using the PROPER rating. The distribution of PROPER ratings across the research sample is presented in the form of frequencies and percentages, as illustrated in Table 3. According to the table, out of a total of 90 observations spanning the 2019–2024 period, there were no observations recorded in Categories 1 and 2. The majority of the observations are concentrated in Category 4, with 47 observations (52 percent), followed by Category 3 with 23 observations (26 percent), and Category 5 with 20 observations (22 percent). This distribution indicates that the environmental performance of the energy sector firms within the sample is generally within the ‘satisfactory’ to ‘good’ range, with a portion of the observations having attained higher performance tiers.

Table 4. Model selection test

Variable	Equality	Chow Test	Hausman Test	Lagrange Multiplier Test	Conclusion
Y1_ROA	ROA = GA + PROPER +K1_PAF + K2_DER + K3_AGE	0.0003	0.0763	0.0029	REM
Y2_ROE	ROE = GA + PROPER +K1_PAF + K2_DER + K3_AGE	0.0022	0.0945	0.0128	REM
Y3_Tobins'Q	Tobins'Q = GA + PROPER +K1_PAF + K2_DER + K3_AGE	0.0000	0.3533	0.0000	REM

Before conducting panel regression analysis, model selection tests were performed to determine the most appropriate estimation model among the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM). The Chow test results for all regression equations show probability values below 0.05, indicating that the Common Effect Model is not appropriate.

Subsequently, the Hausman test results indicate probability values above 0.05 for all models, suggesting that the Random Effect Model is more efficient than the Fixed Effect Model. These findings are further supported by the Lagrange Multiplier test, which confirms that the Random Effect Model is superior to the Common Effect Model. Therefore, the Random Effect Model (REM) was selected as the final estimation model for all regression equations.

Table 5. Multicollinearity test

Variable	GA	PROPER	PAF	DER	AGE
GA	1.000000	0.238665	0.059988	-0.135984	0.035243
SP	0.238665	1.000000	0.235945	0.052046	-0.248176
PAF	0.059988	0.235945	1.000000	-0.279725	-0.231886
DER	-0.135984	0.052046	-0.279725	1.000000	0.137169
AGE	0.035243	-0.248176	-0.231886	0.137169	1.000000

The results of the multicollinearity test indicate that the correlations among the independent variables remain within acceptable thresholds (The established cut-off values for detecting the presence of multicollinearity are a tolerance value of ≤ 0.10 or, equivalently, a Variance Inflation Factor (VIF) of ≥ 10 . There is no evidence of excessive linear dependency between the explanatory variables. Consequently, the regression model is free from multicollinearity issues, ensuring that the coefficient estimates can be interpreted with statistical stability.

The results of the heteroscedasticity test demonstrate that the probability values (P-values) for each model exceed the 0.05 significance threshold. Consequently, it can be concluded that the regression model is free from heteroscedasticity issues, satisfying the assumption of homoscedasticity.

Regression Data Panel Test

The panel regression analysis reveals that green accounting shows a positive association with ROA and is marginally significant at the 10 percent level (coefficient = 0.001262; $p = 0.0682$), suggesting limited evidence that environmental disclosure may support operational profitability and asset utilization efficiency.

Green accounting does not significantly affect ROE, as indicated by a probability value of 0.1596. This result implies that environmental disclosure practices have not directly improved shareholder returns during the observation period, possibly because equity-based profitability is also influenced by leverage, retained earnings, and capital structure decisions.

In contrast, green accounting negatively and significantly affects Tobin's Q with a coefficient value of -0.012558 and a probability value of 0.0031. This result indicates that the market still perceives environmental accounting practices as additional compliance costs and transition risks that may reduce short-term corporate value.

The sustainability performance variable, proxied by PROPER ratings, does not significantly affect ROA, ROE, or Tobin's Q. The probability values for all regression models exceed the 5 percent significance threshold, indicating that environmental performance has not yet translated into measurable improvements in profitability or market valuation. Among the control variables, leverage measured by the Debt-to-Equity Ratio (DER) exhibits a negative and significant relationship with ROA and ROE, indicating that higher debt levels are associated with lower accounting profitability. However, its relationship with Tobin's Q is not statistically significant.

