



The Effect of Carbon Emission Disclosure, Eco-Efficiency, and Institutional Ownership on Company Value with Good Corporate Governance as a Moderating Variable

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ABSTRACT

Purpose of the study: This study aims to examine the effects of carbon emission disclosure, eco-efficiency, and institutional ownership on firm value, with good corporate governance as a moderating variable, among energy sector companies listed on the Indonesia Stock Exchange during the 2022–2025 period.

Methodology: This study employs a quantitative approach using descriptive statistical analysis. The population consisted of 75 companies, from which 20 companies were selected using purposive sampling. Over a four-year observation period, a total of 80 observations were obtained. The data were analyzed using SPSS version 25 and Moderated Regression Analysis.

Main Findings: The results show that carbon emission disclosure and eco-efficiency have no significant effect on firm value, while institutional ownership has a positive effect. Furthermore, good corporate governance does not significantly moderate the relationships between the three independent variables and firm value. The model has an Adjusted R² of 0.128, indicating that the independent variables explain 12.8% of the variation in firm value.

Novelty/Originality of this study: This study contributes to the environmental accounting literature in Indonesia by providing empirical evidence on the relationships between environmental disclosure, eco-efficiency, institutional ownership, and firm value, including the moderating role of good corporate governance in the energy sector. The findings suggest that institutional ownership contributes to firm value, whereas carbon emission disclosure and eco-efficiency do not demonstrate significant direct effects. Practically, companies should strengthen institutional monitoring while continuously improving environmental management and corporate governance practices.

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1. INTRODUCTION

Business sustainability is one of the strategies that companies must implement to remain competitive and achieve long-term success amid increasingly intense business competition [1], [2]. This phenomenon is driven by rapid industrial growth, particularly in developing countries such as Indonesia. To remain competitive, companies seek to demonstrate distinctive characteristics and advantages to gain public recognition and attract investors [3], [4]. However, companies are no longer concerned solely with generating profits but are also expected to demonstrate social and environmental accountability. This expectation aligns with growing global awareness of environmental issues, particularly carbon emissions resulting from industrial activities. One way management can

fulfill its environmental responsibilities is by implementing eco-efficiency practices and disclosing carbon emissions [5], [6].

The energy sector is one of the major contributors to economic growth and has a substantial impact on the environment. Consequently, energy companies face increasing pressure from governments, investors, and the public to adopt sustainable business practices [7], [8]. In this context, firm value serves as an important indicator of corporate performance and reflects investors' perceptions of a company's prospects and financial condition. Investors generally consider firm value when making investment decisions.

Carbon emission disclosure (CED) refers to the reporting of carbon emissions generated by a company's operational activities during a specific reporting period. Despite the importance of environmental transparency, carbon emission disclosure practices remain a concern in Indonesia [9], [10]. According to Goodstats data, Indonesia ranked sixth among the world's largest greenhouse gas emitters in 2024. This situation highlights the importance of corporate environmental accountability, particularly among companies operating in sectors with substantial environmental impacts.



Figure 1. Top 10 Greenhouse Gas Emission Producing Countries 2024

Source: Goodstats (2024)

Eco-efficiency is a concept that integrates operational efficiency and cost control with environmental responsibility. Implementing eco-efficiency can help companies optimize resource utilization while minimizing negative environmental impacts [11], [12]. Companies that successfully implement eco-efficiency practices may improve their reputation and strengthen stakeholder trust, potentially increasing firm value.

Institutional ownership refers to the proportion of a company's shares held by institutional investors, such as insurance companies, financial institutions, other corporations, and government institutions, both domestic and international. Institutional investors generally have greater resources and influence in monitoring management decisions [13], [14]. Their presence can encourage more effective management practices and improve corporate accountability, potentially contributing to firm value.

Good corporate governance (GCG) serves as a strategic mechanism for establishing effective relationships among stakeholders. A sound governance system can help mitigate corporate financial problems, including earnings manipulation and opportunistic management practices [15], [16]. In this study, GCG is examined as a moderating variable that may strengthen or weaken the relationships between carbon emission disclosure, eco-efficiency, institutional ownership, and firm value. Effective governance is expected to encourage corporate transparency, environmental responsibility, and better management practices [17], [18].

