

Strengthening Emission Carbon Disclosure in Increasing Firm Value

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ABSTRACT

This study employs quantitative methodology with a causal comparative design to investigate how green accounting, financial performance, and environmental performance influence firm value, while also examining carbon emission disclosure as a moderating variable in these relationships. The research population comprises mining companies listed on the Indonesia Stock Exchange during 2019-2023, with 16 companies selected through purposive sampling, yielding 80 total observations. Data collection relies on secondary sources, specifically sustainability and annual reports from these mining companies. The analytical approach combines multiple linear regression with Moderated Regression Analysis (MRA) or interaction testing to examine the proposed relationships.

The results show that firm value is unaffected by financial performance or green accounting. Firm value is impacted by environmental performance. Carbon emission disclosure has not been shown to mitigate the impact of firm value on financial performance. It has been demonstrated that the impact of environmental performance and green accounting on firm value is mitigated by carbon emission disclosure. The study's implications can broaden our understanding of environmental reporting and carbon emission disclosure in relation to a company's environmental sustainability, and stock market conclusions are based on companies that receive positive signals from investors. The study's findings may encourage business to reveal carbon emissions and stress the benefit of environmental preservation in order to boost their perceived worth to stakeholders and investors.

Keywords: Green Accounting, Financial Performance, Environmental Performance, Firm Value, Carbon Emission Disclosure

INTRODUCTION

Environmental sustainability is now increasingly central to companies, due to global warming occurring in the community environmental. Global warming in recent years has become an emergency problem and needs to be addressed immediately (27). Global warming that has occurred recently is largely caused by the business activities of companies that are oriented towards profit through the exploitation of natural resources without considering or even ignoring the environmental impacts caused (84). The increasing global economic growth, carbon dioxide emissions from fossil fuels and industry that contribute around 90% of the total emissions produced by human activities have remained stable in the last three years, so that awareness of the environmental impacts caused by business activities carried out by industry players is often less noticed or even ignored (39).

Industry players try to improve their performance, due to increasingly tight industry competition in order to maintain survival and achieve company goals, namely obtaining maximum profit to encourage increasing firm value (56). Firm value is considered very important to increase shareholder wealth (29). The firm value can make the market have confidence, but not in the company's performance, but in the company's expectations that will later share a positive signal (43). This statement is in line with the signaling theory which shares indications that investors share positive signals that share indications of their interest in implementing

increasing investments which can ultimately contribute to the impact of increasing the firm value (48). The increase in the firm value can be used as a benefit as a requirement to guarantee the continuity of the company's operations and the fulfillment of the company's responsibilities to stakeholders (79).

Companies are expected to not only focus on the welfare of owners and management, but also pay attention to the interests of customers, workers, the public, and the environmental (20). The environmental is becoming an increasingly important factor in order to make important decisions as seen from the increasing business commitment to the concept of social responsibility (24). Business commitment to social responsibility can be supported by the implementation of green accounting (71). Green accounting in its application can improve the company's ability to reduce environmental problems caused by its operational activities (19). Green accounting is considered positive by investors, because the company is considered capable of managing financial potential well which can ultimately provide benefits for investors to increase the firm value (23). Companies that implement good green accounting are seen by investors as not guaranteeing to provide benefits for investors, not guaranteeing to benefit them more, making it not effect the firm value (46). The firm value can be influenced by green accounting, but there are other aspects that can effect the firm value, starting from environmental performance and financial performance.

The operational picture of a company's ongoing business operations and the accomplishments made by the company through these activities are reflected in its financial performance, and the company's business activities outcomes are explained by the profits they generate (14). Because of the revenues they make, business can perform better (2). Since financial performance serves as a gauge of how well a business manages its operations to turn a profit, it is strongly linked to the operations of the firm (69). A firm value is increased when it has strong financial performance, and it will fall when its performance deteriorates (35). A company with strong financial results may attract investors who will then help increase the firm value. While financial performance can influence a firm value, environmental performance can also have an impact.

Environmental performance is related to the method for companies that are willing to include their attention to the environment for their operations, and their interactions with stakeholders beyond what is acceptable by corporate law (14). Environmental performance includes the form of company attention to create a healthy and sustainable environmental (60). Disclosure of environmental performance can reduce the value of the party holding shares and effect the firm value (16). Companies have the ability to improve environmental performance which can increase the firm value (45). Companies in the current of globalization are trying to improve their performance, but pay less attention to environmental problems that occur around them, so that they have an impact on society (76). Stakeholder theory explains that companies in carrying out their operations do not have to focus on the interests of the company, but on the interests of all stakeholders (28). Good environmental performance can encourage an increase in the firm value which is strengthened by the carbon emission disclosure.

An organization's impact on environmental and climate change, especially global warming, is revealed through its carbon emission disclosure. The community environmental is an integral part of business entities existence, and as such the corporate location must align with societal norms and values (5). Companies in Indonesia still have little understanding of carbon emission disclosure, because until now there has been no valid law and regulatory standards governing this matter (78). The implementation of carbon emission disclosure and the implementation of sustainable business in general has not been running optimally, and does not have a specific reporting standard, so it is still rarely done and is voluntary by companies (65). Carbon emission disclosure has a favorable and significant effect on firm value, according to study (93) and (33).

The results contradict the study from (55) that demonstrates how carbon emission disclosure lowers a firm value. The results diverge from study (9), This suggests that firm value is unaffected by the carbon emission disclosure. Based on past research, academics are reexamining the effects of financial success, environmental performance, and green accounting on firm value by incorporating carbon emission disclosure as a moderating variable. Carbon emission disclosure was chosen as a moderating variable on firm value as a new element in this study because previous research did not explicitly assess its influence as a moderating variable. Because mining has a significant impact on the environmental, particularly with regard to the carbon emission

disclosure, the study was carried out in a mining firm. Because of their environmental duties, mining corporations are frequently in the public eye.

