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When Environmental Transparency Meets Profitability: The Impact of Carbon Emission Disclosure and Green Investment on Firm Value in Mining Companies

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ABSTRACT: This study examines the valuation of publicly listed mining companies in a specific sub-sector on the Indonesia Stock Exchange during 2020–2024, a period marked by increasing global attention to climate change and ESG transparency. The mining sector faces growing scrutiny due to its carbon emissions and role in the transition toward a sustainable economy. This research analyses the impact of carbon emission disclosure and green investment on firm value, with profitability as a moderating variable. A quantitative descriptive-causal approach was employed using secondary panel data from financial and sustainability reports. Eight mining sub-sector companies were selected through purposive sampling, and the data were analysed using panel data regression and moderated regression analysis (MRA). The results show that green investment does not significantly affect firm value. In contrast, carbon emission disclosure has a negative effect on firm value, indicating that increased transparency may heighten investor concerns regarding environmental risks and compliance costs. However, profitability significantly moderates this relationship by reducing the negative impact of carbon emission disclosure and strengthening the effect of sustainability practices on firm value. These findings imply that transparent carbon emission reporting should be accompanied by strong profitability to enhance firm value. This study extends prior sustainability and firm value research by providing empirical evidence on the moderating role of profitability in Indonesia's mining sub-sector.

Keywords: Carbon Emission Disclosure, Green Investment, Company Value, Profitability, Return on Assets, Price to Book Value.

INTRODUCTION

Amid ongoing global economic changes, Organizations are increasingly focused not just on immediate earnings but also on enduring business viability. As investors now take non-financial

aspects into account when assessing a company's future, environmental, social, and governance (ESG) issues are gaining more attention (Tang, 2022). Company value indicates market confidence in both the current performance and future sustainability.

Figure 1. Global Carbon Emissions Disclosure Practices
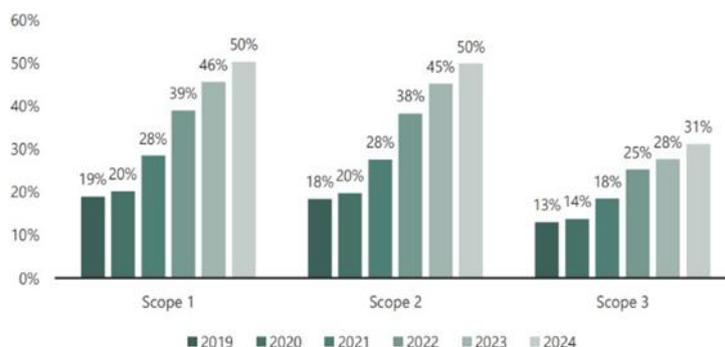
Source: ISS-Corporate (2024)

Based on Figure 1. carbon emission disclosures across Scope 1, Scope 2, and Scope 3 show a consistent upward trend from 2019 to 2024. Scope 1 disclosures reflect direct emissions generated from company-controlled sources, such as operational activities and equipment usage, indicating increased transparency regarding emissions arising from core business processes. Scope 2 disclosures relate to indirect emissions from purchased energy consumption, particularly electricity, which exhibit a more substantial increase due to the energy-intensive nature of mining operations. Meanwhile, Scope 3 disclosures represent other indirect emissions along the value chain, including transportation, suppliers, and downstream activities. Although Scope 3 disclosures have improved over time, they remain lower than those of Scope 1 and Scope 2, suggesting ongoing challenges in measuring and reporting value-chain emissions within the Indonesian mining sector. Overall, the figure illustrates a growing emphasis on emission transparency, while also highlighting structural limitations in comprehensive carbon disclosure practices.

Figure 2. Contribution of the Mining Sub-Sector to Indonesia's Carbon Emissions (2020)
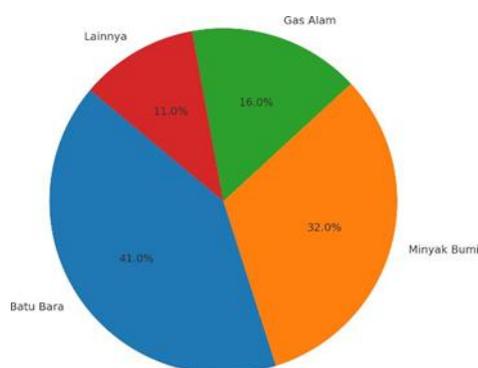

Source: Ministry of Energy and Mineral Resources (EMR) (2020)

Figure 2 indicates that Indonesia's mining subsector remains a substantial contributor to national carbon emissions, underscoring the sector's continued reliance on fossil fuels, particularly coal.

