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# THE ROLE OF CORPORATE GOVERNANCE AS A MODERATING VARIABLE OF THE INFLUENCE OF CARBON EMISSION DISCLOSURE ON FIRM VALUE

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**Abstract:**
This research aims to test and analyze the effect of carbon emissions disclosure on company value, as well as to examine the role of corporate governance mechanisms in moderating this relationship. This research uses quantitative methods with secondary data in the form of annual and sustainability reports of non-cyclical consumer, energy, industrial and logistics transportation sector companies listed on the Indonesia Stock Exchange (BEI) for the 2018 - 2022 period with a total of 37 samples and 185 data observations. The analysis used in this research is descriptive statistical analysis, panel data regression analysis, and moderated regression analysis (MRA) with the help of Eviews 10 software. The results of this research show that disclosure of carbon emissions has a positive and significant effect on environmental values. However, the corporate governance mechanism of independent commissioners and institutional ownership cannot moderate the positive relationship between carbon emission disclosure and firm value. Meanwhile, the corporate governance mechanism of the board of commissioners can strengthen the positive relationship between carbon emission disclosure and company value. It is hoped that companies can continue to increase their level of voluntary disclosure in order to gain a positive image from stakeholders which will lead to sustainability and financial and non-financial benefits.

**Keywords:**
Carbon Emission Disclosure, Firm Value, Corporate Governance

## BACKGROUND

There is no denying that environmental changes are happening right now. According to research by Kahn et al. (2019), environmental change has a long-term impact on the economy and if preventive measures are not taken, it is expected to reduce the world's GDP per capita by 7% by the end of the next century. Rezai et al. (2018) found that environmental changes will ultimately reduce business productivity, investment, and profitability. Investors consider profits not only an investment evaluation, but also an environmental issue. Therefore, a company's ability to survive today is based on a variety of factors, namely its profitability and on its ability to work with others to achieve economic performance, social justice, and environmental sustainability (Hardiyansah & Agustini, 2021).

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Global warming is a topic that is widely debated today around the world. The Global Carbon Project, a research collaboration of multinational teams of scientists consisting of more than 90 institutions, published a study on December 5, 2023, which shows that global carbon emissions from fossil fuels have increased in 2023 and have reached record levels.

Territorial ($MtCO_2$)

| Rank | Country | $MtCO_2$ |
|---|---|---|
| 1 | China | 11397 |
| 2 | United States of America | 5057 |
| 3 | India | 2830 |
| 4 | Russian Federation | 1652 |
| 5 | Japan | 1054 |
| 6 | Indonesia | 729 |
| 7 | Iran | 691 |
| 8 | Germany | 666 |
| 9 | Saudi Arabia | 663 |
| 10 | South Korea | 601 |

Figure 1 Chart of the ranking of the world's carbon emitter countries in 2022
Source: www.globalcarbonatlas.org/emissions/carbon-emissions/

Indonesia is among the top 10 countries globally in terms of carbon emissions. According to records, Indonesia produced 730 million tons of carbon in 2022. This number shows the largest increase compared to other countries, which is an increase of 18.3% compared to the previous year. The release of greenhouse gases, which damage the ozone layer and the earth's ecosystems, has been the focus of the Indonesia government's intensive efforts in recent years to reduce carbon emissions. To improve the company's environmental management performance, the Ministry of Environment created the PROPER assessment program in 1995. In order to respond to regulatory levels and motivate businesses to improve their environmental management performance, one way for companies to show stakeholders that the company has excellent environmental performance is through carbon emission disclosure (Jannah & Muid, 2014). But unfortunately, the disclosure of carbon emissions in Indonesia companies is still voluntary (voluntary disclosure).

The theory of legitimacy is refuted by the small number of issuers that publish carbon emissions. This may happen because of the high cost of disclosing these emissions which may be detrimental to the company (Amaliyah & Solikhah, 2019). Decisions made by creditors and investors are not only based on the information presented in the financial statements. The importance of carbon emission disclosure to the value of companies has led many researchers to conduct research on such disclosures. Carbon emission disclosure is considered to have an impact on the increase or decrease of the company's image in the eyes of the public, thus affecting the company's value. According to Sari & Budiasih (2021) Carbon emission disclosure is a disclosure that evaluates an organization's carbon emissions and identifies emission reduction goals. According to Rachmawati (2021), company value is a condition in which companies gain public trust through an increase in stock prices obtained from their operational activities.

