



GREEN ACCOUNTING, CARBON EMISSION DISCLOSURE, AND FIRM VALUE IN INDONESIA: THE MODERATING ROLE OF GOOD CORPORATE GOVERNANCE

By

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Article Info

Article history:

Received Apr 28, 2026

Revised May 26, 2026

Accepted May 31, 2026

Keywords:

Green Accounting, Carbon
Emission Disclosure, Good
Corporate Governance, Firm
Value

ABSTRACT

Indonesia, as a developing country with several carbon-intensive industries such as mining, energy, and manufacturing, faces significant challenges in achieving a sustainable green economy. In response to increasing environmental concerns, companies are encouraged to implement green accounting practices and disclose carbon emissions as part of their sustainability commitments. However, the effectiveness of these practices in enhancing firm value may depend on the quality of corporate governance. This study aims to examine the effect of green accounting and carbon emission disclosure on firm value, with Good Corporate Governance (GCG) serving as a moderating variable. The study uses mining companies participating in the Corporate Performance Rating Assessment Program (PROPER) issued by the Ministry of Environment and Forestry during the 2020–2023 period. Data were analyzed using multiple regression and moderated regression analysis. The results indicate that green accounting and carbon emission disclosure do not individually affect firm value significantly. However, both variables simultaneously have a positive effect on firm value. Furthermore, Good Corporate Governance significantly moderates the relationship between green accounting and firm value, but does not moderate the relationship between carbon emission disclosure and firm value. These findings suggest that the integration of sustainability practices and strong governance mechanisms can enhance investor confidence and support long-term firm value.

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1. INTRODUCTION

Climate change caused by increasing greenhouse gas emissions has become one of the most pressing global challenges in recent decades. Carbon dioxide (CO₂) emissions from industrial activities, energy production, and transportation continue to rise despite various international initiatives aimed at reducing global carbon footprints. After experiencing a temporary decline during the COVID-19 pandemic in 2020, global carbon emissions increased again as economic activities recovered. Recent reports indicate that global carbon emissions reached approximately 41.2 billion tons in 2024, marking one of the highest levels recorded in history (Lestari, 2024). This trend highlights the urgency of strengthening environmental responsibility across various sectors, including the corporate sector.

The issue of carbon emissions is also increasingly relevant in developing countries, including Indonesia. According to the Global Carbon Project, Indonesia is among the countries with the highest carbon emissions globally. The increasing level of emissions poses significant risks to environmental sustainability, ecosystem stability, and long-

term economic development. Consequently, companies are increasingly expected to take responsibility for the environmental impacts of their operations and to contribute to global efforts aimed at mitigating climate change.

One approach that has gained increasing attention in addressing environmental responsibility in the corporate sector is the implementation of a green economy. A green economy emphasizes economic growth that is environmentally sustainable, resource-efficient, and socially inclusive (Pan et al., 2019). Within the corporate context, the transition toward a green economy requires companies to adopt sustainability practices that integrate environmental considerations into their operational and financial decision-making processes.

Among the practices that support environmental sustainability are the implementation of green accounting and carbon emission disclosure. Green accounting refers to an accounting approach that incorporates environmental costs and environmental impacts into financial reporting and managerial decision-making processes. Through the implementation of green accounting, companies are able to identify, measure, and disclose environmental costs associated with their business activities, thereby promoting greater transparency and accountability in environmental management (Burritt & Schaltegger, 2010). In addition, the disclosure of carbon emissions has become an important mechanism for companies to communicate their environmental performance and commitment to sustainability.

Carbon emission disclosure reflects a company's transparency in reporting greenhouse gas emissions generated from operational activities. Transparent environmental reporting allows stakeholders, including investors and regulators, to assess a company's environmental performance and its commitment to climate change mitigation (Luo et al., 2013). In recent years, the importance of environmental disclosure has increased significantly as investors increasingly consider environmental, social, and governance (ESG) factors when making investment decisions.

However, the effectiveness of sustainability practices in influencing corporate performance may depend on the governance structure of a company. Good Corporate Governance (GCG) plays an important role in ensuring that sustainability initiatives are implemented effectively and transparently. Strong governance mechanisms enhance accountability, improve monitoring of managerial decisions, and strengthen the credibility of sustainability disclosures. As a result, companies with strong governance practices may be better positioned to translate sustainability initiatives into improved corporate performance and firm value.