Table 7. Regression data panel test

Model 1 (ROA)				
Variable	Coefficient	Direction	t-statistic	Prob.
C	-0.064820		-0.698005	0.4871
X1_GA	0.001262	+	1.847803	0.0682
X2_PROPER	0.013009	+	0.691395	0.4912
K1_PAF	0.030780	+	0.878566	0.3821
K2_DER	-0.007921	-	-2.195952	0.0309
K3_FA	-0.001444	-	-0.807038	0.4219
R Squared			0.137674	
Adjusted R Squared			0.086345	
F Statistic			2.682195	
Prob (F-Statistic)			0.026780	
Model 2 (ROE)				
Variable	Coefficient	Direction	t-statistic	Prob.
C	0.083119		0.274395	0.7845
X1_GA	0.003302	+	1.419027	0.1596
X2_PROPER	-0.034471	-	-0.568147	0.5715
Variable	Coefficient	Direction	t-statistic	Prob.
K1_PAF	0.057955	+	0.559372	0.5774
K2_DER	-0.095735	-	-7.889625	0.0000
K3_FA	0.000087	+	0.016560	0.9868
R Squared			0.460114	
Adjusted R Squared			0.427978	
F Statistic			14.31768	
Prob (F-Statistic)			0.000000	
Model 3 (TOBINS Q)				
Variable	Coefficient	Direction	t-statistic	Prob.
C	1.231377		2.095119	0.0392
X1_GA	-0.012558	-	-3.048166	0.0031
X2_PROPER	0.057946	+	0.486053	0.6282
K1_PAF	0.189422	+	0.766850	0.4453
K2_DER	0.019399	+	0.884262	0.3791
K3_FA	0.017430	+	1.356734	0.1785
R Squared			0.123941	
Adjusted R Squared			0.071795	
F Statistic			2.376799	
Prob (F-Statistic)			0.045568	

To ensure the consistency and reliability of the main regression results, robustness testing was conducted using Two Stage Least Squares (2SLS) and Generalized Method of Moments (GMM). For this purpose, financial performance was represented by a profitability common factor formed from ROA and ROE through principal component analysis, while market performance was represented by Tobin's Q, complemented by a one-period-ahead measure, Tobin's Q(t+1). As reported in the robustness table, green accounting has a positive and significant effect on the profitability ratio, indicating that hypothesis H1 is supported on the profitability dimension represented by ROA and ROE. For the market ratio, green accounting is negatively significant on same-period Tobin's Q but becomes insignificant on Tobin's Q(t+1), indicating that the market response is not yet stable. Sustainability performance remains insignificant on the profitability ratio, leverage remains negative and significant on the profitability ratio, and firm age remains insignificant. These results indicate that the main findings are robust and not sensitive to alternative estimation methods.

Table 8. Robustness test

Variable	Profitability Ratio (ROA and ROE)		Market Ratio (TQ)	
	2SLS	GMM	2SLS	GMM
GA	0.048**	0.048**	0.626	0.626
PROPER	0.916	0.916	0.006	0.006
K1_PAF	0.430	0.430	0.232	0.232
K2_DER	0.000**	0.000**	0.673	0.673
K3_FA	0.505	0.505	0.719	0.719
R Squared	0.372	0.372	0.227	0.227
Adjusted R Squared	0.335	0.335	0.053	0.053
F Statistic	9.972	-	1.829	-
Prob (F-Statistic)	0.000	-	0.118	-

Note: ** = significant at the 5% level (0.05)

5. Discussion

The Effect of Green Accounting on Financial Performance

The findings of this study indicate that green accounting has different effects depending on the dimension of financial performance examined. Based on the main panel regression results, green accounting has a positive effect on ROA, although only marginally significant at the 10 percent level. It has no significant effect on ROE and has a negative effect on Tobin's Q. To obtain a clearer decision regarding the profitability dimension, a robustness test was conducted by forming a profitability common factor from ROA and ROE. The result shows that green accounting has a positive and significant effect on profitability. Therefore, hypothesis H1 is supported for the profitability dimension represented by ROA and ROE. These findings show that environmental accounting practices influence internal profitability and market valuation differently.

The positive effect of green accounting on ROA suggests that companies with higher levels of environmental disclosure tend to have better efficiency in using their assets to generate profits. The implementation of green accounting encourages companies to optimize resource, reduce environmental waste, improve energy efficiency, and minimize operational inefficiencies. These practices can reduce operational costs and improve productivity, which may ultimately enhance asset profitability. In the energy sector, operational efficiency is particularly important because companies operate in highly capital-intensive industries with substantial environmental compliance obligations. Therefore, companies that successfully integrate environmental management into their operational systems are more capable of maintaining stable profitability.