LITERATURE REVIEW

1) *Signaling Theory*: This theory was introduced by Spence (1973) explaining that information is very important to be conveyed to the company regarding investment decisions from external parties (43). This theory was reintroduced by Stephen A. Ross in 1977. This theory is a development of the Modigliani-Miller theory which states that financial structures that have no relevance from the implicit context assume the market has complete information about the company's activities. This signaling theory will produce conclusions that can be used as a basis for making decisions by investors in the stock market (13). Signaling theory is needed to minimize data differences by providing signals to parties outside the company, in this context investors (32). This signaling theory is in the form of details that describe management efforts in carrying out the wishes of the company's owners, so that they can convey environmental information (48).

2) *Stakeholder Theory*: This theory was first introduced in Freeman's work entitled "Strategic Management: A Stakeholder Approach" in 1984. This stakeholder theory states that the welfare and success of a company are related to its ability to align all stakeholder interests (61). This theory also states that stakeholders have an influence on the survival of the company which is not only responsible for economic factors, but also for environmental factors and social factors (12). Stakeholder theory states that companies have a social responsibility that requires them to pay attention to the interests of all parties effected by the company's operations (63).

Stakeholders must pay attention to the dynamics of power and primary interests that influence the company's strategy or goals. Stakeholders who have power can provide support or sanctions through the formal and informal relationships they build (27). Stakeholders in their roles become crucial when companies innovate green to minimize negative impacts on nature. Environmental performance through disclosure of environmental information to stakeholders is a step towards the era of sustainability (68).

3) *Green Accounting*: Green accounting is one part of environmental accounting that integrates environmental costs into the decision making process whose application is caused by the environment around the company (1). Green accounting is also defined as a process of identifying, prioritizing, assessing or measuring, and integrating environmental costs for business decisions. This approach utilizes data related to environmental costs and performance to support business decision making (19). The application of green accounting in the long term is actually an effort to save production costs which can then reduce the company's operating costs (18).

4) *Financial Performance*: Financial performance refers to the method used to calculate how successful an entity is in obtaining profits (67). Financial performance is closely related to company operations where financial performance is the main indicator in assessing whether a company has succeeded in achieving profits in its operations (69). Financial performance is needed in analyzing financial statements as an evaluation of the company (57). Financial performance can use financial ratio analysis to assess the company's financial performance, especially in financial aspects (40).

5) *Environmental Performance*: Environmental performance is an achievement of business operations related to efforts to preserve the environment through the use of environmentally friendly materials in its operations (14). Environmental performance needs to be considered to remain good, because it reflects the company's concern for the surrounding environment where it operates (26). Companies report their environmental performance is one way to convey the amount of costs incurred in order to deal with environmental problems (53). Environmental performance is also a clue that the company has implemented environmental accounting (22).

6) *Firm Value*: Firm value describes the condition of the company based on the achievement of its performance and reflects the public's view on the company based on various aspects (91). Firm value can be used as a reference for parties who want to invest to measure how successful a business is and its effectiveness

regarding the governance of the resources they have (44). Firm value is the result of public trust in the company's performance that reflects the company's achievements.

7) *Carbon Emission Disclosure*: Carbon emission disclosure is the reporting of the history and prospects of the carbon performance of a business entity that also includes data on the intended climate, reported to stakeholders (59). This aspect is part of the routine information provided to the company's internal and external stakeholders (83). Carbon disclosure is defined as the delivery of information, both quantitative and qualitative, relating to the level of carbon emissions that have occurred or are expected in the future by the company. Companies can build a positive image in the eyes of stakeholders (6).

Hypothesis Development

1) *The Influence of Green Accounting on Firm Value*: Green accounting is a simple effort that can be implemented by companies in dealing with the impact of environmental pollution. Green accounting aims to maintain environmental sustainability by linking it to the cost factors incurred by the company (18). Green accounting implementation has proven effective in capturing investor interest, thereby enhancing firm value (51). According to stakeholder theory, all corporate activities should deliver benefits to stakeholders, who possess legitimate rights to access information regarding company operations (70). Companies adopt green accounting practices to demonstrate that their activities provide meaningful benefits and to supply relevant information to stakeholders, ultimately contributing to increased company valuation.

Firm value is positively impacted by green accounting, according to studies (3), (74), and (24). The study from (71), which demonstrates that green accounting has not yet impacted firm value, is unrelated to the findings. When used properly, green accounting can boost a firm value by meeting stakeholder expectations on environmental impact transparency and improving the company's reputation. These results allow for the formulation of the following hypothesis regarding the impact of green accounting on firm value:

H1: Green accounting has a positive effect on firm value

2) *The Influence of Financial Performance on Firm Value*: Financial performance describes the performance of a company which is usually measured through various ratios. Financial performance is the main consideration in making business decisions, such as in terms of company investments that generate profits so that investors continue to disburse their investments which can increase the stock price and firm value (25). Financial performance that experiences continuous improvement will have a positive impact on stakeholders which can later effect the firm value (53). Stakeholder theory posits that organizations should consider the needs and interests of all parties effected by their operations, rather than solely focusing on their own objectives. According to this theory, companies should aim to create value not just for them selves, but also generate beneficial outcomes for their entire network of stakeholders (66).