Previous empirical studies examining the relationships between carbon emission disclosure, eco-efficiency, institutional ownership, and firm value have reported inconsistent findings [19], [20]. Several studies have found that carbon emission disclosure positively affects firm value whereas others have reported negative or insignificant effects [21], [22]. Similarly, research on eco-efficiency has produced mixed results, with some studies identifying a positive relationship with firm value. Similarly, research on eco-efficiency has produced mixed results, with some studies identifying a positive relationship with firm value, while others have found no significant effect. In addition, studies on institutional ownership have also yielded different findings. Research by Holly et al. [23] identified an effect of institutional ownership on firm value, whereas reported no significant relationship.

The different research results may be due to differences in industry characteristics, institutional contexts, and the role of governance mechanisms. Investors' concern about business sustainability information in determining investment decisions is increasing, then this study includes a moderation variable, namely GCG [24], [25]. Because the application of GCG principles can make companies more responsible for the environment and

encourage increased openness in the delivery of environmental information. In addition, GCG is also able to encourage the improvement of company performance.

The urgency of this study lies in the growing importance of environmental accountability and corporate sustainability in the energy sector, particularly in Indonesia, where economic growth must be balanced with environmental responsibility. The novelty of this study is its integration of carbon emission disclosure, eco-efficiency, and institutional ownership into a single research model, with good corporate governance serving as a moderating variable. Unlike studies that primarily examine the direct relationships between these variables and firm value, this study investigates whether corporate governance mechanisms can strengthen or weaken these relationships in the context of Indonesian energy companies. This approach provides additional empirical evidence for understanding the role of corporate governance in the relationship between environmental and ownership factors and firm value.

Based on this background description, this study was conducted to analyze the influence of CED, eco-efficiency, and institutional ownership on the value of companies listed on the IDX, especially the energy sector from 2022 to 2025. The research will also investigate the role of good corporate governance as a moderation variable in this relationship. This research is intended to be able to enrich theoretical studies for the development of literature on environmental accounting and corporate governance in Indonesia. In addition, the results will be considered for company management, investors, and regulators in creating regulations that simultaneously increase sustainability and company value.

2. RESEARCH METHODS

2.1. Types of Research

This study employed a quantitative approach using secondary data. Secondary data refer to information obtained indirectly from previously available sources and generally collected by other parties [26]. The data were obtained from the annual reports and sustainability reports of energy companies listed on the Indonesia Stock Exchange. The quantitative approach was used to examine the relationships between the independent, dependent, and moderating variables. The collected data were analyzed statistically to test the proposed research hypotheses.

2.2. Population and Sample

The data for this study were obtained from the Indonesia Stock Exchange (IDX) website and the official websites of the respective companies. The population consisted of 75 energy companies listed on the IDX during the 2022–2025 period. This period was selected because it represents the post-pandemic economic recovery phase, during which business sustainability and climate change issues have received increasing attention [27], [28]. The sample was selected using a purposive sampling method based on predetermined criteria, resulting in 20 companies from the total population. With a four-year observation period, the final dataset comprised 80 observations.

Table 1. Company Sample

No	Sampling Criteria	Quantity
1.	Energy sector companies listed on the Indonesia Stock Exchange during the period 2022-2025	75
2	Energy companies that do not publish annual reports and sustainability reports consistently in the 2022-2025 period	(23)
3	Companies that do not publish carbon emissions disclosure and incomplete company value data	(32)
	Total Sample	20
	Total Research Sample for 4 years	80

2.3. Data Types and Sources

This study employed secondary data obtained from the annual reports and sustainability reports of the companies. A quantitative research approach was used to provide a structured understanding of the phenomena under investigation through the analysis of numerically measurable data [29]. These data were used to measure the research variables and examine the proposed hypotheses. The data collection process focused on information relevant to carbon emission disclosure, eco-efficiency, institutional ownership, good corporate governance, and firm value. All data were collected from publicly available company reports and official sources.