The results of several studies stated inconsistent results regarding the influence of carbon emission disclosure on company value. Blesia et al. (2023), Noor & Ginting (2022), Halimah

et al. (2020), Gabrielle & Toly (2019), Halimah et al. (2020), Rachmawati (2021), Lee & Cho (2021), Sari & Budiasih (2021), and Hardiyansah et al. (2021) stated that carbon emission disclosure has a positive and significant effect on a company's value, so that a company's value will increase along with the amount of carbon emissions it discloses. In contrast, Kurnia et al. (2020), Primanandari & Budiasih (2021), Firmansyah et al. (2021), Anggita et al. (2022), Asyifa & Burhany (2022), Putikadea & Siregar (2023), and Afnilia & Astuti (2023) stated that with a company disclosing carbon emissions, it cannot help a company increase its corporate value. In making investment decisions, third parties also pay attention to and consider non-financial factors including corporate governance data. Previous research also looked at non-financial aspects, namely corporate governance as a variable that can affect the interaction of carbon emission disclosure to company value. Therefore, this study includes non-financial aspects, namely the corporate governance mechanism as a moderating variable. This is still not much researched considering that the majority of previous studies used financial aspects on company value. This research contributes to confirming the theory of legitimacy and agency theory by answering the role of corporate governance in moderating the relationship between the level of carbon emission disclosure and the value of a company. In addition to the lack of research on the relationship between corporate governance moderation and corporate value disclosure, based on research by Nahda & Harjito (2011), Wijaya & Wirayati (2019), and Muhammad & Aryani (2021) states that voluntary disclosure will increase company value when the company's corporate governance index increases.

Thus, based on the phenomenon that has been described earlier, researchers find that there is an empirical gap that the ability of companies to maintain their corporate value in this era of environmental change is not enough just to increase profitability, profit, people, and planet factors are also considered for investors. However, the publication of carbon emissions in Indonesia is currently minimal and uneven because this is still voluntary, thus making the theory of legitimacy refuted. In addition, the researcher sees a contradiction gap between carbon emission disclosure, corporate value, and corporate governance. Where inconsistent results were found in previous studies. And it is still rare to find previous research that tests the corporate governance mechanism as a moderation variable between the relationship between carbon emission disclosure and company value.

## THEORETICAL FRAMEWORK

### Legitimacy Theory

Legitimacy theory is a corporate management system that is oriented to the interests of the community, the government, individuals and community groups (Primanandari & Budiasih, 2021). In the context of business practices, carbon emission disclosure can be understood as one of the ways that companies can use to obtain and maintain legitimacy from stakeholders related to environmental sustainability. According to Hanifah & Wahyono (2018), the theory of legitimization encourages business actors to be environmentally aware so that they look respected in society. The theory of legitimacy argues that companies are obliged to carry out social responsibility to gain recognition or legitimacy from the public (Amaliyah & Solikhah, 2019).

Researchers argue that legitimacy theory encourages organizations to seek to ensure their operations are considered legitimate by adhering to the norms, values, and expectations of stakeholders and society at large. This theory states that businesses operate within a social

contract, gaining legitimacy by aligning their actions with societal norms and expectations. Legitimacy theory also sees that effective carbon emission disclosure can increase stakeholder involvement in a company's decision-making process. By providing more transparent and detailed information on carbon emissions, companies can facilitate more effective dialogue with stakeholders, allowing them to provide input and influence more sustainable corporate policies and practices.

**Agency Theory**

Agency theory is a framework in economics that describes the relationship between capital owners (principals) and agents (management), having a significant influence on the practice of carbon emission disclosure. Agency theory states that it will be difficult for principals to believe that agents will always act in the interests of shareholders, so shareholders need monitoring (Nguyen et al., 2020). According to agency theory, investors or shareholders are principals and management is agents. An effective corporate governance framework can increase a company's capacity to address problems and reduce agency conflicts. Agency theory sees a decrease in information asymmetry between agents and principals as a benefit of carbon emissions reporting. Agency theory helps the application of corporate governance mechanisms to control agent behavior and reduce agency conflicts (Panda and Leepsa, 2017). Agency theory also recognizes the role of regulation and market pressure in controlling agent behavior. Government regulations requiring carbon emissions disclosure or increased market demand for information on sustainable practices could force companies to increase their disclosure rates, even beyond what is required by contractual requirements between principals and agents.

**Green Accounting**

According to Lako (2018), green accounting is a new paradigm in accounting that emphasizes social and environmental considerations in addition to financial considerations. Accounting systems do not seem to give more space to information about the interaction between companies, communities, the natural environment, and the impact of business activities on society and the external environment. In a long period of time, the idea of green accounting can be seen as a program that aims to reduce production costs, thereby reducing the operational burden of the organization (Dewi and Naryana, 2020). Green accounting is an accounting approach that includes measuring, recording, and reporting on various aspects of the environment, including carbon emissions, natural resource use, waste, and other environmental impacts (Angelia et al., 2021). The use of green accounting allows one to evaluate the impact of using sustainable business practices. Given the current environmental status, investors are interested in businesses that refer to the environmental, social, and corporate governance in addition to the disclosure of corporate earnings profits (Astari et al., 2023). Green accounting assists companies in identifying and managing environmental risks that may affect the company's value. This can assist companies in making better strategic decisions, which in turn can increase their long-term value (Mohammadi et al., 2018).

**Firm Value**

When a company controls its resources throughout the year, its success is measured by its company value, which is reflected in the stock price and characterized by the response of investors or shareholders (Afnilia & Astuti, 2023). Company value is a measure of the trust that stakeholders have in the company throughout its operations. Thus, the prosperity of the

stakeholders can increase as the value of the company increases. The value of a company is determined by how well a company performs in the capital market and how investors react to the information that the company releases to the public (Kelvin et al., 2017).