Although the transition toward renewable energy has been increasingly promoted, the structural dominance of fossil-based energy persists as a major obstacle to emission reduction. In response to mounting pressure from governments, the public, and investors, mining companies are increasingly required to enhance carbon emission disclosure (CED) and engage in green investment (GI) as part of their environmental responsibility. When implemented credibly, comprehensive disclosure and substantive green investments can strengthen investor confidence and positively influence firm value, as reflected in higher price-to-book value (PBV). Conversely, high compliance costs or disclosures perceived as symbolic may lead the market to anticipate reduced short-term profitability, resulting in a lower PBV. In this relationship, profitability serves as a moderating factor, as firms with higher return on assets (ROA) are better positioned to absorb associated costs and convey credible environmental commitment, thereby reinforcing the effect of CED and GI on PBV.

Figure 3. Sector Stock Price Movements in Indonesia in 2020
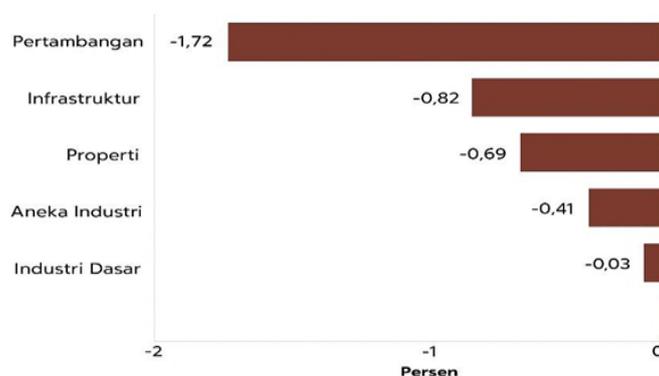
Source: Databoks.katadata.co.id

In Figure 3. the mining sector experienced the most severe decline in share price performance in 2020. This decline reflects high volatility, driven by the global crisis, including declines in mining commodity prices, the decline in international energy demand, and supply chain disruptions due to restrictions on industrial activity during the pandemic. This reflects the direct impact of the global crisis on market performance and investor perceptions of this subsector.

Figure 4. Graph Depicting Value Fluctuations of Mining Sub-Sector Companies
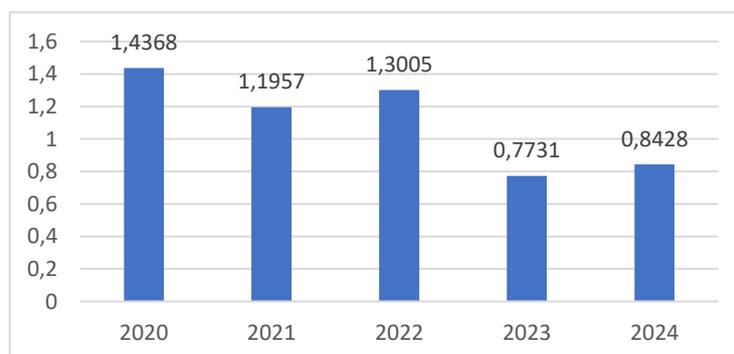
Source: www.idx.co.id data reprocessed 2025

Figure 4. illustrates the valuation dynamics of the mining subsector over the observation period. In the early phase, around 2020, the mining subsector exhibited relatively strong market valuation, supported by post-pandemic economic recovery and favorable global commodity market conditions. This situation reflects positive investor sentiment toward the short-term performance prospects of mining firms. During the subsequent period, particularly from 2021 to 2022, market valuation began to weaken. Although a temporary improvement was observed, the overall valuation trend declined, indicating increasing investor caution amid growing global economic uncertainty and softening commodity demand. In the later period, from 2023 to 2024, the mining subsector continued to trade at relatively low valuations. This condition suggests that market participants had not fully restored confidence in the sector, despite signs of domestic economic stability. Persistent volatility in global commodity prices, tight monetary policy, and the ongoing transition to green energy policies heightened perceptions of long-term risk in the mining industry. Overall, the movement of the Price-to-Book Value in the mining subsector indicates that market valuation is more strongly influenced by macroeconomic conditions and long-term policy shifts than by short-term firm-specific fundamentals. Consequently, the mining subsector remains vulnerable to external shocks, which continue in put pressure on its market valuation.