2.4. Variable Measurement

2.4.1. Company Values

Shareholder prosperity is reflected in the company's value, where an increase in the company's value will increase shareholder welfare and a decrease in the company's value will decrease shareholder welfare. Company

performance can be reflected by the company's value which can then affect the perception of investors, this is what makes the company's value considered important. Formula of company value:

$$PBV = \frac{\text{market price per share}}{\text{book value per share}} \dots (1)$$

2.4.2. Carbon Emission Disclosure

The company's commitment to voluntarily disclosing carbon emissions is reflected in structured reporting, thorough recording, and transparent communication regarding the large amount of carbon emissions created from all operational activities carried out, along with a comprehensive description of the strategic measures implemented to manage and minimize environmental impact. Carbon emissions disclosure is considered a positive thing because it means that companies care about the causes and effects of global warming. CED can be measured by the following formula:

$$CED = \frac{\text{Number of items disclosed}}{18 \text{ disclosure items}} \times 100\% \dots (2)$$

H1: Carbon Emission Disclosure has a positive influence on the Company's Value.

2.4.3. Eco-Efficiency

Eco-efficiency is a strategy that combines economic efficiency with environmental responsibility, where the company strives to improve operational performance and productivity while reducing the negative impact on the environment arising from its business activities. This variable is measured by a dummy variable based on the indicator of the availability of ISO 14001 certificates in companies. H2: Eco-Efficiency has a positive influence on Company Value.

2.4.4. Institutional Ownership

Institutional ownership is a part of the total outstanding shares owned by the institution. Investment development can be monitored with the existence of institutional ownership so that the intensity of supervision of management increases which reduces the chance of fraud. Institutional ownership can be measured using the formula:

$$KI = \frac{\text{Number of shares owned by institutional investors}}{\text{total shares outstanding}} \times 100 \% \dots (3)$$

H3: Institutional Ownership has a positive influence on Company Value

2.4.5. Good Corporate Governance

Good corporate governance is a mechanism that manages the relationship between the management stakeholders, designed to achieve the company's goals while preventing significant strategic errors. The existence of GCG can make the management of company resources more effective and efficient. In this study, the role of GCG as a moderation variable is measured by the existence of an independent board of commissioners. With the formula: the independent board of commissioners is divided with the entire board of commissioners. H4, H5, H6: Good Corporate Governance can strengthen the relationship between Carbon Emission Disclosure, Eco-Efficiency, Institutional Ownership to Company Value.

2.5. Data Analysis Techniques

The data were analyzed using multiple linear regression to examine the relationships between the independent and dependent variables. Data processing was performed using SPSS version 25, including descriptive statistical analysis, classical assumption tests (normality, multicollinearity, and heteroscedasticity), the coefficient of determination test, and Moderated Regression Analysis (MRA) [30]. Based on the Kolmogorov-Smirnov normality test, the data were found to be non-normally distributed. Therefore, a natural logarithm (Ln) transformation was applied to the numerical variables (Y, X1, X3, and Z) to reduce skewness, improve data symmetry, and help meet the normality assumption. This transformation was applied because logarithmic transformations can reduce the influence of extreme values and stabilize data variance. Meanwhile, the dummy variable X2 (eco-efficiency) was not transformed because it consists of categorical values (1 and 0), which cannot be directly transformed using the natural logarithm. The transformed data were subsequently used for further regression analysis and hypothesis testing.