**Carbon Emission Disclosure**

Carbon emissions are gases released into the earth's atmosphere that contain carbon. Greenhouse gas emissions are also known as carbon emissions because the amount of greenhouse gas emissions is often calculated based on the amount of carbon dioxide (CO2) (Kelvin et al., 2017). Carbon emission disclosure is a disclosure that evaluates an organization's carbon emissions and identifies emission reduction goals (Sari & Budiasih, 2021). Carbon emissions disclosure refers to the process by which a company reports its carbon emissions publicly, usually as part of sustainability or environmental reporting.

**Corporate Governance**

As stated by FCGI (Corporate Governance Forum in Indonesia), good corporate governance can be defined as a system that aims to direct and control a company or as a set of rules that stipulate the rights and obligations of management, creditors, government, companies, employees, and other internal and external stakeholders. A good corporate governance structure allows stakeholders, shareholders, commissioners, and managers to set company goals, act as intermediaries to help achieve those goals, and assess company performance (Janrosl & Lim, 2019).

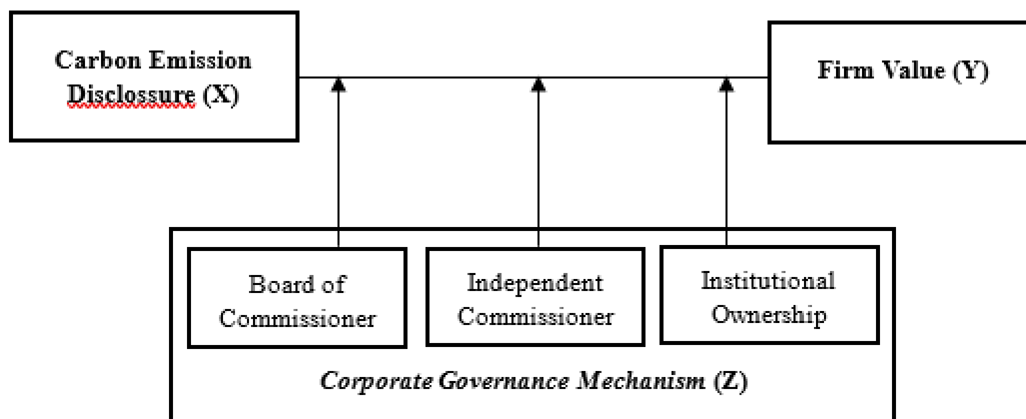


Figure 2 Conceptual Framework of the Research

**Carbon Emissions Disclosure to Firm Value**

From the perspective of legitimacy theory, companies that are seen as having a positive environmental reputation usually voluntarily disclose carbon emissions in large quantities to gain credibility from the public. By disclosing information about carbon emissions, companies can reduce the cost of equity resulting in an increase in stock prices or company values (Kelvin et al., 2017).

The results of the research by Halimah et al. (2020) which stated that the value of a company will increase along with the amount of carbon emissions it discloses, were agreed by the results of research by Noor & Ginting (2022) and Blesia et al. (2023). These findings support the

theory of legitimacy, which states that environmental disclosures—such as Carbon Emission Disclosures—are seen as branding that companies use to uphold corporate identity and reinforce social legitimacy. Therefore, the public can accept the company's operational activities, so that the company is given the authority to use financial resources as an investment to increase its value over time (Blesia et al., 2023). In addition, the research of Gabrielle & Toly (2019), Halimah et al. (2020), Hardiyansah & Agustini (2021), Rachmawati (2021), Lee & Cho (2021) and Hardiyansah et al. (2021) also agreed that carbon emission disclosure has a positive impact on a company's value. On the other hand, the research of Kurnia et al. (2020), Primanandari & Budiasih (2021), Firmansyah et al. (2021), Anggita et al. (2022), Asyifa & Burhany (2022), Putikadea & Siregar (2023), and Afnilia & Astuti (2023) stated that companies that disclose carbon emissions do not help companies increase their corporate value. Therefore, based on the results of previous research, the researcher formulated the following hypothesis

**H1: Carbon emission disclosure affects Firm value**

**The Moderation Role of the Size of the Board of Commissioners on the Effect of Carbon Emission Disclosure on Firm Value**

Agency theory states that an organization's financial performance will eventually improve if it has a larger board size because this will result in more informed monitoring and decision-making. The results of research conducted by Nasih et al. (2019), Zanra et al. (2020), Karim et al. (2021) and Riantono & Sunarto (2022) show that the large size of the board of commissioners allows companies to make greater efforts in increasing transparency to their stakeholders. Therefore, this study will examine the effect of moderation on the relationship between carbon emission disclosure and company value by using the size of the board of commissioners as one of the proxies for corporate governance. This study refers to the research of Fiona (2017) and Iskandar et al. (2023) which examined the effect of carbon emission disclosure on the value of companies with the size of the board of commissioners as a moderating variable. Based on the results of previous research, the researcher formulated the following hypothesis:

**H2: The size of the board of commissioners moderates the effect of carbon emission disclosure on Firm value**

**The Moderation Role of Independent Commissioners on the Effect of Carbon Emission Disclosure on Firm Value**

Based on the viewpoint of legitimacy theory and agency theory, the relationship between carbon emission disclosure and corporate governance creates a strong synergy in increasing company value (Hardiyansah et al., 2021). The presence of independent commissioners assures investors that the company upholds corporate governance standards. This trust can lead to increased investment and higher company valuations. Therefore, this study will examine the effect of moderation on the relationship between carbon emission disclosure and corporate value by using an independent board as one of the corporate governance proxies. Based on research by Fiona (2017) and Iskandar et al. (2023), an independent board of commissioners can positively strengthen the influence of carbon emission disclosure on company value. Based on the results of previous research, the researcher formulated the following hypothesis:

**H3: Independent Commissioners moderate the effect of carbon emission disclosure on firm value**

**The role of institutional ownership moderation on the effect of carbon emission disclosure on firm value**

Agency theory suggests that institutional investors are often actively involved with company management and can influence strategic decisions, governance policies, and corporate social responsibility initiatives (Astari et al., 2020). Their influence can drive better performance, innovation, and adherence to ethical standards, thereby increasing the overall value of the company. Akbaş & Canikli (2019) in their research stated that companies with a larger number of institutional investors are more likely to disclose Greenhouse Gas results to the public. In line with previous research, Amaliyah & Solikhah (2019) and Zanra et al. (2020) also stated that ownership of other institutions will encourage better and more comprehensive monitoring of carbon emission disclosures. This study refers to the research of Fiona (2017) which examines the effect of carbon emission disclosure on the value of companies with the size of institutional ownership as a moderating variable. Based on the results of previous research, the researcher formulated the following hypothesis:

**H4: Institutional ownership moderates the effect of carbon emissions disclosure on company value**

## METHOD

This research uses quantitative methods with secondary data in the form of annual and sustainability reports of non-cyclical consumer, energy, industrial and logistics transportation sector companies listed on the Indonesia Stock Exchange (BEI) for the 2018 - 2022 period with a total of 37 samples and 185 data observations. The analysis used in this research is descriptive statistical analysis, panel data regression analysis, and moderated regression analysis (MRA) with the help of Eviews 10 software. The sampling technique in this study uses non-probability sampling through purposive sampling. According to Purwohedi (2022), purposive sampling or judgemental sampling is a sample data collection technique that conveys information by paying attention to certain criteria set by the researcher. Meanwhile, the data collected includes financial data as well as data on the board of commissioners, institutional ownership, and independent boards of commissioners taken from the company's annual report for 2018 – 2022. The sample criteria in this study include:

1. Companies in the consumer non-cyclicals, energy, industrial, and logistics transportation sectors that have gone public or been listed on the Indonesia Stock Exchange (IDX) for 5 years (2018-2022) and are included in the Main Board category.
2. Companies that publish annual reports and sustainability reports that have been audited consecutively during the period 2018 – 2022.
3. Companies that implicitly or explicitly disclose at least one policy or one disclosure item related to carbon emissions in their annual reports for the 2018-2022 period.

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| No. | Kriteria | Jumlah Perusahaan |
|---|---|---|
| 1. | Perusahaan sektor *consumer non-cyclicals*, energi, industrial, dan transportasi logistik yang telah go public atau terdaftar di Bursa Efek Indonesia (BEI) selama 5 tahun (2018-2022) dan termasuk dalam kategori Papan Utama | 97 |
| 2. | Perusahaan yang tidak mempublikasikan *annual report* atau *sustainability report* yang telah diaudit berturut-turut selama periode 2018 – 2022 | (1) |
| 3. | Perusahaan yang secara implisit maupun eksplisit tidak mengungkapkan minimal satu kebijakan atau satu item pengungkapan terkait emisi karbon pada laporan tahunan periode 2018 – 2022 secara berturut-turut | (59) |
| Jumlah sampel perusahaan yang dapat digunakan dalam penelitian dalam 1 tahun | | 37 |
| Tahun penelitian | | 5 |
| **Total observasi data** | | **185** |

Table 1 Research Sample Determination
Source: data processed by researchers (2024)

The dependent variable in this study is firm value. Referring to Noor & Ginting (2022), Asyifa & Burhany (2022), Anggita et al. (2022), and Putikadea & Siregar (2023), this study measures firm value using the Tobin's Q formula (Rachmawati, 2021). Tobin's Q formula period t+1 is used in this study to measure the value of the company, which is the dependent variable in this study, to determine whether the disclosure of a company's carbon emissions in period t will affect the value of the company in period t+1 (Gabrielle & Tolly, 2019). The period t+1 in question is the stock price data and the number of shares outstanding on March 31, as well as the amount of debt and total assets on March 31 obtained from the company's Q1 financial position report.