Financial performance is intrinsically linked to operational effectiveness, serving as a key indicator of whether a company succeeds or fails in generating profits that can influence its overall value (46). Research conducted by (87), (50), and (41) provides evidence that financial performance positively and significantly impacts firm value. However, these findings stand in contrast to the study performed by (38), which determined that financial performance has not demonstrated a meaningful effect on company valuation metrics. Financial performance is the main consideration in business in carrying out its operations which can later effect the firm value. Based on these findings, the hypothesis related to the effect of financial performance on the firm value can be formulated, namely:

H2: Financial performance has a positive effect on firm value

3) *The Impact of Environmental Performance on Firm Value*: Environmental performance reflects a company's environmental stewardship efforts, addressing concerns that have captured global stakeholder attention (45). It represents a critical factor in company valuation processes. Environmental performance functions as a measurement of corporate responsibility, demonstrating a company's success in maintaining environmental sustainability (16). Organizations that consistently achieve strong environmental results experience positive

effects on their stock prices, which subsequently enhances overall firm value (52). Signaling theory suggests that superior environmental performance creates favorable market signals, increasing investor willingness to provide capital to business that have secured high PROPER ratings (21).

Environmental performance has a favourable effect on firm value, as explained by the studies (34), (48), and (29). The study that was done (25), which found that environmental performance has a negative influence on firm value, does not yet relate to these studies. The research that has been done (73), which indicates that environmental performance does not have a direct and significant influence on firm value, differs from the conclusions of these investigations. Consistently implementing environmental performance can have an impact on a firm value. With reference to these results, the following hypothesis can be put forth:

H3: Environmental performance has a positive effect on firm value

4) *The Influence of Green Accounting on Firm Value with Carbon Emission Disclosure as a Moderating Variable*: Green accounting is the first step in finding solutions to these environmental problems (24). Green accounting has an important role in reducing waste, financial management, and saving costs related to the environmental, as well as supporting managers in decision making to increase firm value (49). Firm value reflects the general view of investors on company performance, which is ongoing now or in the long term and increasingly intense competition in today's industry often causes companies to appear to ignore the negative impacts of their activities on nature, such as the influence of carbon emission disclosure (70). Carbon emission disclosure must be given attention so that it reflects how the company is doing well which can later play a role in increasing firm value (54).

Carbon emission disclosure is a crucial aspect, because it can give a positive signal according to the signaling theory related to investors and the public will increase the firm value. Financial information disclosure serves as a signal that meets stakeholder requirements (12). Research by (64) and (16) demonstrates that carbon emission disclosure positively and significantly impacts firm value. However, these findings contradict the study by (31), which found that carbon emission disclosure negatively effects firm value. Additionally, research conducted by (30) concluded that carbon emission disclosure has no significant effect on firm value, suggesting inconsistent relationships between these variables across different research contexts.

The impact of green accounting on firm value can be strengthened through the existence of carbon emission disclosure. Companies implement green accounting, but they take into account the environmental impact in financial reports that can increase firm value, then the lack of disclosure or high carbon emission disclosure can reduce the positive effect of green accounting on firm value. Based on these findings, it can be stated that the hypothesis of the influence of green accounting on firm value through carbon emission disclosure as a moderating variable can be formulated, namely:

H4: Disclosure of carbon emissions strengthens the influence of green accounting on firm value

5) *The Influence of Financial Performance on Firm Value with Carbon Emission Disclosure as a Moderating Variable*: Financial performance is the main benchmark in business decision making, such as when considering investments. Financial performance reflects the company's performance which is usually measured through various financial ratios used to measure the efficiency and effectiveness of the company in running its operations (25). Financial performance is related to the results achieved by the company and is reflected in how good the firm value in question. The firm value seen through financial reports and annual reports can be utilized by parties who invest or use financial reports to evaluate whether the company's operations have effectively managed its assets, liabilities, and equity in order to gain large profits (77).

Stakeholder theory explains that companies do not only focus on fulfilling their own interests, but are expected to obtain positive benefits for all stakeholders (66). Companies with large profits cannot always provide better environmental disclosure (90). Carbon emission disclosure by companies has encouraged many studies from various perspectives. The study stated that there were differences in results regarding aspects influenced by companies related to carbon emission disclosure (27). The study that has been carried out (86) explains that financial performance effects carbon emission disclosure. The impact of financial performance on firm value

can be strengthened by carbon emission disclosure. Business that have good financial performance can encourage an increase in their value, because they show efficiency and profitability. Companies transparently disclose their carbon emissions and demonstrate a commitment to managing environmental impacts. Based on these findings, the hypothesis that can be proposed here regarding the impact of financial performance on firm value through the process of carbon emission disclosure as a moderating variable can be formulated, namely:

H5: Carbon emission disclosure strengthens the influence of financial performance on firm value

6) *The Influence of Environmental Performance on Firm Value with Carbon Emission Disclosure as a Moderating Variable*: Good environmental performance of a company gets a positive image from the perspective of investors and the general public. This good image becomes an asset for the company that can trigger an increase in the firm value (85). Good environmental performance can also trigger the attraction of investors in investing their funds, thus providing the company with a greater source of funds to run its operations (42). Stakeholder theory explains that good company achievements can influence stakeholder perceptions (66). Environmental performance is related to the evaluation of company performance that has an impact and form of social responsibility on the environmental both around the operational area and outside its business activities, the contributing to increasing firm value (48). This aspect can be increased through optimal environmental performance and strengthened by efforts to disclose the environmental. High carbon emission disclosure can be used to assess the company's performance regarding environmental maintenance, whether it is of good or bad quality (27).

Carbon emission disclosure is positively and significantly impacted by environmental performance, as demonstrated by the studies (27), (60), and (17). The study that was produced is pertinent to the one that was carried out (9), which illustrates how environmental performance has a detrimental impact on the carbon emission disclosure. This contrasts with research (75), which found that carbon emission disclosure is unaffected by environmental performance. Carbon emission disclosure can increase the impact of environmental performance on firm value. Because they exhibit sustainability and social responsibility, business that do well in terms of the environmental can eventually see an increase in their worth. Business that openly report their carbon emission disclosure and attempts to reduce them send a good signal to stakeholders and investors, which can raise the firm value. The impact of environmental performance on firm value using carbon emission disclosure as a moderating variable can be expressed as follows in light of the aforementioned findings:

H6: Carbon emission disclosure strengthens the influence of environmental performance on firm value.