This finding supports Stakeholder Theory, which explains that companies are not solely responsible to shareholders but also to broader stakeholders, including governments, communities, environmental groups, and society. Companies that disclose environmental information transparently are more likely to gain social affirmation and strengthen relationships with external stakeholders. Increased legitimacy may improve public trust, reduce conflicts with regulators and communities, and create a more stable business environment that supports operational performance. In the context of the Indonesian energy sector, which is highly exposed to environmental scrutiny, maintaining legitimacy is crucial for sustaining business continuity and operational licenses.

The findings also reinforce Neo-Institutional Theory, which explains that companies adapt their practices in response to institutional pressures originating from regulations, professional standards,

and industry expectations. Energy companies face strong coercive pressures from environmental regulations, including reclamation obligations, carbon reduction policies, and sustainability reporting requirements. Consequently, green accounting can be interpreted as a strategic organizational response aimed at complying with institutional expectations while simultaneously improving operational efficiency.

The main panel regression produces non-uniform results for green accounting across the financial performance indicators, with a positive direction on ROA, an insignificant effect on ROE, and a negative and significant effect on Tobin's Q, thus a robustness test was conducted to obtain a firmer hypothesis decision. The test formed a profitability common factor from ROA and ROE through principal component analysis. The result shows that green accounting has a positive and significant effect on the profitability ratio. Therefore, hypothesis H1 is accepted for the financial performance dimension represented by profitability. This indicates that higher levels of environmental accounting disclosure are associated with a stronger ability to generate profits, even though the effect is not clearly captured when ROE is examined separately.

This positive effect suggests that green accounting may encourage companies to improve resource efficiency, reduce waste, and adopt more environmentally responsible operational practices. Such efficiency ultimately driving towards lowers costs, increases productivity, and improves the company's ability to generate profits. Accordingly, the implementation of green accounting does reflect environmental responsibility and provides internal economic benefits for the company, which are reflected in the profitability ratio than in market valuation.

The negative and significant effect of green accounting on Tobin's Q indicates that the market still perceives environmental accounting practices as additional expenditures rather than value-generating investments. Investors may interpret environmental disclosure as a signal of increasing compliance costs related to environmental management, reclamation obligations, emission reduction programs, and sustainability investments. These additional costs may create concerns regarding future profitability and cash flow stability, particularly within the energy sector, where operational costs and regulatory risks are already substantial.

The market response can also be understood within the context of Indonesia's strengthening environmental and energy transition regulations during the 2019–2024 period. The implementation of Presidential Regulation No. 98 of 2021 concerning Carbon Economic Value, Ministerial Regulation No. 16 of 2022 concerning carbon economic implementation in electricity generation, and Presidential Regulation No. 112 of 2022 concerning renewable energy acceleration has increased investor concerns regarding transition risks and future capital expenditures. Under these conditions, green accounting disclosure may be interpreted as evidence of increasing environmental obligations and future compliance costs, which potentially reduce short-term firm value reflected in Tobin's Q.

Despite the negative market response, green accounting still possesses substantial long-term strategic value. Companies that consistently implement environmentally responsible practices are more likely to reduce regulatory risks, improve adaptability to policy changes, strengthen corporate reputation, and attract sustainability-oriented investors. While the short-term market response remains negative, green accounting may contribute positively to corporate sustainability and long-term competitiveness.

The findings of this study are consistent with previous studies conducted by [Afni & Achyani \(2023\)](#), [Cahyani & Puspitasari \(2023\)](#), and [Rusdiansyah & Sarikuswati \(2023\)](#), which found that environmental disclosure positively affects operational financial performance. However, the findings

also support studies by [Gündüz & Gündüz \(2025\)](#), [Nisaa & Hidayati \(2025\)](#), and [Okterianda et al. \(2025\)](#), which reported that environmental disclosure is not always positively perceived by capital markets, particularly in the short term.

Overall, these findings indicate that green accounting is not merely symbolic or ethical disclosure but also has measurable economic implications for companies. The positive relationship with ROA demonstrates that environmental practices can improve internal operational efficiency, while the negative relationship with Tobin's Q highlights challenges in communicating the long-term strategic value of sustainability practices to investors. Therefore, energy companies need to integrate green accounting more strategically into corporate governance, operational planning, and investor communication to ensure that environmental initiatives contribute not only to internal efficiency but also to long-term market valuation.

The Effect of Sustainability Performance on Financial Performance

This study also finds that sustainability performance, measured using PROPER ratings, does not significantly affect ROA, ROE, or Tobin's Q. These findings indicate that environmental performance has not yet been consistently translated into improvements in profitability or market valuation among Indonesian energy companies during the observation period.