Firm value represents the market's perception of a company's overall performance and future prospects. For publicly listed companies, firm value is generally reflected in stock prices and market valuation. Investors tend to favor companies that demonstrate not only strong financial performance but also responsible environmental and governance practices. Therefore, sustainability practices such as green accounting and carbon emission disclosure may influence firm value by improving corporate reputation and strengthening investor confidence.

Although previous studies have examined the relationship between environmental practices and firm value, the empirical findings remain inconclusive. Several studies suggest that green accounting and environmental disclosures positively influence firm value by enhancing corporate reputation and investor trust (Agustia et al., 2019; Sukmadilaga et al., 2023). However, other studies indicate that sustainability practices do not always have a significant impact on firm value, particularly in emerging markets where investors tend to prioritize short-term financial performance (Muhammad & Aryani, 2021; Aswin, 2022).

Furthermore, limited studies have explored the combined influence of green accounting and carbon emission disclosure on firm value, particularly within industries that generate relatively high levels of carbon emissions, such as the mining sector. In addition, the moderating role of Good Corporate Governance in strengthening the relationship between sustainability practices and firm value has received relatively limited attention in the context of developing economies such as Indonesia.

Therefore, this study investigates the effect of green accounting and carbon emission disclosure on firm value, with Good Corporate Governance serving as a moderating variable in Indonesian mining companies. This study contributes to the existing literature in three ways. First, it examines the combined effect of green accounting and carbon emission disclosure on firm value within carbon-intensive industries. Second, it explores the moderating role of Good Corporate Governance in strengthening sustainability practices. Third, this study provides empirical evidence from an emerging economy where sustainability reporting practices are still developing.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Legitimacy Theory

Legitimacy theory explains that organizations strive to ensure that their operations are aligned with the norms, values, and expectations of society. According to Dowling and Pfeffer (1975), organizations continuously attempt to obtain and maintain legitimacy from society in order to ensure their long-term survival. When a discrepancy arises between corporate activities and societal expectations, a legitimacy gap may occur, which can threaten the sustainability of the organization.



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In the context of environmental responsibility, legitimacy theory suggests that companies tend to disclose social and environmental information as a strategy to gain public approval and maintain their legitimacy. Deegan (2002) argues that environmental disclosure can be used by companies as a mechanism to demonstrate that their operations are consistent with societal expectations. Therefore, companies that transparently disclose sustainability practices, including carbon emission management and green accounting implementation, may improve their corporate reputation and strengthen investor confidence, which ultimately contributes to higher firm value.

Green Economy

The concept of the green economy was first introduced in the report *Blueprint for a Green Economy* published in 1989 by a group of environmental economists in the United Kingdom. Since then, the concept has evolved as an approach to promote sustainable economic development while preserving environmental sustainability.

The United Nations Environment Programme (UNEP) defines a green economy as an economy that results in improved human well-being and social equity while significantly reducing environmental risks and ecological scarcities (UNEP, 2011). A green economy is characterized by low carbon emissions, efficient resource utilization, and social inclusiveness.

In the business context, the implementation of green economy principles encourages companies to integrate environmental considerations into their operational activities. This integration may include energy efficiency, waste management, carbon emission reduction, and the implementation of environmental accounting practices that recognize environmental impacts generated by corporate activities.

Green Accounting

Green accounting is an accounting system that integrates environmental aspects into the measurement, recording, and reporting of corporate activities. This approach aims to identify and measure the environmental impacts resulting from business operations and incorporate them into managerial decision-making processes.

According to Burritt and Schaltegger (2010), green accounting serves as a management tool that enables companies to identify environmental costs, improve resource efficiency, and support sustainable business practices. By implementing green accounting, companies can increase transparency regarding the environmental consequences of their operations.

Furthermore, green accounting provides strategic benefits for companies, such as improving corporate reputation, strengthening stakeholder relationships, and attracting investors who are concerned with sustainability issues (Lako, 2018). Therefore, companies that consistently implement green accounting practices are expected to enhance firm value through increased market trust and investor confidence.

Carbon Emission Disclosure

Carbon emission disclosure refers to the reporting of greenhouse gas emissions produced by corporate activities. As global awareness of climate change continues to grow, companies are increasingly required to provide transparent information regarding the environmental impacts of their business operations.

Luo, Tang, and Lan (2013) explain that carbon emission disclosure represents a form of corporate accountability in providing stakeholders with information about environmental performance. Such information is important for investors and society to evaluate the extent to which companies contribute to climate change mitigation efforts.