The inconsistency between the growing adoption of carbon-emission disclosure practices and the fluctuating firm value in the mining subsector raises questions about the relevance of sustainability information in market valuation. Therefore, this study aims to analyze the effect of carbon emission disclosure and green investment on firm value, with profitability as a moderating variable, in Indonesian mining companies, in order to provide empirical evidence on the extent to which environmental information serves as a signal for investors in investment decision-making.

This study expands on previous research such as (Lee & Cho, 2021) and Tyas (2025) which found the positive influence of Carbon Emission Disclosure (CED) on company value, and Putri & Paramita, 2025) which showed the positive influence of green investment, by providing evidence that in certain mining subsectors in Indonesia for the 2020–2024 period, CED and green investment are not always positively responded to by the market. In contrast to the research of Mubarok & Rosyadi (2024) and Agatha & Aryanti (2024) which only tested the direct influence of CED and green investment on company value, this study explicitly tested profitability (ROA) as a moderation variable using Moderated Regression Analysis (MRA). In addition, this study has a methodological novelty by using GRI 305 as a CED proxy and the PROPER rating as a proxy for green investment, thus providing a more contextual understanding of how sustainability practices and financial performance simultaneously affect the value of companies in the mining subsector of emerging markets(Putri & Bawono, 2023).

Legitimacy Theory

The legitimacy theory of interests holds that businesses must align their activities and disclosures to be in line with society's values and norms in order to secure long-term support and sustainability. Carbon emission disclosure (CED) is a method companies use to build legitimacy in the public's eyes, thereby improving the Company's image and gaining public trust (Adeoye, 2021; Suchman,

1995). Transparent disclosure reflects the Company's dedication to sustainability, which is essential to ensuring the Organisation's operations remain sustainable.

Stakeholder Theory

Stakeholder Theory holds that a corporation is responsible to both its investors and all other interested parties, including employees, customers, and the community. Green Investment (GI) and transparency in carbon emissions disclosure can assist companies in strengthening ties with stakeholders, improving their standing, and, subsequently, contributing to an increase in the Company's value(Barney & Harrison, 2020; Freeman, 1984; Safitri & Paramita, 2025).

Signal Theory

Signal theory holds that the information imbalance between company management and investors can result from a lack of clear, accurate information (Nurhadimah & Paramita, 2024). Signal theory posits that the Company can reduce information asymmetries by conveying favourable signals to outside parties through relevant disclosures, such as CED and GI. This disclosure signals to investors that the Company is committed to sustainability and social responsibility, which might enhance the market's perception of the business's opportunities and enhance the Company's overall value. (Spence, 1973). Positive signals received by investors can drive investment decisions that support the Company's rise in value.

Company Values

The value of a company describes an investor's view of its future performance and potential as reflected in its stock price or equity market value (Agustia et al., 2019; Anisah, 2020; Wahyudi, 2020). This assessment involves the Organization's financial performance, growth prospects, and reputation. Increasing the Organisation's value is the principal strategic goal because it affects the Organisation's sustainability and attractiveness in the eyes of investors (Anggraini & Siska, 2019).

In this study, company value is measured using the Price-to-Book Value (PBV) ratio. PBV is explicitly defined and calculated using the following formula (Fitria et al., 2023).

$$PBV = \frac{Market\ Price\ per\ Share}{Book\ Value\ per\ Share}$$

Market Price per Share refers to the company's closing stock price at the end of the fiscal year, while Book Value per Share is calculated by dividing total shareholders' equity by the number of outstanding shares. A higher PBV indicates that the market values the firm above its book value, reflecting positive investor expectations regarding future performance and growth potential.

Carbon Emission Disclosure

Carbon Emission Disclosure (CED) is the disclosure of information by a company regarding carbon and greenhouse gas emissions, which includes emission levels, emission sources, emission intensity, emission reduction efforts, and other emissions relevant to environmental impacts. (Pratiwi et al., 2021; Simamora et al., 2022; Yuliandhari et al., 2023). This information is presented in annual reports, sustainability reports, or integrated company reports to promote transparency and environmental accountability.

This disclosure refers to the Global Reporting Initiative (GRI) 305 indicator, which includes seven categories of disclosure, namely: Greenhouse Gas (GHG) emissions from direct origin, emissions from energy sources, indirect Greenhouse Gas emissions, Greenhouse Gas emission intensity levels, GHG emission reductions, emissions from industrial processes (ODS), and nitrogen dioxide (NOx), sulfur dioxide (SOx) emissions, and others (Global Reporting Initiative, 2021). Carbon Emission Disclosure can be calculated as follows:

$$CED = \frac{\Sigma di}{M}$$

Description:

Σdi: The number of disclosure items that are scored 1 if disclosed and 0 if not disclosed.