RESEARCH METHOD

1) *Type of Research and Research Location*: This type of research is classified as quantitative. Quantitative research is a method that has deductive, scientific, and objective properties where the data collected is in the form of statements or numbers that can be analyzed. The data is then analyzed using statistical analysis methods (36). The location of the research was chosen as a mining company registered with the IDX for the 2019-2023 period by obtaining data from annual reports and sustainability reports. This research lasted approximately 3 months, namely from november 2024 to january 2025.

2) *Research Approach*: This research uses quantitative methods and a comparative causal approach. The comparative causal approach is a research approach that aims to measure the level of correlation between 2 or more variables, and identify patterns of relationships between independent and dependent variables (36).

3) *Population*: A generalization area containing subjects or objects with specific characteristics and desired qualities in research to achieve research and analysis objectives (80). The selected population is mining companies registered with the IDX for the 2019-2023 period or 5 years.

4) *Sample*: An element of the totality of its population that has certain characteristics (81). The technique in taking the sample applies purposive sampling which indicates that the sample is selected referring to certain provisions and a reference that has been set. The following are the criteria used in selecting the sample here, namely:

a. Mining companies registered with the IDX for the period 2019-2023.

- b. Mining companies that consistently publish annual reports and sustainability reports when conducting observations, namely from 2019-2023.
- c. Mining companies that have complete data related to green accounting variables, financial performance, environmental performance, firm value, and carbon emission disclosure.

Table 1 List of Names of Mining Companies that are Research Samples

| No. | Code | Company Name |
|-----|------|--------------------------------|
| 1. | ABMM | ABM Investments Tbk |
| 2. | ADRO | Adaro Energy Indonesia Tbk |
| 3. | AKRA | AKR Corporindo Tbk |
| 4. | ELSA | Elnusa Tbk |
| 5 | BUMI | Bumi Resources Tbk |
| 6. | INDY | Indika Energy Tbk |
| 7. | MBSS | Mitrabahtera Segara Sejati Tbk |
| 8. | PTBA | Bukit Asam Tbk |
| 9. | PTRO | Petrosea Tbk |
| 10. | DEWA | Darma Henwa Tbk |
| 11. | BRMS | Bumi Resources Minerals Tbk |
| 12. | ANTM | Aneka Tambang Tbk |
| 13. | INCO | Vale Indonesia Tbk |
| 14. | TINS | Timah Tbk |
| 15. | PGAS | National Gas Company Tbk |
| 16. | PSSI | IMC Pelita Logistics Tbk |

Source: Indonesia Stock Exchange, 2024

5) *Data Types and Sources*: This study uses secondary data types. Secondary data refers to information obtained from previous research results or from publications from various other agencies (37). The data source was obtained from the financial reports of mining companies registered with the IDX for the period 2019-2023 which were documented in www.idx.co.id.

6) *Data Collection Method*: This study uses literature study and documentation collection. Literature study is related to theoretical review and various references that are closely related to scientific literature (62). Document data collection is carried out through documentation methods that include financial reports of mining companies registered with the IDX for the period 2019-2023 and have been officially published by the company on the idx website.

7) *Operational Definition*: This research consists of various variables, as follows:

Dependent Variable (Y): Firm value is the result of public trust in company performance that reflects the company's achievements. Firm value increases to become an achievement in it self for companies that have gone public. Firm value can be measured using the Tobin's Q ratio. This ratio was introduced by Professor James Tobin in 1967. This ratio is considered as one of the most informative indicators because it can describe the company's operational phenomena (57). The Tobin's Q formula is related to this study that has been carried out by (29):

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

Independent Variable (X): Green accounting (X1) is an environmental accounting concept that focuses on the integration of environmental benefits and costs in the process of obtaining economic decisions (88). Green accounting is carried out using the dummy assessment method. The following are the dummy assessment criteria related to the topic studied (14), as follows:

a. If a company does not have one element of environmental costs, environmental operational costs, product recycling costs, development costs, or environmental research in its annual or sustainability report, then the value is 0.

b. If a company has one of the elements of environmental costs, environmental operational costs, product recycling costs, and development costs, as well as environmental research in its annual and sustainability reports, so the value is 1.

Independent variable: Financial performance (X2) serves as a metric to assess a company's efficiency and effectiveness in generating profits over a specified time frame. When companies adhere to established norms and demonstrate responsiveness to stakeholder concerns, they can enhance their financial outcomes. Return on Assets (ROA) is employed as the measurement tool for financial performance in this context. According to research study (89), the ROA calculation is formulated as follows:

$$ROA = \frac{\text{Net Profit}}{\text{Total Assets}}$$

Independent variable: Environmental performance (X3) is related to the calculation of company performance to environmental impacts, starting from the area of business operational locations to those outside the area, as well as the company's social responsibility for the impacts caused by its business activities on the balance of nature (11). Environmental performance measurement is carried out by giving a score from one to five based on each PROPER obtained by the company (10). PROPER values start from gold: 5, green: 4, blue: 3, red: 2, and black: 1.

Moderation Variable (M): Carbon emission disclosure represents a standardized component of information regularly shared with both internal and external company stakeholders. This disclosure encompasses the organization's carbon performance, climate change strategies, and the potential risks and opportunities stemming from climate change impacts (83). The measurement of this variable utilizes an index developed by researcher (15), which categorizes carbon emission information into five distinct classifications: climate change-related risks and opportunities, greenhouse gas emissions data, energy consumption metrics, greenhouse gas reduction efforts and associated costs, and carbon emission accountability. This comprehensive index comprises a total of 18 distinct items. For the purposes of the present study, the carbon emission disclosure formula has been applied according to methodology previously established by researcher (43).

$$CED = \frac{\sum di \times 100\%}{M}$$

8) *Data Processing and Analysis Techniques:* Quantitative data analysis was carried out in this study using statistical formulas pertinent to the subject and research issues (82). Descriptive statistics, traditional assumption testing, and hypothesis testing were the methods of data analysis employed. The IBM SPSS version 25 program helped with each of these tests.