$$Tobin's\ Q_{t+1} = \frac{MVE + DEBT}{TA}$$

This study refers to the research of Kurnia et al. (2020), Firmansyah et al. (2021), and Muhammad & Aryani (2021) by applying the Global Reporting Initiative (GRI) Standard 305: Emissions to create an assessment index for carbon emission disclosure, different from previous studies that used the CDP questionnaire (Kilic et al., 2018; Trufvisa & Ardiyanto, 2019; and Astuti & Setiany, 2021). This study uses the GRI 305 Standard because most companies in Indonesia use this index to disclose their environmental activities. Carbon emission indicators consist of six categories, namely: (1) Series 103 Management Disclosure; (2) Series 305-1 Direct GHG Emissions; (3) Series 305-2 Indirect GHG Emissions; (4) Series 305-3 Other Indirect GHG Emissions; (5) Series 305-4 Carbon Emission Intensity; and (6) Series 305-5 Carbon Emission Reduction. The carbon disclosure score is calculated by dividing the items disclosed by the maximum number of items, which is 12.

The moderating variable of the board of commissioners is measured based on the total number of board of commissioners in a company obtained from the annual report of the related issuer (Zanra et al., 2020).

$$\text{BC} = \Sigma\, Jumlah\ seluruh\ dewan\ komisaris$$

The moderating variable of the proportion of independent board of commissioners can be measured by the number of independent directors divided by the total number of boards (Pramuditya & Budiasih, 2020; Iskandar et al., 2023; Afnilia & Astuti, 2023).

$$COMIND = \frac{Jumlah\ dewan\ komisaris\ independen}{Jumlah\ seluruh\ dewan\ komisaris}$$

Meanwhile, the moderating variable of institutional ownership is determined through the ratio of the number of shares of the company in circulation (obtained from the annual report of the related issuer) to the percentage of institutional ownership of the company (Pramuditya & Budiasih, 2020; Ardillah & Rusli, 2022; Safutri et al., 2023).

$$INSOWN = \frac{Jumlah\ kepemilikan\ saham\ institusional}{Jumlah\ saham\ yang\ beredar}$$

## RESULT

### Descriptive Statistics

Descriptive statistics have the advantage of reducing the occurrence of measurement errors, especially in company characteristic data for secondary data research. Descriptive statistics include the study of average, median, maximum, minimum, variance, and standard deviation values for all variables tested.

| | FV | CED | BC | COMMIND | INSOWN |
|---|---|---|---|---|---|
| Mean | 1.730000 | 0.510865 | 4.891892 | 0.452162 | 0.810955 |
| Median | 1.020000 | 0.500000 | 5.000000 | 0.400000 | 0.857200 |
| Maximum | 17.63000 | 1.000000 | 10.00000 | 1.000000 | 0.996000 |
| Minimum | 0.362000 | 0.080000 | 2.000000 | 0.250000 | 0.352000 |
| Std. Dev. | 2.295832 | 0.251855 | 1.930642 | 0.148180 | 0.162940 |
| Skewness | 4.193281 | 0.129483 | 0.626015 | 1.806429 | -1.074770 |
| Kurtosis | 22.86969 | 1.812493 | 2.780410 | 6.750950 | 3.313080 |
| Sum | 320.0500 | 94.51000 | 905.0000 | 83.65000 | 150.0267 |
| Sum Sq. Dev. | 969.8350 | 11.67126 | 685.8378 | 4.040135 | 4.885125 |

Table 2 Descriptive Statistics Result
Source: Eviews output (2024)

### Classic Assumption Test

### Normality Test

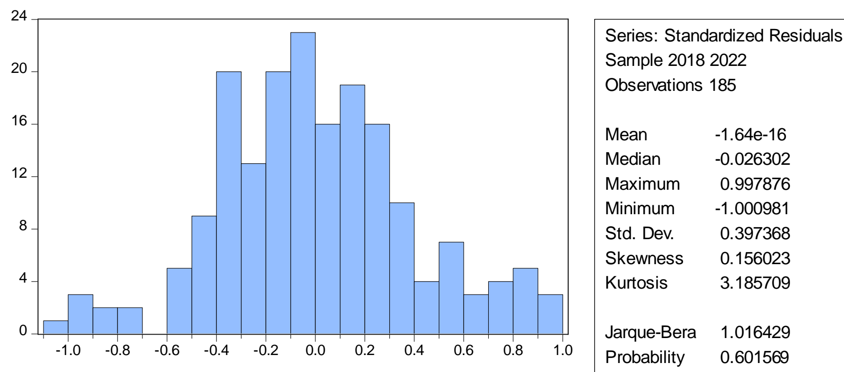


Figure 3 Normality Test Result
Source: Eviews output (2024)

The results show that after data transformation, the data in this study were normally distributed. This can be seen from the Jarque-Bera probability value obtaining a value > 0.05, which is 0.602. This indicates that the data distribution is normal and the data distribution is even so that it can represent the research population.