M: Maximum number of items stated

Transparent disclosures serve as a positive indicator for investors, increasing market confidence in the Organization's prospects. Legitimacy Theory Suchman (1995) Suggests that environmentally responsible companies gain greater public support, which triggers a surge in demand for their stocks and market value. This is reflected in the increase in the Price – to - Book Value (PBV) ratio, which serves as an indication of the Company's value. A study conducted by Lee & Cho (2021), Zulkifli (2025), Damas et al. (2021), and Maharani et al. (2024) indicate that organisations with high CED tend to achieve greater corporate importance because they are seen as responsible and sustainable entities. Therefore, the hypothesis proposed is:

H1: Carbon emission disclosure positively influences the company's value.

Green Investments

Green Investment refers to a company's allocation of resources to environmentally friendly initiatives or technologies, aimed at supporting sustainability, reducing emissions, and improving energy efficiency. (Chictimiea et al., 2021; Hasanah & Paramita, 2025; Tyas, 2025) Green investments are essential for companies aiming to align with environmental sustainability goals and improve long- term competitiveness. PROPER is used to measure GI by evaluating a company's Assessment of total environmental performance, including water use, emissions, waste management, and the execution of sustainability programs. This program aims to encourage Indonesian companies to be more concerned about environmental management and comply with applicable regulations. Environmental performance assessments are carried out based on

PROPER ratings with numerical scores, namely Gold ratings with a score of 5, Green scores 4, Blue scores 3, Red scores 2, and Black scores 1 (MoEF, 2019). The PROPER rating is basically ordinal data that shows the order of performance of a company's environment. However, in this study, the ratings were coded into scores of 1–5 and treated as an interval variable in regression analysis, assuming that each rating increase reflected a relatively comparable improvement in environmental performance.

Sustainable green investing enhances a company's reputation and strengthens its social legitimacy, which in turn strengthens public and investor trust. Based on Signal Theory, GI indicates that companies are aware of environmental risks and engage in sustainable planning, thereby enhancing positive investor perception and attracting investment. The higher PROPER's performance, the greater the trust. This results in increased organisational value. Aimed at an increase in the Price-to-Book Value (PBV) ratio. Research by Paramita & Ali, (2023) and Putri & Paramita (2025) shows that.

GI has a positive effect on firm value, with businesses that have strong environmental performance and consistent green investments having a higher market value.

H2: Green investment positively influences the company's value.

Profitability

Profitability is calculated using the Return on Assets (ROA) ratio, which indicates how effectively a business generates profits from its assets and capital (Aulia & Mahpudin, 2020). Profitability reflects management effectiveness and operational efficiency in resource management to generate optimal profits. When an organisation has strong Profitability, it shows that it can add value to its shareholders and is more attractive to investors and creditors. In this study, Profitability was assessed using the following ROA formula:

$$ROA = \frac{Net\ Income}{Total\ Assets} \ x\ 100\%$$

In this study, the net profit used is net profit after tax, while total assets are total assets at the end of the year. All data was obtained from the company's annual report published during the research period. No additional data transformation was carried out on the ROA variable, so the ROA value was used in the form of a ratio as reported.

Return on Assets (RO A) measures how effectively a corporation generates profit from its assets. Companies with strong Profitability have greater resources to support environmental management and transparent disclosure of carbon emissions (Maharani et al., 2024). Strong financial performance strengthens investor confidence and enhances the Corporate's identity, as reflected in increases in share price and the Price-to-Book-Value (PBV) ratio. (Supriadi et al., 2022). Stakeholder Theory, Freeman (1984) Explains that high Profitability allows companies to meet social and environmental responsibilities, strengthen social legitimacy, and increase corporate image. This study finds that profitability strengthens the favourable correlation between carbon emission disclosure and corporate value(Zulkifli, 2025).

H3: Profitability moderates the relationship between Carbon Emission Disclosure and the Company value

Profitability, an organisation's capacity to generate income from its assets, is measured by Return on Assets (ROA). High Profitability gives companies greater capacity to invest in green initiatives, such as energy efficiency and waste management, thereby strengthening the Organization's image as a sustainable entity. Based on Stakeholder Theory, companies with high Profitability can fulfil their responsibilities to stakeholders and invest in sustainability. This increases social legitimacy, strengthens market confidence, and ultimately raises Freeman (1984) Prices for book value (PBV). These outcomes align with the conclusions of Paramita & Ali (2023) and Adellia, (2020), which shows that Profitability strengthens the positive connection between corporate value and green investment.