Matsumura, Prakash, and Vera-Muñoz (2014) found that companies that transparently disclose carbon emissions tend to receive more favorable evaluations from the market because they are perceived as being more committed to sustainability. Therefore, carbon emission disclosure may influence investor perceptions and contribute to increased firm value.

Firm Value

Firm value reflects the market's perception of a company's performance and future prospects. For publicly listed companies, firm value is typically reflected in the company's stock price. Higher firm value indicates greater investor confidence in the company's ability to generate future returns (Brigham & Houston, 2019).

In recent years, the assessment of corporate performance has expanded beyond financial indicators to include environmental, social, and governance (ESG) aspects. Investors are increasingly concerned with how companies manage the environmental and social impacts of their operations. Consequently, companies that demonstrate a commitment to sustainability through practices such as green accounting and carbon emission disclosure may achieve higher firm value.

Good Corporate Governance

Good Corporate Governance (GCG) refers to the system that regulates and controls relationships between company management, shareholders, and other stakeholders. The implementation of GCG aims to ensure that companies are managed in a transparent, accountable, and responsible manner.

According to the OECD (2015), effective corporate governance enhances investor confidence, improves corporate performance, and reduces the risk of managerial opportunism. In the context of sustainability, corporate governance also plays a crucial role in ensuring that environmental practices are implemented transparently and responsibly.

Companies with strong governance mechanisms are generally more capable of implementing sustainability policies effectively, including the adoption of green accounting and carbon emission disclosure. Therefore, Good Corporate Governance may function as a moderating variable that strengthens the relationship between corporate sustainability practices and firm value.

Hypothesis Development

Based on legitimacy theory, companies that adopt sustainability practices such as green accounting and carbon emission disclosure seek to gain legitimacy from society and stakeholders. These practices can enhance corporate reputation and strengthen investor trust, which ultimately contributes to higher firm value.

Previous studies suggest that the implementation of green accounting may improve corporate reputation and provide positive signals to investors regarding a company's commitment to sustainability (Yuliani & Prijanto, 2022; Lyandra, 2024). Therefore, the following hypothesis is proposed:

H1: Green accounting has an effect on firm value.

Carbon emission disclosure represents corporate transparency in reporting environmental impacts generated by business operations. Research conducted by Bahriansyah and Ginting (2022) indicates that carbon emission disclosure has a positive effect on firm value.

H2: Carbon emission disclosure has an effect on firm value.

Furthermore, the simultaneous implementation of green accounting and carbon emission disclosure may strengthen corporate reputation as an environmentally responsible organization. This may increase investor confidence and consequently enhance firm value.

H3: Green accounting and carbon emission disclosure simultaneously affect firm value.

Good Corporate Governance plays an important role in ensuring that corporate sustainability practices are implemented transparently and accountably. Companies with strong governance mechanisms are more capable of implementing sustainability initiatives effectively and gaining investor trust. Strong governance mechanisms may enhance the credibility of sustainability practices and improve stakeholder confidence in corporate environmental disclosures.

H4: Good Corporate Governance moderates the effect of green accounting on firm value.

H5: Good Corporate Governance moderates the effect of carbon emission disclosure on firm value.

3. RESEARCH METHOD

Research Design and Data Source

This study employs a quantitative research approach using secondary data obtained from mining companies listed on the Indonesia Stock Exchange (IDX). The research focuses on examining the relationship between green accounting, carbon emission disclosure, and firm value, with Good Corporate Governance (GCG) acting as a moderating variable.

The observation period covers four years, from 2020 to 2023. Mining companies are selected as the research object because this sector has relatively high environmental risks and carbon emission intensity compared to other industrial sectors.

The data used in this study are secondary data derived from publicly available sources, including annual reports and financial statements of mining companies published on the official website of the Indonesia Stock Exchange (IDX).

Population and Sample

The population of this study consists of all mining companies listed on the Indonesia Stock Exchange during the period 2020–2023. The sample was determined using a purposive sampling technique, in which samples are selected based on specific criteria to ensure the availability and completeness of the required data.

The sample selection criteria are as follows:

- 1) Mining companies listed on the Indonesia Stock Exchange during the period 2020–2023.
- 2) Companies that publish complete annual financial statements during the observation period.
- 3) Companies that provide complete data required for measuring all research variables.