RESEARCH RESULTS

1) *Descriptive Analysis:* This analysis can make it easier for readers to view the description of the study in general. The descriptive data below includes the maximum, minimum, mean, and standard deviation scores. The following is a description of the variables used here, including:

Table 2 Descriptive Analysis Results

| Descriptive Statistics | | | | | |
|---------------------------|----|-----|------|--------|----------------|
| | N | Min | Max | Mean | Std. Deviation |
| Green Accounting | 80 | .00 | 1.00 | .9000 | .30189 |
| Financial Performance | 80 | .10 | .28 | .0625 | .07405 |
| Environmental Performance | 80 | .00 | 5.00 | 2.8000 | .02140 |

| | | | | | |
|----------------------------|----|-----|------|--------|--------|
| Firm Value | 80 | .00 | 9.36 | 3.9107 | .31448 |
| Carbon Emission Disclosure | 80 | .94 | 1.00 | .9917 | .01996 |
| Valid N (Listwise) | 80 | | | | |

Source: SPSS Output 25, 2024

The results of the descriptive analysis, which were gathered from 16 mining companies over a 5 year period (2019–2023), are displayed in table 2. The green accounting variable has a mean of 0.9000, a standard deviation of 0.30189, a minimum value of 0.00, and a maximum value of 1.00. According to these results, 0.00 is the lowest green accounting value and 1.00 is the greatest. The majority of the data in this study falls within the range of the mean value of 0.9000. The data distribution is fairly stable and does not exhibit notable fluctuations, as indicated by the standard deviation value of 0.30189, which is lower than the mean score.

The financial performance variable ranges from a minimum value of -0.10 to a maximum of 0.28, with a mean score of 0.625. The measured standard deviation is 0.7405, which is above the mean. This higher standard deviation indicates that the data points are more widely spread around the mean, indicating considerable variability in financial performance across the sample. The distribution of scores appears somewhat spread out, with individual observations indicating significant deviations from the central tendency of 0.625.

The environmental performance variable demonstrates a range from 0.00 (minimum) to 5.00 (maximum), with a mean value of 2.8000. The standard deviation is calculated at 2.02140, which falls below the mean score. This indicates that most data points cluster around the average value, suggesting a relatively consistent distribution of environmental performance scores across the sample. The lower standard deviation compared to the mean implies that the data shows moderate stability without extreme variations, pointing to a fairly uniform pattern in environmental performance measurements.

The firm value variable has a mean of 3.9107, a standard deviation of 2.31448, a minimum value of 1.00, and a maximum value of 9.36. According to this, the lowest firm value variable data calculation results are 1.00, and the highest is 9.36. The majority of the values in this study fall within the range of the mean value of 3.9107. The distribution of data values is stable and does not exhibit substantial changes, as indicated by the standard deviation value of 2.31448 being less than the mean score.

The carbon emission disclosure variable yields a mean score of 0.9917, a standard deviation of 0.01996, a minimum score of 0.94, and a maximum score of 1.00. These results show the data on the carbon emission disclosure, which has the lowest value at 0.94 and the highest value at 1.00. The majority of the data in this study fall within the range of the mean value of 0.9917. The data distribution is steady and does not exhibit substantial fluctuations, as indicated by the standard deviation value of 0.01996 being smaller than the mean score.

2) *Classical Assumption Test*: Used when not yet in the process of hypothesis testing. This step is taken to ensure that the data used and to be analyzed meets the requirements to be tested by linear regression. The classical assumption test in this study, there are normalty, multicollinearity, heteroscedasticity, and autocorrelation tests as follows:

Table 3 Normality Test Results

| One-Sample Kolmogorov-Smirnov Test | | |
|------------------------------------|----------------|-------------------------|
| | | Unstandardized Residual |
| N | | 80 |
| Normal Parameters ^{a,b} | Mean | .0000000 |
| | Std. Deviation | 2.15191832 |
| Most Extreme Differences | Absolute | .129 |
| | Positive | .129 |
| | Negative | -.073 |

| | | |
|-----------------------------|------|-------------------|
| Test Statistics | | .129 |
| Asymp. Sig. (2-tailed) | | .002 ^c |
| Monte Carlo Sig. (2-tailed) | Sig. | .129 ^d |

- Test distribution is Normal
- Calculated from data
- Lilliefors Significance Correction

Source: SPSS Output 25, 2024

Referring to the results of the normality test in table 3, it can be concluded that the data studied is said to be normal. The proof that can be shown is through testing using Kolmogorov-Smirnov in Monte Carlo. The significance level is 0.129 or 12.9% exceeding 0.05, indicating that the data is included in the category of normally distributed data.

Table 4 Multicollinearity Test Results

| Coefficients ^a | | | |
|---------------------------|-----------------------------|-------------------------|-------|
| | | Collinearity Statistics | |
| Model | | Tolerance | VIF |
| 1 | (Constant) | | |
| | Green Accounting | .973 | 1.027 |
| | Financial Performance | .948 | 1.055 |
| | Environmental Performance | .935 | 1.070 |
| | Carbon Emissions Disclosure | .936 | 1.068 |

- Dependent Variable: Firm Value

Source: SPSS Output 25, 2024

The results of the multicollinearity test in table 4 divide the indications of each variable in the study showing an acceptable level of independence. Green accounting has a VIF number of 1.027 and a tolerance number of 0.973. The financial performance variable divides the indication of the VIF number of 1.055 through a tolerance number of 0.948. Carbon emission disclosure divides the indication of the VIF number of 1.068 through a tolerance number of 0.936, while environmental performance has a VIF number of 1.070 and a tolerance number of 0.935. Since all variables divide the indication of the tolerance number above the threshold of 0.10 and the VIF number is far below the critical value of 10, the regression model can be considered free from multicollinearity problems, which confirms the statistical independence of the predictor variables.