2.6. Research Model

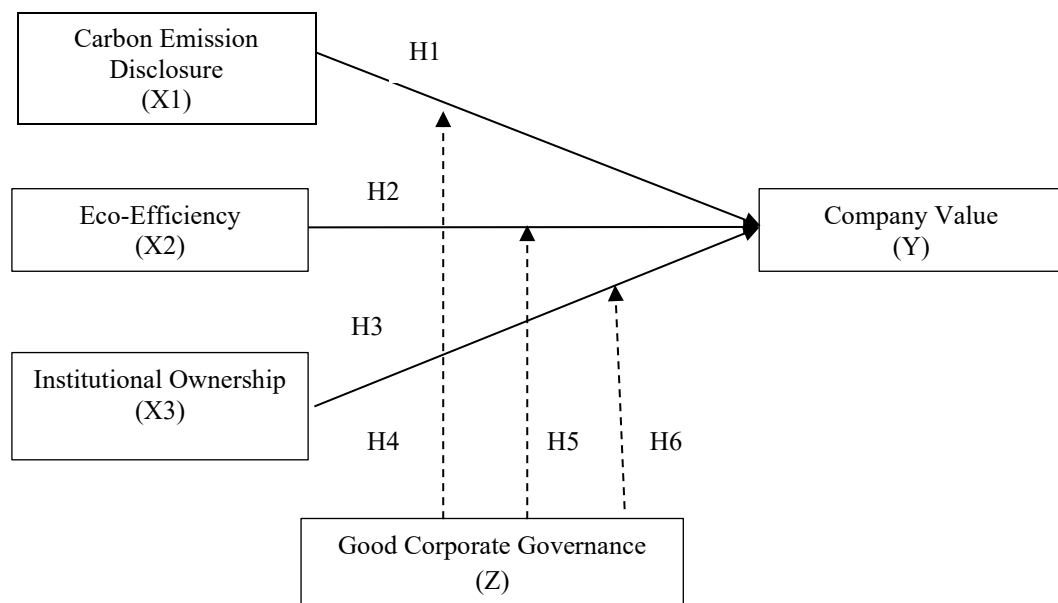


Figure 2. Research Model

3. RESULTS AND DISCUSSION

3.1. Descriptive Analysis Test

Tabel 2. Results of The Descriptive Statistical Analysis

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
X2	80	,00	1,00	,9125	,28435
LN _Y	80	-1,47	1,39	-,0548	,55750
LN _{X1}	80	-,82	-,06	-,2415	,16089
LN _{X3}	80	-,58	-,01	-,2031	,16927
LN _Z	80	-2,30	-,34	-,9367	,29153
Valid N (listwise)	80				

The Company's value as a bound variable (Ln_Y) has a maximum value of 1.39, a minimum value of -1.47 and an average value of -0.0548 with a standard deviation value of 0.55750. Then the independent variable (Ln_{X1}) of Carbon Emission Disclosure has a maximum value of -0.06, a minimum value of -0.82 and an average value of -0.2415 with a standard deviation value of 0.16089. The independent variable X2 Eco-Efficiency has a maximum value of 1.00, a minimum value of 0.00, an average value of 0.9125 and a standard deviation value of 0.028435. Ln_{X3}, institutional ownership has a maximum value of -0.01, a minimum value of -0.58, and an average value of 0.2031, and a standard deviation value of 0.16927. Ln_Z, Good Corporate Governance, a maximum value of -0.34, a minimum value of -2.30, an average value of -0.9367, and a standard deviation value of 0.29153.

3.2. Classical Assumption Test

3.2.1. Normality Test

Table 3. Results of the Research Data Normality Test

One-Sample Kolmogorov-Smirnov Test			
			Standardized Residual
N			80
Normal Parameters ^{a,b}	Mean		,0000000
	Std. Deviation		,98082889
Most Extreme Differences	Absolute		,079
	Positive		,079
	Negative		-,061
Test Statistic			,079
Asymp. Sig. (2-tailed)			,200 ^{c,d}

- a. Test distribution is Normal.
- b. Calculated from data.
- c. Lilliefors Significance Correction.
- d. This is a lower bound of the true significance.

The results for 80 samples, showed a significant Kolmogorov-Smirnov value of 0.200 which proves that the data is normally distributed because the data is more than 0.05.