**Multicollinearity Test**

| | FV | CED | BC | COMMIND | INSOWN |
|---|---|---|---|---|---|
| FV | 1.000000 | 0.155727 | -0.068846 | 0.179382 | 0.278371 |
| CED | 0.155727 | 1.000000 | **0.143536** | **0.184620** | **0.065997** |
| BC | -0.068846 | 0.143536 | 1.000000 | **-0.207958** | **0.003760** |
| COMMIND | 0.179382 | 0.184620 | -0.207958 | 1.000000 | **0.059688** |
| INSOWN | 0.278371 | 0.065997 | 0.003760 | 0.059688 | 1.000000 |

Table 3 Multicollinearity Test Result
Source: Eviews output (2024)

The above results use the Pair Wise Correlations method which can show that the regression model in this study does not experience multicollinearity problems. This can be seen from the partial correlation value of each variable (independent and moderation) obtaining a value <0.80. This shows that the correlation relationship between independent variables describes the skill or accuracy of the regression model used.

**Heteroscedasticity Test**

Dependent Variable: ABS(RESID)
Method: Panel EGLS (Cross-section random effects)

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.060000 | 0.271910 | 0.220662 | 0.8256 |
| CED | -0.095249 | 0.080863 | -1.177903 | 0.2404 |
| BC | 0.021133 | 0.090728 | 0.232931 | 0.8161 |
| COMMIND | 0.138435 | 0.224819 | 0.615763 | 0.5388 |
| INSOWN | 0.361961 | 0.239869 | 1.508998 | 0.1331 |

Table 4 Heteroscedasticity Test Result
Source: Eviews output (2024)

The above results can show that the regression model in this study does not experience heteroscedasticity problems. This can be seen from the probability of each variable (independent and moderation) obtaining a value > 0.05. This shows that the data in the study is homogeneous.

**Autocorrelation Test**

| Durbin-Watson stat |
|---|
| 0.354807 |

Table 5 Autocorrelation Test Result
Source: Eviews output (2024)

The results above can show that the Durbin Watson value in this study is 0.355 where the value lies between -2 and 2, namely -2 < 0.355 < 2 so it can be concluded that autocorrelation does not occur.

**Moderated Regression Analysis**

In multiple linear regression, each independent variable has a coefficient that shows its specific influence on the dependent variable (Basuki, 2021). Meanwhile, moderated regression analysis

is a method used to evaluate whether the relationship between the independent variable and the dependent variable is influenced by another variable called the moderator variable.

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 1.033475 | 0.095693 | 10.79986 | 0.0000 |
| CED | 0.633659 | 0.478003 | 2.132652 | 0.0343 |
| CED_BC | -0.269611 | 0.151070 | -2.280955 | 0.0240 |
| CED_COMMIND | -0.032694 | 0.345361 | -0.094667 | 0.9247 |
| CED_INSOWN | 0.335925 | 0.448777 | 0.748534 | 0.4551 |
| Weighted Statistics | | | | |
| R-squared | 0.170459 | Mean dependent var | | 0.269495 |
| Adjusted R-squared | 0.152025 | S.D. dependent var | | 0.260849 |
| S.E. of regression | 0.240204 | Sum squared resid | | 10.38566 |
| F-statistic | 9.246859 | Durbin-Watson stat | | 1.497677 |
| Prob(F-statistic) | 0.000001 | | | |

Table 6 Moderated Regression Result
Source: Eviews output (2024)

The panel data regression equation model is as follows.
FV = 1.03347519261 + 0.633659096779*CED - 0.26961147454* CED_BC - 0.03269424* CED_COMMIND + 0.335925259859* CED_INSOWN

**Hypothesis Testing**
**T Test**
Based on the results of the moderated regression analysis test in table 6, it can be concluded that the influence of the independent variables on the dependent variables and the moderation interaction is as follows:

1. Disclosure of carbon emissions has a significant effect on company value.
   The beta coefficient value of carbon emission disclosure is positive 0.6336 with a probability of 0.0343, where 0.0343 <0.05. The results of the t-test on the Carbon Emission Disclosure (CED) variable obtained a calculated t value of 2.1326> t table, which is 1.972663, so the carbon emission disclosure variable has a significant effect on company value. So it can be concluded that **H1 is accepted.**
2. The size of the board of commissioners moderates the effect of carbon emission disclosure on firm value.
   The coefficient value of the interaction variable between carbon emission disclosure and the board of commissioners is negative 0.2696 and the probability is 0.0240, where the probability value is <0.05. The results of the t-test on the interaction variable of Carbon Emission Disclosure (CED) with the Board of Commissioners (BC) obtained a calculated t value of 2.2809> t table, which is 1.972663, so the moderating variable of the board of commissioners can moderate the relationship between carbon emission disclosure and firm value. Therefore**, H2 is accepted.**
3. The proportion of independent commissioners moderates the effect of carbon emission disclosure on firm value.
   The coefficient value of the interaction variable between carbon emission disclosure and independent commissioners is negative 0.0326 and the probability is 0.9247, where the probability value is > 0.05. The results of the t-test on the interaction variable of Carbon Emission Disclosure (CED) with Independent Commissioners (COMMIND) obtained a

calculated t value of 0.0946 <t table, which is 1.972663, so the independent commissioner moderation variable cannot moderate the relationship between carbon emission disclosure and firm value. Therefore, **H3 cannot be accepted.**