Table 5 Heteroscedasticity Test Results-Glejser

| Coefficients ^a | | | | |
|---------------------------|-----------------------------|---------------------------|--------|------|
| | | Standardized Coefficients | | |
| Model | | Beta | t | Sig. |
| 1 | (Constant) | | -1.558 | .124 |
| | Green Accounting | -.055 | -.481 | .632 |
| | Financial performance | -.004 | -.038 | .970 |
| | Environmental Performance | .072 | .620 | .537 |
| | Carbon Emissions Disclosure | .208 | 1.779 | .079 |

- Dependent Variable: RES_ABS

Source: SPSS 25 Output

Table 5 shows that each variable exceeds 0.05 or 5% overall. It can be stated that the variables observed here have met the standards and it can be said that this study does not show any signs of heteroscedasticity problems.

Table 6 Autocorrelation Test Results

| Model Summary ^b | | | | | |
|----------------------------|-------------------|----------|-------------------|----------------------------|---------------|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
| 1 | .331 ^a | .110 | .061 | 2.18105 | 1.961 |

a. Predictors: (Constant), Carbon Emission Disclosure, Green Accounting, Environmental Performance, Financial Performance

b. Dependent Variable: Firm Value

Source: SPSS Output 25, 2024

Table 6 shows the Durbin Watson value has a value of 1.961. The Durbin Watson table above according to the variables of this study can be seen K: 5 with N: 80 which refers to the value of dl: 1.5070 and du: 1.7716. So the conclusion is that the value of $1.7716 < 1.961 < 2.2284$ which means the null hypothesis is accepted which means there are no symptoms of autocorrelation in this study.

a) Results of Multiple Linear Regression Tests for Research Hypotheses H1, H2 and H3

Table 7 Results of Determination Coefficient Test

| Model Summary | | | | |
|---------------|-------------------|----------|-------------------|----------------------------|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | .334 ^a | .112 | .077 | 2.22385 |

a. Predictors: (Constant), Environmental Performance, Green Accounting, Financial Performance

Source: SPSS Output 25, 2024

The R square value of 0.112, or 11.2%, can be explained by the test findings shown in table 7. This demonstrates how the firm value can be impacted by green accounting, financial performance, and environmental performance by 11.2%. Other factors that are not the focus of this observation account for the remaining 88.8% (100%-11.2%) of the variance.

Table 8 Simultaneous Regression Test Results (F Test)

| ANOVA | | | | | | |
|-------|------------|----------------|----|-------------|-------|-------------------|
| Model | | Sum of Squares | Df | Mean Square | F | Sig. |
| 1 | Regression | 47.330 | 3 | 15.777 | 3.190 | .028 ^b |
| | Residual | 375.858 | 76 | 4.945 | | |
| | Total | 423.188 | 79 | | | |

a. Dependent Variable: Firm Value

b. Predictors: (Constant), Environmental Performance, Green Accounting, Financial Performance

Source: SPSS Output 25, 2024

The results of the multiple regression test in table 8 above showed df: 2.72 and a computed F test of 3.190 with a significance level of 0.028 less than 0.05. According to these results, the variable green accounting, financial

performance, and environmental performance all have a similar impact on the firm value because the computed F test of 3.190 is more than the F table of 2.72.

Table 9 t-Test Results – Partial Test

| Coefficients ^a | | | | | |
|---------------------------|---------------------------|-----------------------------|-----------|-------|------|
| | | Unstandardized Coefficients | | | |
| Model | | B | Std.Error | t | Sig. |
| 1 | (Constant) | 2.575 | .852 | 3.022 | .003 |
| | Green Accounting | .436 | .840 | .518 | .606 |
| | Financial performance | -1.941 | 3.454 | -.562 | .576 |
| | Environmental Performance | .380 | .125 | 3.045 | .003 |

a. Dependent Variable: Firm Value

Source: SPSS Output 25, 2024

The green accounting variable has a t-statistic of 0.518 with a significance level of 0.05 and degrees of freedom (df) of 1.991, as indicated in table 9. The significance value of 0.606 (60.6%) exceeds the threshold of 0.05 (5%), leading to the rejection of hypothesis H1. This result demonstrates that green accounting does not positively influence firm value, meaning the hypothesis proposing a positive relationship between green accounting and firm value is not supported or is rejected.

Since the financial performance variable has no positive impact on the firm value, H2 is rejected. The financial performance variable's t count is -0.562, the t table is through a significance level of 0.05, and the df: 1.991 is through a significance level of 0.576 exceeding 0.05. This indicates that either H2 is rejected or the premise that financial success has a positive impact on the firm value is not supported.

The environmental performance variable produces a t-statistic of 3.045, compared to the t-table value at a significance level of 0.05 and degrees of freedom (df) of 1.991. With a significance level of 0.003, which falls below the 0.05 threshold, hypothesis H3 is accepted. This result confirms that environmental performance positively effects firm value, supporting the hypothesis that better environmental performance enhances a firm value.

b) Results of the Moderation Regression Test with the MRA Test Approach on Research Hypotheses H4, H5 and H6

Table 10 Results of Determination Coefficient Test

| Model Summary | | | | |
|---------------|-------------------|----------|-------------------|----------------------------|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | .985 ^a | .970 | .966 | .40076 |

a. Predictors: (Constant), X1_M, Financial Performance, Green Accounting, Carbon Emission Disclosure, Environmental Performance, X2_M, X1_M

Source: SPSS Output 25, 2024

The R square value for this test is 0.970, according to table 10 above, which shows the R square of the regression moderation used to assess the coefficient of determination and look at how much the moderating variable contributes to the explanation of the relationship between independent and dependent variables. This indicates that 97% of the variance in firm value can be explained by green accounting, financial performance, and environmental performance, all moderated by carbon emission disclosure. The remaining 3% is influenced by other factors not considered in this model.