H4: Profitability moderates the relationship between green investment and company value.

METHOD

Research Type

This study adopts a quantitative research approach using panel data analysis to examine the relationship between carbon emission disclosure, green investment, and firm value, with profitability as a moderating variable. Panel data were employed to capture both cross-sectional variations across firms and time-series dynamics over the observation period.

Population and Sample

The population of this study comprises mining sub-sector companies listed on the Indonesia Stock Exchange (IDX) during the period 2020–2024, totaling 63 firms. The sample was selected using a non-probability sampling technique, specifically purposive sampling, due to the fact that not all firms met the research criteria.

The sample selection criteria were as follows:

1. Mining sub-sector companies consistently listed on the IDX from 2020 to 2024.
2. Companies that published annual financial reports consistently during the observation period.
3. Companies that consistently disclosed sustainability reports from 2020 to 2024.
4. Companies reporting carbon emission disclosures based on GRI 305 standards.
5. Companies that participated in and disclosed PROPER ratings

Research Location

This study was conducted in Cimahi City, Indonesia, and investigates the effect of carbon emission disclosure and green investment on firm value, with profitability as a moderating variable. The research focuses on mining subsector companies listed on the Indonesia Stock Exchange during the 2020–2024 period, using secondary data obtained from the official IDX website and other credible documentation sources.

Instrumentation or Tools

This study utilizes secondary data obtained from companies' annual reports, sustainability reports, and PROPER disclosures. Carbon emission disclosure is measured using the GRI 305 index, while firm value is proxied by Price-to-Book Value (PBV).

PBV is selected as the firm value proxy because it reflects market perceptions relative to the company's book value and is considered more appropriate for capital-intensive industries such as mining, where asset values play a dominant role. Compared to Tobin's Q, PBV is also more stable and widely used in studies involving emerging markets.

Financial performance indicators and control variables were extracted from audited financial statements.

Data Collection Procedures

Data were collected through a documentation method, involving systematic retrieval of publicly available reports from:

1. The official IDX website (www.idx.co.id);
2. Companies' official websites;
3. Published sustainability and annual reports.

All data were compiled and organized using Microsoft Excel prior to statistical analysis.

Data Analysis

The study employs panel data regression analysis using EViews 12. Model selection was conducted using the Chow test, Hausman test, and Lagrange Multiplier test, with the Random Effects Model (REM) identified as the most appropriate estimation method.

Green investment is proxied by the PROPER rating, which is originally measured on an ordinal scale. To ensure compatibility with regression analysis, the PROPER ratings were transformed

into interval data using the Method of Successive Interval (MSI). Thus, green investment is treated as a continuous variable in the empirical model.

The analytical procedures included descriptive statistics, panel regression estimation, hypothesis testing, coefficient of determination analysis, and Moderated Regression Analysis (MRA) to examine the moderating role of profitability (ROA).

Ethical Approval

This study exclusively uses publicly available secondary data and does not involve human participants or personal data. Therefore, ethical approval was not required. Nevertheless, data integrity and proper citation practices were strictly maintained throughout the research process.

RESULT AND DISCUSSION

Descriptive Statistical Analysis

This research analyses the impact of carbon emission disclosure and environmental performance on firm value, while profitability is used as a moderating variable. Prior to performing the main analysis, descriptive statistics were applied to provide an initial overview of the data, as presented in the following table.

Table 1. Descriptive Statistical Analysis Results.

	X1	X2	Z	Y
Mean	0.803571	0.975579	0.111923	1.109812
Median	1.000000	0.186579	0.090150	0.975000
Maximum	1.000000	2.004800	0.454000	2.630000
Min	0.142857	0.186579	-0.098400	0.352173
Std. Dev	0.256139	0.896864	0.111813	0.616405
N	40	40	40	40

Source: Data processing results using E-views 13,2025

Based on the descriptive statistics, the average score for X1 (Carbon Emission Disclosure) was 0.803571, with a standard deviation of 0.256139. This shows that the companies had moderate and fairly similar levels of disclosure. For X2, which is Green Investment, the average was 0.975579, but the standard deviation was much higher at 0.896864, indicating substantial variation in how much companies invested in green initiatives. The Z variable, which measures Profitability, had an average of 0.111923 and a standard deviation of 0.111813, indicating only a slight change in profitability across the sample. The Y variable, Company Value, had an average of 1.109812 and a standard deviation of 0.616405. This suggests that most companies had market values higher

than their book values, though there was some moderate variation. All results in this study are based on data from 8 companies observed over a five-year period, resulting in 40 firm-year observations. Accordingly, the unit of analysis is firm-year observations, and the sample structure is explicitly defined as a balanced panel consisting of 8 firms and 5 years of observation.