Data Collection Method

This study uses secondary data collected through documentation techniques. The documentation method involves collecting financial and non-financial information from corporate annual reports, sustainability reports, and financial statements published by the Indonesia Stock Exchange.



In addition, literature review and online database reviews were conducted to obtain supporting information from various online sources, including academic journals, government publications, and other relevant databases related to environmental disclosure and corporate governance.

Research Variables and Measurement

This study uses four main variables: green accounting, carbon emission disclosure, firm value, and Good Corporate Governance.

Green Accounting

Green accounting represents the implementation of environmental accounting through the environmental costs incurred by companies as a form of corporate environmental responsibility. In this study, green accounting is measured using environmental costs reported by the company, which are transformed into the natural logarithm form:

$$\text{Environmental Cost} = \ln(\text{Environmental Cost})$$

Carbon Emission Disclosure

Carbon emission disclosure refers to the information reported by companies regarding carbon emissions generated from operational activities. The measurement of carbon emission disclosure is based on a disclosure index adapted from Permana and Bambang (2020), which includes the following indicators:

- 1) Disclosure regarding global warming or the Kyoto Protocol (score 1)
- 2) Disclosure of company plans to address global warming (score 2)
- 3) Information about potential costs to achieve emission reduction targets (score 3)
- 4) Information about current costs incurred to reduce greenhouse gas emissions (score 3)
- 5) Disclosure of the amount of carbon emissions produced by the company (score 3)

The maximum disclosure score is 12.

Firm Value

Firm value is the dependent variable in this study and is measured using Tobin's Q ratio. Tobin's Q reflects the market valuation of a company relative to the book value of its assets. The formula used is as follows:

$$\text{Tobin's Q} = \frac{(\text{EMV} + \text{D})}{(\text{EBV} + \text{D})}$$

Where:

EMV = Market value of equity (closing price × number of outstanding shares)

D = Book value of total debt

EBV = Book value of total assets

Good Corporate Governance

Good Corporate Governance (GCG) is used as a moderating variable in this study. The GCG index consists of 32 indicators derived from the Indonesian General Guidelines for Good Corporate Governance (2006).

Each indicator disclosed in the company's annual report is assigned a score of 1, while undisclosed indicators receive a score of 0. The total GCG index is calculated by summing all disclosed items, with a maximum possible score of 32, representing full compliance with governance guidelines.

Data Analysis Method

Descriptive Statistics

Descriptive statistics are used to describe and summarize the characteristics of the data, including the mean, minimum, maximum, and standard deviation values of each research variable.

Classical Assumption Test

Before conducting regression analysis, classical assumption tests are performed to ensure that the regression model satisfies the Best Linear Unbiased Estimator (BLUE) criteria. These tests include: Normality test, Multicollinearity test, Autocorrelation test, Heteroscedasticity test.

The normality test is conducted using the Kolmogorov–Smirnov test. Multicollinearity is examined using the Variance Inflation Factor (VIF) and tolerance values. Autocorrelation is tested using the Durbin–Watson statistic, while heteroscedasticity is tested using scatterplot analysis.

Regression Model

To examine the effect of green accounting and carbon emission disclosure on firm value, the following multiple regression model is employed:

$$\text{FV} = \alpha + \beta_1 \text{GA} + \beta_2 \text{CED} + \beta_3 \text{SIZE} + \epsilon$$

To test the moderating role of Good Corporate Governance, the following regression model is applied:

$$FV = \alpha + \beta_1 GA + \beta_2 CED + \beta_3 GA * GCG + \beta_4 CED * GCG + \beta_5 SIZE + \epsilon$$

Where:

FV	=		Firm		Value
GA	=		Green		Accounting
CED	=	Carbon		Emission	Disclosure
GCG	=	Good		Corporate	Governance
SIZE	=	Firm	Size	(control	variable)
ϵ	=	Error term			

Hypothesis Testing

Hypothesis testing is conducted using the t-test, F-test, and coefficient of determination (R²).

The t-test is used to determine the partial effect of independent variables on the dependent variable. The F-test is used to test the simultaneous effect of independent variables on the dependent variable. The coefficient of determination (R²) measures the ability of the independent variables to explain variations in firm value.

All statistical tests in this study use a significance level of 5% ($\alpha = 0.05$).

4. RESULTS AND DISCUSSION

Sample Description

The population of this study consisted of 65 mining companies listed on the Indonesia Stock Exchange (IDX) during the 2020–2023 period. The sample was selected using purposive sampling based on several criteria, including the availability of sustainability reports and complete financial statements.