3.2.2. Multicollinearity Test

Table 4. Results of the Multicollinearity Test on Research Data

Model		Coefficients ^a				t	Say.	Collinearity Statistics	
		Unstandardized Coefficients		Standardized Coefficients	Tolerance			LIVE	
		B	Std. Error						
1	(Constant)	,376	,224		1,677	,098			
	X2	-,271	,205	-,138	-	,190	,973	1,028	
					1,321				
	LNx1	-,345	,365	-,100	-,944	,348	,958	1,043	
	LNx3	1,315	,347	,399	3,793	,000	,963	1,039	
a. Dependent Variable: LNY									

a. Dependent Variable: LNY

LNx1 Carbon Emission Disclosure has a toll value of 0.958 and VIF of 1.043 which means there are no symptoms of multicollinearity. X2 Eco-Efficiency has a toll value of 0.973 and VIF of 1.028 which means there are no symptoms of multicollinearity. LNx3 Institutional Ownership shows a toll value of 0.963 and VIF of 1.039 which means there are no symptoms of multicollinearity.

3.2.3. Heteroscedasticity Test

Table 5. Heteroscedasticity Test Results for Research Data

Model		Coefficients ^a			t	Say.	Collinearity Statistics	
		Unstandardized Coefficients		Standardized Coefficients			Tolerance	LIVE
		B	Std. Error					
1	(Constant)	,219	,138		1,584	,117		
	X2	,237	,127	,212	1,874	,065	,973	1,028
	LNx1	,093	,225	,047	,410	,683	,958	1,043
	LNx3	,137	,214	,073	,640	,524	,963	1,039
a. Dependent Variable: abress								

a. Dependent Variable: abress

Based on the glacial test that has been carried out, it can be seen that all variables have a significant level greater than the predetermined minimum limit of 0.05 so that it can be interpreted that there are no symptoms of heteroscedasticity in the regression model used.

3.3 Hypothesis Test

Table 6. Results of Research Hypothesis Testing

Table of Results of Hierarchical Regression						
Model		Coefficients ^a			t	Sig.
		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error			
1	(Constant)	,376	,224		1,677	,098
	X2	-,271	,205	-,138	-1,321	,190
	LNx1	-,345	,365	-,100	-,944	,348
	LNx3	1,315	,347	,399	3,793	,000
a. Dependent Variable: LNY						

a. Dependent Variable: LNY

$$Y = 0.376 - 0.345X1 - 0.271X2 + 1.315X3$$

The regression equation above can be described as follows:

1. The constant of 0.376 (positive) shows that without being influenced by independent variables, namely carbon emission disclosure, eco-efficiency, institutional ownership, the value of the company that is the sample is quite accountable.
2. Carbon emission disclosure has a coefficient of -0.345 and a significant value of 0.348. Because it has a significant level of more than 0.05, it can be concluded that H1 is rejected. Therefore, carbon emission disclosure has no influence on the y variable (company value).
3. Eco-efficiency has a coefficient of -0.271 and its significance value is 0.190. Because it has a significant level of more than 0.05, it can be concluded that H2 is rejected. Therefore, eco-efficiency has no influence on the variable y (company value).
4. Institutional ownership has a coefficient of 1.315 and its significant value is 0.000. Because it has a significant level of less than 0.05, it can be concluded that H3 is accepted. So institutional ownership has a positive influence on the variable y (company value).

3.4. Variable Regression Analysis (MRA) Test

Table 7. Variable Regression Analysis (MRA) Test

		Coefficients ^a			t	Say.
Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta		
1	(Constant)	,443	1,034		,429	,669
	X2	-,009	,760	-,004	-,011	,991
	LNx1	-,164	1,994	-,047	-,082	,935
	LNx3	,033	1,257	,010	,026	,979
	LNz	,051	,943	,027	,055	,957
	LNx1Z	,263	1,985	,088	,133	,895
	LNx3Z	-1,416	1,291	-,433	-1,097	,276
	X2Z	-,729	2,114	-,214	-,345	,731

a. Dependent Variable: LNY

The value of the regression coefficient on all independent variables, namely Carbon Emission Disclosure, Eco-Efficiency, Institutional Ownership, and its moderation variable, namely Good Corporate Governance, has a significance value of more than 0.05. This shows that GCG cannot strengthen the independent variable over the bound variable (company value).