Model Selection

The result of the model selection is shown as follows:

Table 2. Chow Test Results

Effect Test	Statistic	d.f.	Prob.
Cross-section F	5.852985	(7,29)	0.0003
Cross-section Chi-square	35.231340	7	0.0000

Source: Data processing results using E-views 13,2025

According to Table 3, the p-value is 0.0003, which is less than 0.05; therefore, the alternative hypothesis (Ha) is accepted, and the suitable model is the Fixed Effect Model (FEM).

Table 3. Hausman Test Results

Test Summary	Chi-sq Statistic	Chi-sq. d.f	Prob.
Cross-section random	2.704894	3	0.4394

Source: Data processing results using E-views 13,2025

The probability value in this table is 0.4394, which is greater than 0.05; therefore, the null hypothesis (H0) is not rejected, and the appropriate model is the Random Effect Model (REM).
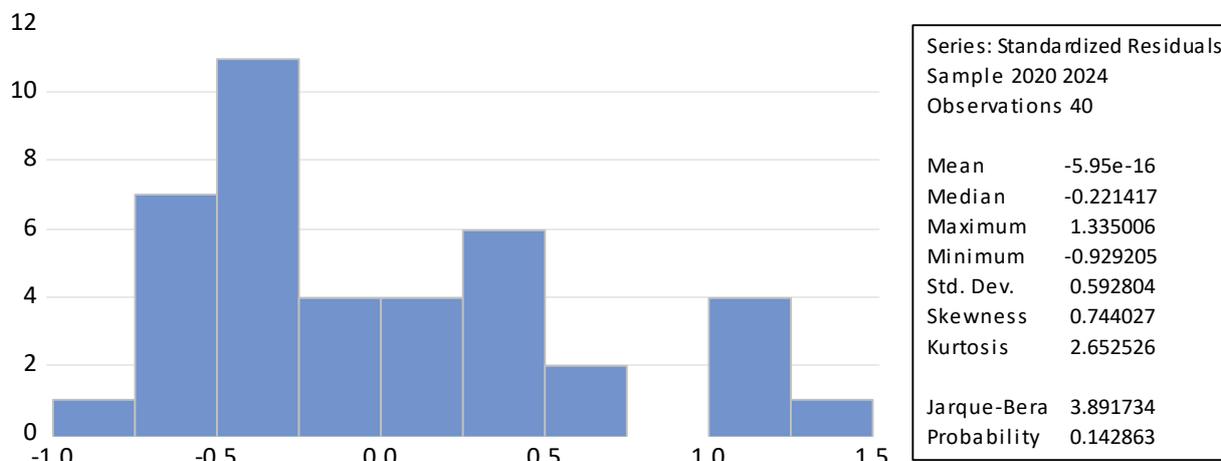
Table 4. Lagrange Multiplier Test Results

	Test Hypothesis Cross-section	Time	Both
Breusch-pagan	13.66901 (0.0002)	0.866662 (0.3519)	14.53568 (0.0001)

Source: Data processing results using E-views 13,2025

The Breusch-Pagan value of 0.0002 < 0.05. Therefore, the Random Effects Model (REM) was selected for the Lagrange Multiplier test and subsequent analysis, resulting in acceptance of the alternative hypothesis (Ha).

Classical Assumptions

Table 5. Normality Test Results

Series: Standardized Residuals
Sample 2020 2024
Observations 40

Mean	-5.95e-16
Median	-0.221417
Maximum	1.335006
Minimum	-0.929205
Std. Dev.	0.592804
Skewness	0.744027
Kurtosis	2.652526
Jarque-Bera	3.891734
Probability	0.142863

Source: Data processing results using E-views 13,2025

Based on the p-value of 0.142863 > 0.05, the residuals follow a normal distribution, so the assumption of normality is met.

Table 6. Multicollinearity Test Result

	X1	X2
X1	1.000000	-0.000611
X2	-0.000611	1.000000

Source: Data processing results using E-views 13,2025

The data presented indicate that the relationship between X1 and X2 is -0.000611 < 0.9. Therefore, the independent variables are free of multicollinearity and pass the test for multicollinearity.