4. Institutional ownership moderates the effect of carbon emission disclosure on firm value. The coefficient value of the interaction variable between carbon emission disclosure and institutional ownership is positive at 0.3359 and the probability is 0.4551, where the probability value is > 0.05. The results of the t-test on the interaction variable of Carbon Emission Disclosure (CED) with Institutional Ownership (INSOWN) obtained a calculated t value of 0.7485 > t table, which is 1.972663, so the institutional ownership moderation variable cannot moderate the relationship between carbon emission disclosure and firm value. Therefore, it can be concluded that **H4 cannot be accepted.**

**Coefficient of Determination Test**

The adjusted R-squared value is a value used to measure how well the dependent variable can explain the effect of variability in the dependent variable. In table 6, it can be seen that the Adjusted R-squared value is 0.1520 or 15.20%. The coefficient of determination value is relatively low in influencing the value of the company. This shows that 15.20% of the company's value can be influenced by the level of carbon emission disclosure, board of commissioners, independent commissioners, and institutional ownership, while 84.80% is explained by other variables outside this study such as managerial ownership, environmental performance, corporate social responsibility, or other financial factors that have been proven to have a high level of influence on the movement of company value such as leverage, profitability, payout ratio, and so on.

**F Test (Model Feasibility)**

The feasibility of the regression model in a study is shown through the F test. The results of the F test in Table 6, each variable obtained a probability value of F-statistic <0.05. Each variable also has a calculated F value of 9.24685> F table of 2.42021. So the regression model in the study is declared feasible to use so that the disclosure of carbon emissions and corporate governance mechanisms consisting of the size of the board of commissioners, the proportion of independent commissioners, and institutional ownership have an influence on the company's value simultaneously.

## DISCUSSION

### The Effect of Carbon Emission Disclosure on Company Value

The results of the first hypothesis test show that carbon emission disclosure has a significant effect on company value. This indicates that if a company discloses high carbon emissions, the company's value will increase. Likewise, if the company's carbon emission disclosure is low, the company's value will also decrease. The results of this study support the legitimacy theory which explains that investors or the public will tend to be more interested in companies that carry out their operational activities by not only paying attention to profit factors, but also prioritizing environmental factors. Alfayerds & Setiawan (2021) added that companies that have gained legitimacy from the public strive to improve their public image and reputation, because this will affect the overall value of the company.

The results of this study are in line with the research of Halimah et al. (2020), Hardiyansah & Agustini (2021), Rachmawati (2021), Lee & Cho (2021), Noor & Ginting (2022), and Blesia et al. (2023) who agree that investors who evaluate the value of a company not only consider

its profitability but also how much the company cares about the environment and how much its operations affect the environment. The public responds positively to information about companies that disclose their carbon emissions, thereby increasing stock prices and increasing company value (Hardiyansah & Agustini, 2021). As more companies disclose carbon emissions, many parties who rely on corporate social responsibility efforts will have more confidence, increasing the perception of the company's value in the eyes of stakeholders (Noor & Ginting, 2022). This study shows that most companies provide information about global warming and their strategies to reduce its impact. However, not many companies disclose much information about the amount of emissions, current environmental costs, or potential costs.

However, the findings of this study contradict Muhammad & Aryani (2021) and Anggita et al. (2022) who argue that carbon emission disclosure has a negative effect on company value. The main cause of this rejection is the tendency of investors to ignore the environmental impact of global warming due to the high environmental cost, which will ultimately harm the company. This is different from Primanandari & Budiasih (2021) who stated that carbon emission disclosure does not affect the company's value because investors or stakeholders focus more on the company's economic fundamentals in making investment decisions than calculating CED.

**The Effect of Board of Commissioners Moderation on Carbon Emission Disclosure on Company Value**

The results of the second hypothesis test show that the corporate governance mechanism, namely the board of commissioners, can moderate the significant effect of carbon emission disclosure on company value. This indicates that the number of commissioners in a company can affect the amount of high carbon emission disclosure in a company, so that the company's value can be affected. The results of this study support the agency theory which states that the higher the implementation of good corporate governance in a company, the more it will minimize information asymmetry between management and stakeholders. In this context, the information asymmetry in question is regarding the disclosure of company operational information that has an impact on the environment. Agency theory emphasizes that the proportion of the board of commissioners in a company will encourage the company's responsibility towards society and the environment to maximize the company's value while still considering other stakeholders.

However, besides that, the results of Fiona's research (2017) and Iskandar et al. (2023) are not in line with the results of this study, where they stated that the board of commissioners failed to moderate the effect of carbon emission disclosure on company value. The number of board of commissioners in a company is considered unable to drive and influence the increase in carbon emission disclosure. The reason for this may be because the board of commissioners in Indonesia still does not have the responsibility to monitor sustainability performance directly. The scope of the board of commissioners' supervisory responsibility for the performance of the board of directors is broad, so that the level of carbon emission disclosure is not the main concern of the board of commissioners in maintaining the sustainability of the company.