3.5. Model Accuracy Test

Table 8. Model Accuracy Test

		ANOVA				Say.
Model		Sum of Squares	df	Mean Square	F	
1	Regression	5,032	7	,719	2,651	,017b
	Residual	19,522	72	,271		
	Total	24,554	79			

a. Dependent Variable: LNY

b. Predictors: (Constant), X2Z, LNx3, LNx1, X 2, LNz, LNx3Z, LNx1Z

The ANOVA test (F test) yielded a calculated F value of 2.651 with a significance level of 0.017. The value was lower than 0.05, so the regression model could be used to predict Y. Thus, the variables were free together to explain the changes in the bound variables, and the model was declared fit.

3.6. Coefficient Determination Test

Table 9. Coefficient Determination Test

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,453a	,205	,128	,52071

a. Predictors: (Constant), X2Z, LNx3, LNx1, X 2, LNz, LNx3Z, LNx1Z

Based on the results in the table, it shows an adjusted R square of 0.128 or 12.8%, thus the variable of company value can be explained by the variables of carbon emission disclosure, eco-efficiency, institutional ownership of 12.8%, while the remaining 87.2% is due to other factors that are not examined in this article.

The results show that carbon emission disclosure (CED) has no significant effect on firm value, with a significance value of 0.348 (> 0.05); therefore, H1 is rejected. Similarly, eco-efficiency has no significant effect on firm value, with a significance value of 0.190 (> 0.05), leading to the rejection of H2. In contrast, institutional ownership has a positive and significant effect on firm value, with a significance value of 0.000 (< 0.05); thus, H3 is accepted. Furthermore, the Moderated Regression Analysis (MRA) results indicate that good corporate governance (GCG) does not significantly moderate the relationship between CED and firm value ($0.935 > 0.05$), eco-efficiency and firm value ($0.731 > 0.05$), or institutional ownership and firm value ($0.276 > 0.05$). Consequently, H4, H5, and H6 are rejected.

The results of this study show that carbon emission disclosure has no significant effect on firm value among energy companies listed on the Indonesia Stock Exchange (IDX) during the 2022–2025 period. These findings indicate that carbon emission disclosure has not become a primary consideration for investors in assessing firm value. Although carbon emission disclosure provides information about a company's environmental responsibility, it does not necessarily influence investors' perceptions of its financial prospects and performance [31], [32]. Investors may prioritize other factors directly related to profitability and potential returns. Therefore, greater carbon emission disclosure does not necessarily lead to higher firm value.

Similarly, the results indicate that eco-efficiency has no significant effect on firm value. This finding suggests that improvements in resource efficiency and reductions in environmental impacts have not been directly reflected in market valuation. Although eco-efficiency can help companies optimize resource utilization and potentially reduce operational costs, its financial benefits may require time to materialize and become visible to investors [33], [34]. Furthermore, investors may not yet consider eco-efficiency a primary factor in evaluating energy companies. Consequently, improvements in environmental efficiency do not necessarily result in an immediate increase in firm value.

In contrast, institutional ownership has a positive and significant effect on firm value. This finding indicates that a higher proportion of institutional ownership is associated with greater firm value. According to agency theory, conflicts of interest may arise between managers and shareholders because managers do not always act in the best interests of shareholders. Institutional investors can help mitigate these conflicts through effective monitoring of management activities and corporate decision-making [35]. Their greater resources and monitoring capabilities can encourage management to act in shareholders' interests, improve accountability, and reduce agency costs. Consequently, effective institutional monitoring may strengthen investor confidence and contribute to higher firm value. In this study, the significant effect of institutional ownership, compared with the insignificant effects of carbon emission disclosure and eco-efficiency, suggests that external monitoring may be more directly reflected in investors' valuation of energy companies.