Table 7. Heteroscedasticity Test Results

Variable	Coefficient	Std. Error	t-Statictic	Prob.
C	0.845992	0.190948	4.430480	0.0001
X1_CED	-0.381880	0.213558	-1.788179	0.0819
X2_GI	-0.073198	0.061427	-1.191626	0.2410

Source: Data processing results using E-views 13,2025

The data above show that the prob values for X1_CED and X2_GI are 0.0819 and 0.2410, respectively. Respectively, it can be concluded that the variable does not exhibit heteroscedasticity, as all p-values are greater than 0.05.

Panel Data Regression

Panel data regression analysis was conducted to examine the relationship between the independent variables and firm value by utilizing both cross-sectional and time-series data.

Table 8. Panel Data Regression Analysis Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.725543	0.320587	5.382456	0.0000
X1_CED	-0.771331	0.311851	-2.472295	0.0181
X2_GI	0.004190	0.091666	0.045710	0.9638

Source: Data processing results using E-views 13,2025

The regression equation for the panel data is:

FV = 1.725543 – 0.771331CED + 0.004190GI + e

The regression coefficient showed that a 1% increase in CED (X1) was estimated to decrease the PBV by -0.771331 or -77.13%, while a 1% increase in the GI (X2) was estimated to increase the PBV by 0.004190 or 0.42%, if the other variables did not change.

Moderated Regression Analysis (MRA)

Moderated Regression Analysis (MRA) is employed to examine whether the moderating variable influences the relationship between the independent variables and the dependent variable.

Table 9. Moderation Regression Analysis Test Result

Variable	Coefficient	Prob.
C	2.013494	0.0000
X1*Z_CED*Profitability	4.579115	0.0471
X2*Z_GI*Profitability	0.389492	0.6306

Source: Data processing results using E-views 13,2025

Table 10 presents the following results:

1. The study found that profitability strengthens the effect of carbon emission disclosure on corporate value in mining sector companies listed on the Indonesia Stock Exchange during 2020–2024. The probability value is 0.0471 (< 0.05), therefore the null hypothesis is rejected and the alternative hypothesis is accepted.
2. Profitability does not moderate the relationship between green investment and corporate value in the same sector. The probability value is 0.6306 (> 0.05), thus the null hypothesis is accepted and the alternative hypothesis is rejected.

Hypothesis Test

T-test (Partial)

The partial hypothesis test is conducted to examine the individual effect of each independent variable on the dependent variable.

Table 10. T-test results (partial)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.725543	0.320587	5.382456	0.0000
X1_CED	-0.771331	0.311851	-2.473395	0.0181
X2_GI	0.004190	0.091666	0.045710	0.9638

Source: Data processing results using E-views 13,2025

According to the table above, there are the following:

1. Impact of Carbon Emission Disclosure on Corporate Value

The p-value of 0.0181 (< 0.05) indicates that the null hypothesis (H0) is rejected and the alternative hypothesis (H1) is accepted. This result confirms that carbon emission disclosure has a statistically significant negative effect on the corporate value of mining sub-sector companies listed on the Indonesia Stock Exchange during the 2020–2024 period.

2. Impact of Green Investment on Corporate Value

The probability value of 0.9638 > 0.05 indicates that H0 is accepted and Ha (H2) is rejected. This demonstrates that green investment does not affect the value of mining businesses listed on the Indonesia Stock Exchange.

F Test (Simultaneous)

The simultaneous hypothesis test is performed to assess whether all independent variables jointly have a significant effect on the dependent variable.

Table 11. F Test Result

F-statistic	3.144126
Prob(F-statistic)	0.054813

Source: Data processing results using E-views 13,2025

The value of mining companies listed on the Indonesia Stock Exchange during the 2020–2024 period is not simultaneously influenced by carbon emission disclosure and green investment. This is indicated by the F-test probability value of 0.054813, which exceeds the 5% significance level. Therefore, the null hypothesis is accepted, and the alternative hypothesis is rejected.

Determination Coefficient Test

The coefficient of determination test is used to measure the extent to which the independent variables explain the variation in the dependent variable.

Table 12. Determination Coefficient Test Results

R-squared	0.144715
Adjusted R-squared	0.073441

Source: Data processing results using E-views 13,2025

The adjusted R-squared value of 0.144715 indicates that carbon emission disclosure and green investment explain 14.48% of firm value, and the discussion has been revised to ensure consistency with this result.