Table 11 F-Test Results – Simultaneous Test

| ANOVA | | | | | | |
|-------|------------|----------------|----|-------------|---------|-------------------|
| Model | | Sum of Squares | Df | Mean Square | F | Sig. |
| 1 | Regression | 245.473 | 7 | 35.068 | 218.341 | .000 ^b |
| | Residual | 7.549 | 47 | .161 | | |
| | Total | 253.022 | 54 | | | |

a. Dependent Variable: Firm Value

b. Predictors: (Constant), X3_M, Financial Performance, Green Accounting, Carbon Emission Disclosure, Environmental Performance, X2_M, X1_M

Source: SPSS Output 25, 2024

The moderation regression test yielded a computed F test of 218,341 at a significance level of 0.000 less than 0.05, as shown in table 11 above, 2.72 is the df value. This indicates how well the carbon emission disclosure moderating variable and its independent variables (green accounting, financial performance, and environmental performance) effect the firm value, since the computed F test value of 218.341 is greater than the F table of 2.72.

Table 12 t-Test Results – Partial Test

| Coefficients ^a | | | | | |
|---------------------------|-----------------------------|-----------------------------|------------|--------|------|
| | | Unstandardized Coefficients | | | |
| Model | | B | Std. Error | t | Sig. |
| 1 | (Constant) | -4.410 | 3.224 | -1.368 | .178 |
| | Green Accounting | -1.910 | .362 | -5.269 | .000 |
| | Financial Performance | -1.553 | 1.731 | -.897 | .374 |
| | Environmental Performance | -.191 | .097 | -1.965 | .055 |
| | Carbon Emissions Disclosure | 5.437 | 2.962 | 1.836 | .073 |
| | X1_M | .629 | .081 | 7.786 | .000 |
| | X2_M | .438 | .364 | 1.205 | .234 |
| | X3_M | 1.242 | .251 | 4.942 | .000 |

a. Dependent Variable: Firm Value

Source: SPSS Output 25, 2024

Based on the statistical results presented in table 12, the moderating variable X1_M demonstrates a t-count value of 7.786, which exceeds the t-table threshold of 1.991, with a significance level of 0.000 ($p < 0.05$). These findings provide statistical support for the acceptance of Hypothesis 4 (H4). The data confirms that carbon emissions disclosure positively moderates the relationship between green accounting practices and firm value. Therefore, the fourth hypothesis, which proposes that carbon emission disclosure enhances the effect of green accounting on firm value, is supported by the empirical evidence.

With a significance level of 0.234 above 0.05, the moderation variable, X2_M, yields a t count of $1.205 < t$ table of 1.991, indicating that H5 is rejected, meaning that carbon emission disclosure can reduce the impact of financial performance on firm value. Hypothesis 5, which posits that carbon emission disclosure can increase the impact of financial performance on firm value, is either not proven or H5 is rejected. H6 is accepted as the moderating variable X3_M shows a t-statistic of 4.496, which exceeds the t-table value of 1.991, with a significance level of 0.000 (below the 0.05 threshold). These results demonstrate that carbon emission disclosure strengthens the positive relationship between environmental performance and firm value. The findings confirm hypothesis 6, which proposed that carbon emission disclosure enhances the impact of environmental performance on firm value.

DISCUSSION OF RESEARCH RESULTS

1) *The Effect of Green Accounting on Firm Value*: The study's first hypothesis, according to which green accounting has no effect on firm value, is rejected (H1). The results indicate that implementing green accounting costs a lot of money, including developing reporting systems, environmental friendly technology, and training human resources. Companies that are focused on making more money will take into account all of their expenses, including environmental costs that could lower their level of profit (8). Green accounting has not been able to persuade investors to evaluate a company. These studies (71), (29) and (92) explain that green accounting does not effect the firm value. Investors still do not consider information related to green accounting as an important factor in assessing a company. Companies still need more time to feel the real benefits of green accounting (92). In contrast to studies (74) and (24) that show that green accounting has a positive impact on firm value, green accounting practices in Indonesia are still minimal and do not fully referring to environmental reporting standards according to GRI (29).

2) *The Influence of Financial Performance on Firm Value*: The second hypothesis in this study states that financial performance has no influence on firm value, so H2 is rejected. The findings indicate that the financial performance carried out by the company has not been able to influence the existing firm value. This shows that a good ROA value does not necessarily mean that the firm value (Tobin's Q) will increase, because investors look at other factors such as business prospects, debt, and existing market trends. Investors do not only rely on ROA as a consideration in investing (58).

The studies that have been conducted (66), and (38), indicate that financial performance does not effect the firm value. High ROA values do not result in an increase in the firm value in the samples studied. This is due to data showing that management performance in managing assets is still less efficient and effective. This is reflected in the net profit of the sample companies which did not achieve maximum profit, even though they had a large amount of assets (77). The findings produced are different from the studies that have been conducted (50) and (41) which demonstrated that a firm value is positively and significantly impacted by its financial performance.

3) *The Influence of Environmental Performance on Firm Value*: The third hypothesis in this study demonstrates that environmental performance has an influence on firm value, hence H3 is accepted. The results of this study suggest that every company that may achieve a PROPER rating signifies that the company has paid attention to environmental issues so that it has a beneficial impact on enhancing the firm value. High rated business can bolster their credibility and communicate favorably to investors, which eventually raises the firm value and serves stakeholders interests (48). According to the signaling theory, a company's environmental performance might provide a positive signal to the market, making investors interested in funding businesses with high PROPER ratings (21).