One explanation for this condition is that PROPER mainly functions as a compliance-based environmental evaluation system rather than a direct measure of economic efficiency. Changes in PROPER ratings do not necessarily represent proportional changes in productivity, cash flow generation, or operational profitability within the same period. Besides, the energy sector is highly sensitive to commodity prices, exchange rates, operational costs, and macroeconomic conditions, causing environmental performance to become less dominant compared to broader industrial factors.

The insignificant relationship between sustainability performance and ROA as well as ROE suggests that environmental compliance is still largely administrative in nature. Companies tend to implement sustainability initiatives primarily to satisfy regulatory obligations rather than to improve operational competitiveness and profitability. Consequently, sustainability practices have not yet been fully integrated into value creation processes capable of generating measurable financial benefits.

The insignificant effect on Tobin's Q further indicates that investors do not yet consider environmental performance as a primary determinant of firm value within the Indonesian energy sector. Investors remain more focused on profitability, leverage, growth opportunities, and commodity market conditions compared to sustainability ratings. This finding reflects that market awareness regarding ESG and sustainability issues is still relatively limited, especially in emerging markets where short-term financial performance remains the dominant investment consideration.

From the perspective of Stakeholder Theory, companies improve sustainability performance mainly to fulfill stakeholder expectations and maintain operational legitimacy. Compliance with environmental standards may reduce social conflict and regulatory risks, but such compliance does not necessarily generate immediate financial returns. Similarly, Neo-Institutional Theory explains that participation in PROPER reflects organizational responses to coercive and normative institutional pressures rather than efficiency-oriented strategic decisions.

The findings imply that sustainability practices in the Indonesian energy sector are still positioned as moral and legal obligations rather than strategic competitive advantages. Therefore, companies need

to transform sustainability initiatives from compliance-oriented activities into integrated business strategies capable of creating long-term economic value. Sustainability initiatives should be linked directly with operational efficiency, technological innovation, renewable energy development, and sustainable supply chain management to strengthen their financial impact.

This study is consistent with previous research conducted by Alareeni & Hamdan (2020), Atan et al. (2018), and Moneva (2015), which found that environmental performance does not always directly improve corporate financial performance. However, the findings contradict studies by Eva et al. (2015) and Widjatkiko & Sari (2024), which reported positive relationships between sustainability performance and financial performance. These inconsistencies suggest that the relationship between sustainability performance and financial performance remains highly dependent on industrial context, market maturity, investor awareness, and institutional conditions.

Overall, this study contributes to the development of sustainability accounting literature by demonstrating that the economic benefits of sustainability practices may not immediately appear in short-term financial indicators. Instead, sustainability initiatives may function primarily as mechanisms for legitimacy, risk management, and long-term operational continuity. Therefore, companies should strengthen sustainability communication and demonstrate that environmental initiatives are not merely compliance costs but strategic investments capable of enhancing operational resilience, reducing long-term risks, and creating sustainable corporate value.

6. Conclusion

This study concludes that green accounting serves as a pivotal mechanism for enhancing the company's internal profitability. Although the main panel regression shows that green accounting only gives marginally significant effect on ROA and insignificant on ROE, the robustness test based on a profitability common factor of ROA and ROE confirms that green accounting has a positive and significant effect on profitability, consequently supporting hypothesis H1 regarding the profitability dimension. However, the negative and significant effect on Tobin's Q, which remains insignificant on Tobin's Q(t+1), suggests that the market still perceives environmental expenditures as a short-term financial burden and a transition risk rather than a value-creating asset. In contrast, sustainability performance proxied by PROPER, as well as firm age, show no significant influence on financial outcomes, indicating that environmental performance still functions as a tool for social legitimacy and regulatory compliance rather than a strategic driver of profitability, thus the hypothesis H2 is rejected. Theoretically, these findings reinforce Stakeholder Theory and Neo-Institutional Theory by demonstrating that while sustainability practices secure social recognition and legitimacy, both did not spontaneously translate into market value. Economically, the significant negative effect of the Debt-to-Equity Ratio (DER) on ROA and ROE highlights that suboptimal capital structures in the energy sector heighten financial risk and erode profitability. The robustness of these results, confirmed via 2SLS and GMM methods, ensures their stability against estimation biases.

Despite provided insights, this study is limited by its focus on a single environmentally sensitive sector, a relatively strict sample selection process, and measurement based on disclosure scores and PROPER ratings. In addition, several external factors that may affect profitability and market valuation, such as commodity prices, exchange rates, and energy policy shocks, are not explicitly included in the model. Future research should conduct cross-sector comparisons, integrate broader ESG indicators, and apply dynamic sustainability analysis over a longer period in order to capture delayed financial effects of environmental disclosure and sustainability performance.

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