The findings regarding carbon emission disclosure and eco-efficiency should also be considered in relation to previous studies. Ferriswara et al. [36] provide relevant empirical references for examining the relationship between environmental factors and firm value. Differences in research findings may be associated with variations in research periods, industry characteristics, measurement methods, and investor responses to environmental information. The present study contributes to this discussion by examining these relationships in Indonesian energy companies during the 2022–2025 period and incorporating GCG as a moderating variable. The results indicate that the relationship between environmental practices and firm value may depend on the characteristics of the companies and the context in which these practices are implemented.

The moderation test results show that GCG does not significantly moderate the relationship between carbon emission disclosure and firm value. This finding indicates that GCG does not significantly strengthen or weaken the relationship between environmental disclosure and market valuation. Although GCG promotes transparency, accountability, and effective supervision, its implementation may not necessarily increase the importance investors place on carbon emission disclosure. One possible explanation is that the proportion of independent commissioners, which serves as the proxy for GCG in this study, may not fully represent the overall quality and effectiveness of corporate governance [37], [38]. The actual effectiveness of governance also depends on factors such as the independence, expertise, and active involvement of commissioners in monitoring management.

Furthermore, GCG does not significantly moderate the relationship between eco-efficiency and firm value. This finding suggests that corporate governance mechanisms do not significantly change the relationship between environmental efficiency and market valuation [39]. Although effective governance can support responsible resource management and corporate accountability, the presence of independent commissioners alone may not be sufficient to ensure that eco-efficiency improvements translate into higher firm value. Moreover, the benefits of eco-efficiency may take time to become financially visible to investors. The insignificant moderation effect may also reflect the limitations of using the proportion of independent commissioners as the sole proxy for

GCG, as this measure does not necessarily capture the effectiveness of governance practices in supporting environmental performance.

The results also show that GCG does not significantly moderate the relationship between institutional ownership and firm value. This finding suggests that the proportion of independent commissioners does not significantly strengthen or weaken the relationship between institutional ownership and firm value. Institutional investors already have their own monitoring mechanisms and may directly influence management decisions through their ownership and participation in corporate oversight [40], [41]. Consequently, the additional monitoring role represented by independent commissioners may not significantly change the relationship between institutional ownership and firm value. Furthermore, the proportion of independent commissioners may not fully capture the effectiveness of the board's supervision or its interaction with institutional investors.

The findings have several implications for energy companies, investors, and regulators. Companies should strengthen institutional monitoring mechanisms while continuing to improve carbon emission disclosure, eco-efficiency, and corporate governance practices as part of their long-term sustainability strategies. Investors may consider institutional ownership alongside environmental and governance information when evaluating investment opportunities. For regulators, the findings highlight the importance of encouraging transparent environmental reporting and effective corporate governance in the energy sector. Although carbon emission disclosure and eco-efficiency do not significantly affect firm value in this study, they remain relevant to corporate environmental accountability and sustainability. Future research could incorporate additional environmental, financial, and governance variables, extend the observation period, or examine other industry sectors to provide a broader understanding of the factors influencing firm value.

4. CONCLUSION

This study examined the effects of carbon emission disclosure, eco-efficiency, and institutional ownership on firm value, with good corporate governance (GCG) as a moderating variable, in energy companies listed on the Indonesia Stock Exchange during the 2022–2025 period. The results indicate that carbon emission disclosure and eco-efficiency have no significant effect on firm value, while institutional ownership has a positive and significant effect. Furthermore, GCG does not significantly moderate the relationships between carbon emission disclosure, eco-efficiency, institutional ownership, and firm value. These findings suggest that institutional ownership plays an important role in explaining firm value, whereas environmental disclosure and eco-efficiency have not demonstrated significant direct effects in the observed companies. The findings also indicate that the proportion of independent commissioners may not be sufficient to strengthen the relationships between these variables and firm value. Future research is recommended to extend the observation period, include companies from other sectors, and incorporate additional financial, environmental, and corporate governance variables. Furthermore, future studies could use alternative measures of GCG, such as board independence, board size, or audit committee effectiveness, to provide a more comprehensive understanding of the role of corporate governance in the relationship between environmental practices, institutional ownership, and firm value.

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