Studies that have been conducted (34), (48), and (29), reveal that environmental performance has a positive effect on firm value. The PROPER program allows companies to better monitor their environmental maintenance. Companies that care about the environment and society in society will create a positive image, so that they are considered classy and influential companies (72). These findings are different from studies that have been conducted (73) and (66) which explain that environmental performance has not yet effected firm value.

4) *Moderates the Effect of Green Accounting on Firm Value*: The fourth hypothesis explains that the effect of green accounting on firm value is moderated by carbon emission disclosure, which is why H4 is accepted. The results show that green accounting has no effect on firm value, but that its existence can strengthen it, and that voluntary disclosure of environmental aspects, particularly carbon emission, by companies has a positive relationship with firm value (4). Good environmental management can provide a positive signal to investors. Signaling theory suggests that favorable signals connected to investors and the public will ultimately boost the firm value. The signal is related to the disclosure of financial information requested by stakeholders (12). Stakeholder views can be influenced by positive firm accomplishments, according to stakeholder theory (66). Firm value is positively and significantly impacted by carbon emission disclosure, according to research (64) and (16).

In the relationship model that is constructed, the carbon emission disclosure variable is a predictor moderation that solely serves as a predictor variable. Since b_3 is significant and b_2 is not, the moderation predictor is present. The findings produced are not yet relevant to the study that has been conducted (31) which revealed that carbon emission disclosure has a negative impact on firm value. They differ from the research that has been conducted (30) which explains that carbon emission disclosure does not effect firm value. Although this analysis shows that green accounting has not yet had an impact on firm value, carbon emission disclosure increases the impact of green accounting on firm value. Green accounting implementation is very important, and companies need to record and disclose various environmental activities in order to increase firm value and realize sustainable development (18).

5) *Moderates the Impact of Financial Performance on Firm Value*: According to the fifth hypothesis, which is rejected, carbon emission disclosure has no moderating effect on the impact of financial performance on firm value. The results show that the relationship between financial success and firm value is not sufficiently strengthened by carbon emission disclosure. This happens as a result of investors focusing more on the company's financial reports, from which they can decide whether or not to invest, rather than understanding the information pertaining to carbon emission disclosure (40). Financial performance and carbon emission disclosure show no significant correlation, according to findings that align with previous research (43).

The carbon emission disclosure variable demonstrates potential as a moderator, rather than establishing a direct relationship. This potential moderating effect is evidenced by the statistical insignificance of both the b_2 and b_3 coefficients, indicating that while the variable its not have direct effects, it could influence the relationship between other variables in the model. The findings differ from the study (86), which demonstrates that financial performance influences carbon emission disclosure. High profits are not always directly proportional to better disclosure quality, primarily because Indonesian companies are not aware of the importance of carbon emission disclosure (90). Financial performance factors are more focused on short term achievements, whereas carbon emission disclosure reflects the company's commitment to long term sustainability (25).

6) *Moderates the Impact of Environmental Performance on Firm Value*: The sixth hypothesis, which has been accepted, states that carbon emission disclosure lessens the effect of environmental performance on firm value. The findings indicate that there is sufficient data on carbon emission disclosure to substantiate the relationship between environmental performance and firm value. The foundation upon which business communicate information about carbon emission disclosure is optimal environmental performance (17). According to stakeholder theory, positive company outcomes can effect stakeholders opinions (66).

According to research (27), (60), and (17), environmental performance significantly and favorably effects the carbon emission disclosure. In the relationship model that is constructed, the carbon emission disclosure variable is a predictor moderation that solely serves as a predictor variable. Since b_3 is significant and b_2 is not, the moderation predictor is present. Disclosures from business that manage trash well will benefit stakeholders and foster confidence among members of a group to preserve harmony (60). A company's environmental responsibility is reflected in its carbon emission disclosure, which attracts investors and raises the firm value (47). The results obtained are not yet pertinent to the study that was carried out (9), which discovered that carbon emission disclosure is negatively impacted by environmental performance. There are variations between this study and the one that was done (75), which explains that carbon emission disclosure has not been influenced by environmental performance.

This study has limitations, first the number of samples of this study is certainly still lacking in describing the real situation. The second only focuses on mining companies so that it has a less broad scope. The third only uses the perspective of 2 theories, namely stakeholder theory and signaling theory that explain the influence between variables, but there are still many theories that are able to provide different views related to this research topic, such as legitimacy theory and agency theory and other theories.

CONCLUSION

Based on the data obtained and then analyzed, the conclusions The following is a description of this study: the firm value is unaffected by green accounting. The impact on mining firm value is negligible because the

adoption of green accounting necessitates a substantial financial outlay and has not been felt by stakeholders. The firm value is unaffected by its financial performance. This conclusion stems from the fact that market mood and world wide economic trends frequently have a greater impact on a firm value than does its financial performance. The firm value is impacted by its environmental performance. This conclusion stems from the fact that mining firm value is positively impacted by their environmental performance. The impact of green accounting on the firm value is reinforced when carbon emission disclosure.

This is because the firm value is raised by the carbon emission disclosure, which demonstrates the degree of accountability and openness of management with regard to the governance of environmental impacts emanating from its operations. When carbon emission disclosure, the impact of financial performance success on the firm value is lessened. The rationale is that the firm value has been impacted since investors and stakeholders have not regarded information regarding carbon emission disclosure as a pertinent or substantial issue when evaluating the company's overall financial performance. The impact of environmental performance on the firm value is reinforced when carbon emission disclosure. The rationale is that the data pertaining to the carbon emissions is sufficiently robust to reinforce the correlation between environmental performance and firm value.

The results of this study can also be a motivation for mining companies in disclosing carbon emissions and the importance of protecting the environment to increase their firm value. This research can also be an input for the government and society regarding the importance of mining companies involvement in reducing carbon emission and their impact on the economic environmental of society as a whole.

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