Based on the sample selection process, 26 companies were excluded due to incomplete financial data or the absence of sustainability reports. Therefore, the final sample consisted of 39 mining companies. With four years of observation, the study obtained 156 firm-year observations.

Descriptive Statistics

Descriptive statistics were used to provide an overview of the characteristics of the research variables, including minimum, maximum, mean, and standard deviation values.

Firm value (FV) has a minimum value of 0.34 and a maximum value of 1514.44, indicating substantial variation among companies and the possible presence of outliers. Green accounting (GA) shows an average value of 22.75 with a standard deviation of 2.62, suggesting moderate variation in the implementation of environmental accounting practices.

Carbon emission disclosure (CED) has an average value of 9.26 and a standard deviation of 2.04, indicating moderate differences in disclosure practices among companies. Meanwhile, Good Corporate Governance (GCG) has an average value of 0.456 with a standard deviation of 0.145, suggesting that governance implementation among the sampled firms is relatively moderate.

Classical Assumption Tests

Before conducting regression analysis, several classical assumption tests were performed to ensure the reliability of the regression model.

The normality test using the normal probability plot indicates that the residual values are normally distributed, as the plotted points follow the diagonal line. The heteroscedasticity test using the Glejser method shows that the significance values for green accounting (0.076), carbon emission disclosure (0.906), and Good Corporate Governance (0.062) are greater than 0.05, indicating the absence of heteroscedasticity.

Furthermore, the multicollinearity test shows that all tolerance values are above 0.10 and the Variance Inflation Factor (VIF) values are below 10, indicating no multicollinearity among the independent variables. The Durbin–Watson value of 1.880 also indicates that the regression model does not suffer from autocorrelation problems.

Regression Analysis

The regression analysis results indicate that Good Corporate Governance (GCG) has a positive and significant effect on firm value, with a coefficient value of 404.483 and a significance level of 0.000. This finding suggests that stronger governance practices enhance investor confidence and improve corporate credibility.

Green accounting (GA) shows a positive but insignificant effect on firm value, with a coefficient of 11.617 and a significance value of 0.115. This result indicates that environmental accounting practices may not yet be fully considered by investors in assessing firm value.

Similarly, carbon emission disclosure (CED) does not significantly affect firm value, as indicated by a coefficient value of -0.539 and a significance level of 0.955. This finding suggests that investors may still prioritize financial performance indicators over environmental disclosure.

The regression equation can be formulated as follows:

$$\text{Firm Value} = -410.818 + 11.617(GA) + 404.483(GCG) - 0.539(EK)$$



Moderated Regression Analysis

Moderated Regression Analysis (MRA) was conducted to examine the moderating role of Good Corporate Governance (GCG) in the relationship between green accounting, carbon emission disclosure, and firm value. The results show that the interaction between green accounting and GCG has a positive and significant effect on firm value, with a significance value of 0.000. This finding indicates that Good Corporate Governance strengthens the relationship between green accounting and firm value.

However, the interaction between carbon emission disclosure and GCG does not show a significant effect, with a significance value of 0.841. This result suggests that Good Corporate Governance does not moderate the relationship between carbon emission disclosure and firm value.

Furthermore, the adjusted R-square value of 0.219 indicates that approximately 21.9% of the variation in firm value can be explained by the variables included in the moderation model.

5. DISCUSSION

The results of this study provide several important insights into the relationship between green accounting, carbon emission disclosure, corporate governance, and firm value within Indonesian mining companies.

First, the findings indicate that green accounting does not have a statistically significant effect on firm value. Although the regression coefficient shows a positive direction, the relationship is not strong enough to influence market valuation directly. This result suggests that investors may not yet fully incorporate environmental accounting information into their investment decisions. In many emerging markets, including Indonesia, investors tend to prioritize short-term financial performance indicators rather than long-term sustainability information.

This finding is consistent with previous studies which suggest that environmental accounting practices often require a longer period before their benefits are reflected in market valuation. In addition, the implementation of green accounting among companies may still be relatively limited and inconsistent. As a result, the information disclosed may not yet provide sufficient signals to investors regarding the company's environmental commitment.

Second, the results show that carbon emission disclosure does not have a significant effect on firm value. This finding indicates that environmental disclosure related to carbon emissions may still be perceived as supplementary information rather than a key determinant of firm performance. One possible explanation is that carbon emission disclosure practices in Indonesia are still largely voluntary, which may result in variations in disclosure quality among companies.