**The Moderation Effect of Independent Commissioners on Carbon Emission Disclosure on Company Value**

The results of the third hypothesis test show that the corporate governance mechanism, namely independent commissioners, cannot moderate the significant effect of carbon emission disclosure on company value. This indicates that the proportion of independent commissioners

in a company cannot affect the amount of high carbon emission disclosure in a company, so that the company value will not change.

The influence of commissioner independence is unable to make management feel compelled to disclose carbon emissions. Amaliyah & Solikhah (2019) argue that independent commissioners have no influence on the level of carbon emission disclosure because the independent board of commissioners is an external party and has limited time to supervise the company. In Indonesia, the independent board of commissioners is currently more conservative in providing information to stakeholders regarding carbon emissions because the disclosure of sustainability reports in Indonesia is still voluntary (Nasih et al., 2019). The independent board of commissioners is considered to still not have the responsibility to monitor sustainability performance directly according to the Circular Letter (SE) of the Financial Services Authority (OJK) No. 33 / SEOJK.04 / 2014.

In addition, the results of this study contradict the opinions of Fiona (2017) and Iskandar et al. (2023) which state that the proportion of independent commissioners as company supervisors can moderate the effect of carbon emission disclosure on company value. The proportion of independent commissioners as one of the corporate governance mechanisms can improve the quality of corporate governance so that carbon emission disclosure will be higher and on the other hand the company value achieved will increase. According to the agency theory perspective, an independent board of commissioners from community leaders can be a channel for companies to obtain information about the needs of the community as stakeholders related to sustainability issues. On the other hand, the results of this study are in accordance with agency theory which states that effective monitoring activities in sustainability activities will deplete company resources (agency costs) and will indirectly harm shareholder value.

**The Moderation Effect of Institutional Ownership on Carbon Emission Disclosure on Company Value**

The results of the fourth hypothesis test show that the corporate governance mechanism, namely institutional ownership, failed to moderate the significant effect of carbon emission disclosure on company value. This indicates that the proportion of institutional ownership in a company cannot affect the level of carbon emission disclosure in a company, so that the company's value will not be affected by its movement.

The high average for the proportion of institutional ownership is 0.8109, which means that the average institutional investor in the sample company reaches 81% of the total outstanding shares. This proves that as an external party that can influence other parties in making investment decisions, institutional ownership has not been able to encourage increased carbon emission disclosure as a form of transparency to stakeholders. The results of this study are not in line with agency theory and the principles of Good Corporate Governance where institutional ownership can reduce the attitude of managers who want to take advantage of opportunities in their positions to benefit themselves through transparency in sustainability disclosure.

The results of this study are in line with Fiona's opinion (2017) which states that the proportion of institutional investors cannot moderate the effect of carbon emission disclosure on company value. This is because institutional investors are considered to act as inactive supervisors and are only interested in short-term trading, so institutional investors are considered not interested in supervising company management in encouraging transparency through carbon emission reporting. Sari & Hudaya (2020) added that institutional shareholders generally tend to be

passive towards voluntary disclosures made by companies because these decisions are the realm of management policy. So it can be said that as external parties, institutional investors cannot influence other parties in determining their best investment decisions. However, this study cannot support the statement of Sari & Hudaya (2023) that large institutional ownership by a company can encourage stronger supervision, especially when it comes to sustainable environmental disclosure initiatives that can increase the company's value and improve its standing in the eyes of stakeholders. Despite these reasons, according to research data, it can be concluded that with institutional ownership, it does not guarantee that the company's carbon emission disclosure will be encouraged, companies tend not to pay much attention to large fines due to lawsuits that can have an impact on financial stability and company value.

## CONCLUSION

This study was conducted in order to find empirical evidence whether carbon emission disclosure can affect the increase or decrease in company value, as well as whether the corporate governance mechanism represented in this study by the variables of the board of commissioners, independent commissioners, and institutional ownership can moderate the influence of carbon emission disclosure on company value. This study uses secondary data derived from financial statements, annual reports, and sustainability reports of companies in the consumer non-cyclicals, energy, industrial, and logistics transportation sectors that have gone public or been listed on the Indonesia Stock Exchange (IDX) for 5 years (2018-2022). The determination of the research sample was carried out by the purposive sampling method which produced 37 company samples with a total of 185 data observations. The results of this research show that disclosure of carbon emissions has a positive and significant effect on environmental values. However, the corporate governance mechanism of independent commissioners and institutional ownership cannot moderate the positive relationship between carbon emission disclosure and firm value. Meanwhile, the corporate governance mechanism of the board of commissioners can strengthen the positive relationship between carbon emission disclosure and company value.

This study has limitations due to the small number of samples that match the variable criteria due to the small number of companies that disclose carbon emissions in their annual or sustainability reports. The lack of previous literature sources that use the GRI 305 index indicator as a method of measuring carbon emission disclosure and the low adjusted r-squared value also contribute to limitations in this study. Further research is expected to use other indicators that are more widely used in other literature in measuring carbon emission disclosure such as using the Carbon Disclosure Project index. In addition, further research is expected to expand the research population in order to describe the non-financial population more comprehensively, by setting criteria that include companies from each sector so that the company can represent the condition of companies in Indonesia.

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