The Influence of Carbon Emission Disclosure (CED) on Company Value

According to the study, carbon emission disclosure (CED) has a negative effect on firm value, as measured by price-to-book value (PBV). Contradicting the positive correlation reported in previous research. Increased transparency in carbon emissions disclosures may raise investor concerns about a company's environmental performance, potentially reducing its market value. According to signal theory, disclosing carbon emissions may not always signal environmental responsibility; instead, it can signal potential regulatory costs or reputational risks, thereby diminishing investor confidence.

These findings diverge from the research of Lee & Cho (2021), Zulkifli (2025) and Damas et al., (2021) Who reported that carbon emissions disclosure generally increases corporate value by demonstrating corporate responsibility and sustainability. In contrast, the present results align with studies by Al Banjari, (2023) and Sholekhah et al., (2025) It is found that Carbon emissions disclosure can harm a company's value due to concerns about regulatory burdens and negative perceptions of environmental performance.

Impact of Green Investment (GI) on Company Value

The partial test shows that green investment does not have a significant impact on company value (PBV). It relates to the second hypothesis, which states that corporate value is positively affected by green investment; the hypothesis is rejected. These findings contradict legitimacy theory, which argues that aligning organisational operations with societal values and norms should lead to social recognition and, ultimately, higher firm value.

Although green investments are expected to enhance legitimacy in the eyes of the public and investors, this study indicates that they have not yet been priced by the market.

From a practical perspective, this may occur because the benefits of green investment tend to be long-term and lagged, while investors—especially in the mining sector—often prioritise short-term financial performance.

In addition, green investment may raise concerns about higher initial costs and reduced short-term profitability, causing investors to perceive it as a financial burden rather than a value-creating strategy.

Another possible explanation is credibility-related, in which investors may doubt whether green investment initiatives are substantive or merely symbolic (greenwashing).

Moreover, using PROPER ratings as a proxy for green investment may limit the market's ability in fully capture the economic value of environmental investments, potentially weakening the market's response.

These findings are consistent with prior studies reporting that green investment does not significantly affect firm value (Azhari & Hasibuan, 2023; Nur Aeni & Murwaningsari, 2023; Rusmanto, 2022).

Profitability Can Moderate Carbon Emission Disclosure on Company Value

The results of the moderation test indicate that profitability moderates the effect of Carbon Emission Disclosure (CED) on company value. Return on Assets (ROA) allows firms with strong financial performance to enhance transparency in carbon emission disclosures, which in turn increases investor confidence and firm value.

Stakeholder theory supports these findings, suggesting that highly profitable firms are better positioned to fulfil social and environmental responsibilities, thereby strengthening corporate legitimacy and market valuation.

From an economic perspective, the moderating role of profitability implies that firms with higher ROA have greater capacity to absorb the costs of environmental compliance and sustainability reporting.

As a result, carbon emission disclosures by profitable firms are perceived as more credible and substantive than symbolic, thereby reducing investor concerns about compliance costs and environmental risks.

This financial strength enables investors to view environmental disclosure as a long-term value-creating strategy rather than a threat to short-term profitability.

These findings are consistent with prior studies showing that profitability strengthens the relationship between carbon emission disclosure and firm value.

Profitability Can Moderate Green Investment on Company Value

The study finds that, according to the moderation test, profitability has little bearing on how green investments affect the corporation's value. However, Profitability is expected to link Green Investment to company value. These results imply that profitability is not a significant moderating influence. This does not align with the concept of legitimacy, which suggests that companies with high profitability should enhance the impact of green investments on company value. With good Profitability, companies can commit more to sustainable investments, which in turn increases the Company's social legitimacy and market value. However, the findings of this study show that, despite high profits, Green Investing does not have a significant impact on the Corporate's value. This finding contrasts with research indicating that profitability is positively associated with green investment and company value.

CONCLUSION

This study examines the effect of carbon emission disclosure and green investment on firm value, with profitability as a moderating variable, in mining sub-sector companies listed on the Indonesia Stock Exchange during the 2020–2024 period. The results indicate that carbon emission disclosure has a negative, significant effect on firm value, suggesting that increased transparency may heighten investor concerns about environmental risks and compliance costs. In contrast, green investment does not have a significant effect on firm value, indicating that sustainability investments in the mining sector are not yet fully reflected in market valuation.

Furthermore, profitability significantly moderates the relationship between carbon emission disclosure and firm value, implying that firms with strong financial performance are better able to absorb environmental-related costs and enhance the credibility of their sustainability disclosures. However, profitability does not moderate the relationship between green investment and firm value. These findings demonstrate that transparent environmental disclosure alone is insufficient to increase firm value unless it is supported by strong profitability.

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