Another possible explanation is that investors may still prioritize traditional financial indicators, such as profitability, revenue growth, and firm size, when evaluating corporate value. Environmental disclosures, including carbon emission reporting, may therefore have a limited immediate impact on firm valuation, particularly in markets where sustainability reporting practices are still developing.

However, when green accounting and carbon emission disclosure are examined simultaneously, the results show a significant influence on firm value. This finding suggests that sustainability practices may generate stronger market signals when implemented together rather than individually. Green accounting provides financial information related to environmental costs, while carbon emission disclosure reflects the company's transparency regarding environmental impacts. When both practices are implemented simultaneously, they may strengthen the credibility of corporate sustainability commitments.

These findings highlight the importance of adopting an integrated sustainability strategy. Companies that simultaneously implement environmental accounting practices and transparent emission reporting may create stronger signals of environmental responsibility to investors and stakeholders. Such signals may contribute to improved corporate reputation and increased investor confidence, which ultimately enhances firm value.

Furthermore, the results demonstrate the significant moderating role of Good Corporate Governance in strengthening the relationship between green accounting and firm value. Companies with strong governance structures are more capable of implementing environmental practices effectively and ensuring that sustainability disclosures are credible and reliable. Good Corporate Governance improves transparency, accountability, and managerial oversight, which enhances stakeholder trust in corporate sustainability initiatives.

The interaction between green accounting and Good Corporate Governance indicates that environmental accounting practices become more effective when supported by strong governance mechanisms. Investors may perceive sustainability information as more reliable when companies demonstrate strong governance structures that ensure transparency and accountability.

On the other hand, the moderating role of Good Corporate Governance in the relationship between carbon emission disclosure and firm value was not supported. This finding suggests that governance mechanisms alone may not be sufficient to strengthen the influence of carbon emission disclosure on firm value. One possible explanation is

that the quality and depth of carbon emission disclosure may still be limited among the sampled companies, reducing its relevance to investors.

Overall, these findings highlight that corporate sustainability practices may influence firm value more effectively when supported by strong governance mechanisms and integrated environmental strategies. Companies that combine environmental responsibility with transparent governance structures are more likely to gain investor confidence and achieve sustainable long-term value.

6. CONCLUSION

This study examines the effect of green accounting and carbon emission disclosure on firm value, with Good Corporate Governance (GCG) serving as a moderating variable in mining companies listed on the Indonesia Stock Exchange during the 2020–2023 period.

The results show that green accounting and carbon emission disclosure do not individually have a significant effect on firm value. These findings suggest that investors in emerging markets may still prioritize short-term financial performance over environmental information. However, the simultaneous implementation of green accounting and carbon emission disclosure significantly affects firm value, indicating that integrated sustainability practices may strengthen investor confidence.

Furthermore, Good Corporate Governance significantly moderates the relationship between green accounting and firm value, indicating that sustainability practices become more effective when supported by strong governance mechanisms. However, Good Corporate Governance does not moderate the relationship between carbon emission disclosure and firm value. Overall, this study highlights the importance of integrating sustainability practices with effective corporate governance to enhance corporate credibility and long-term firm value.

Research Implications

The findings of this study provide several important implications for companies, investors, and policymakers.

For companies, the results highlight the importance of strengthening the implementation of green accounting and improving the quality of carbon emission disclosure as part of corporate sustainability strategies. Companies that integrate environmental responsibility with strong governance mechanisms are more likely to enhance investor trust and firm value.

For investors and stakeholders, this study suggests the importance of considering environmental performance and sustainability disclosures when evaluating corporate performance and long-term business sustainability.

From a policy perspective, regulators may consider developing clearer standards and guidelines regarding environmental disclosure and green accounting practices to improve transparency and comparability across companies.

Limitations and Future Research

This study has several limitations that should be considered when interpreting the findings. First, the study focuses only on mining companies listed on the Indonesia Stock Exchange, which may limit the generalizability of the results to other industrial sectors. Second, the measurement of carbon emission disclosure is based on publicly available information, which may vary in quality and completeness across companies.

Future research is encouraged to expand the sample to include companies from different sectors and longer observation periods. Additional variables such as financial performance, environmental innovation, ESG performance, or other sustainability indicators may also be incorporated to provide a more comprehensive understanding of the relationship between sustainability practices and firm value.

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