

Determinants of Carbon Emission Disclosure in Energy Sector Firms Listed On the Indonesian Stock Exchange

Amalinda Kartika¹, Zuhrotul Isnaini²

^{1,2} Faculty Of Economic and Business, University Of Mataram, Indonesia

Corresponding author : amalinda646@gmail.com

Abstract

This study aims to examine and gather empirical data regarding the impact of profitability, leverage, board of directors size, board of commissioners size, and appropriate proper rating on the carbon emissions disclosure by energy sector firms listed on the Indonesia Stock Exchange from 2019 to 2022. The sample for this research comprised 82 energy sector companies publicly traded on the Indonesia Stock Exchange. A purposive sampling method was employed in the research study to select a sample of 48 companies for observation. This research uses content analysis techniques and documentation of the organization's sustainability and financial reports spanning the subsequent four years to quantify carbon emissions. Descriptive statistics and multiple linear regression analysis were employed to analyze the data, utilizing version 16.0 of the Statistical Package for the Social Sciences (SPSS) software. The study indicates that leverage significantly and positively influences carbon emission disclosure. There is no statistically significant positive correlation between profitability, board of commissioners size, profitability, and proper rating about carbon emission disclosure.

Keywords: Profitability, Leverage, Board of Commissioners, Board of Directors, Proper Rating.

INTRODUCTION

Due to unchecked climate change, many environmental concerns are gaining prominence globally and becoming the subject of increasing discourse among the general public. Climate change continues to be a persistent and pressing issue in numerous nations, including Indonesia. Energy sector companies are one of the sectors that contribute significantly to carbon emissions. Prolonged environmental degradation and industrial

activities aimed at profiting from exploiting natural resources are additional factors contributing to the elevated levels of carbon dioxide or carbon emissions in Indonesia. Therefore, to fulfill the corporate responsibility objective of mitigating greenhouse gas emissions, environmental management must be executed in a manner that generates substantial value and influence. This condition will worsen as business actors become aware of the impact of carbon emissions (Florescia & Handoko, 2021). As a result of implementing the UNFCCC concerning climate change caused by carbon emissions, several nations reached a reduction agreement under the Kyoto Protocol. Aside from that, an engineering program to reduce carbon emissions, commonly known as carbon accounting in accounting, has been devised via joint implementation, emission trading, and clean development mechanisms (Pratama, 2021). In addition, the Company Performance Rating Assessment Program (PROPER), an initiative established by the Ministry of the Environment, seeks to incentivize businesses to adopt effective environmental management systems to enhance waste reduction efficiency (Dewi & Aldhani, 2021). This research draws from a comprehensive review of the literature, including the works of (Florescia & Handoko, 2021), (Sekarini & Setiadi, 2022), and (Wahyuningrum et al., 2022), all of which examined carbon emissions disclosure. The findings of this research indicate that profitability, one of the independent variables, does not have a significant impact on carbon emissions disclosure, which is contrary to the conclusions of research conducted by (Nastiti & Hardiningsih, 2021) (Deantari et al., 2019), and Ulupui et al. . (2020). The results indicate that the profitability variable positively influences the disclosure of carbon emissions. Furthermore, findings from studies conducted by (Wahyuningrum et al., 2022) and (Ulupui et al., 2020) indicated that the disclosed independent variable, leverage, did not influence on carbon emissions disclosure less; these findings contradict those of studies (Sekarini & Setiadi, 2022), (Deantari et al., 2019), (Florescia & Handoko, 2021) and (Widiastutik & Khafid), which demonstrated that leverage negatively impacts carbon emissions disclosure. Conversely, a study (Nastiti & Hardiningsih, 2021) discovered alternative findings. Their research indicated that leverage did not statistically impact carbon emissions disclosure considerably. Consequently, this must be more consistent with research findings concerning the disclosure of carbon emissions. Additional research was conducted in response to this research gap to examine and acquire empirical evidence regarding the impact of profitability, leverage, board of directors, board of commissioners, and proper rating on carbon emissions disclosure. The study under consideration was titled "Determinants of Carbon Emission Disclosure in Energy Sector Firms Listed on the Indonesian Stock Exchange."

LITERATURE ANALYSIS AND METHODOLOGY

Legitimacy theory explains the correlation between corporations and the general public through the recognition that corporations receive from society for their socially responsible actions. In building credibility in the eyes of the public, businesses can disclose environmental information and implement environmentally based performance practices, such as identifying carbon emissions from their operations. An organization can achieve conformity between its social values and traditional behavior inherent in the system or company by involving the community (Nastiti & Hardiningsih, 2021). Apart from that, this theory can be a basis or reference for organizations to align their operations with the values and boundaries of local communities (Dewi & Aldhani, 2021).

Meanwhile, stakeholder theory argues that organizations carry out activities not solely to advance their interests but also to maintain relationships with their constituents and provide benefits to them. Environmental management exemplified through carbon emission disclosure means maintaining the company's position in the eyes of stakeholders. Organizations that publish this information are expected to have the capacity to fulfill the requests of their stakeholders, thereby fostering positive and friendly relations between the organization and its stakeholders (Cahya, 2016). Companies are faced with different expectations from their stakeholders. As a result, organizations may face pressure from stakeholders to meet these expectations. The company's tendency to align its positioning with the preferences of its stakeholders is directly proportional to the strength of its stakeholders' position (Dewi & Aldhani, 2021). In this research, carbon emissions are substances released into the atmosphere through the combustion of carbon-based compounds, including CO₂. This process causes an increase in the earth's temperature or global warming. According to a study (Asyari & Hernawati, 2023), one of these emissions may come from the operational activities of industrial companies. The consequence of this dilemma is that an organization will disclose its active activities, usually known as "carbon emission disclosure." In addition, the extent to which companies involved in carbon emissions disclose information regarding environmental responsibility is also related to the disclosure of carbon emissions referred to in this research (Maqfirah & Riswan Yudhi Fahrianta, 2022).

The impact of profitability on carbon emissions disclosure

The profitability ratio indicates management effectiveness in executing operational activities and determines the capacity of a business to generate profits (Mujiani et al., 2019). An increase in profitability positively correlates with how a company utilizes its assets to generate profits. Legitimacy theory posits that corporations will face societal scrutiny

concerning their environmental stewardship, including the obligation to disclose carbon emissions (Nastiti & Hardiningsih, 2021). Furthermore, organizations that achieve favorable financial outcomes, as evidenced by their substantial profitability, are empowered to divulge emissions associated with their operational undertakings. Hence, this degree of profitability may serve as a foundation or point of reference for the revelation of an organization's carbon emissions. Particularly for businesses in the energy sector, the level of profitability generated by an organization will impact carbon emissions disclosure. In certain situations, a high level of profitability may incentivize a company to disclose information regarding its environmental impact, such as carbon emissions. Profitability is achieved by increasing the company's credibility and enticing the interest of investors (Florescia & Handoko, 2021). Furthermore, legitimacy theory posits that corporations will perpetually face societal pressure to address environmental concerns, including carbon emissions. Consequently, corporations that achieve a considerable degree of profitability will be better equipped to withstand external pressures, as they possess more significant resources to implement environmental disclosures, such as those about carbon emissions.

Profitability positively influences carbon emissions disclosure, according to the findings of the following studies: (Dewi & Aldhani, 2021), (Zanra et al., 2020), (Nastiti & Hardiningsih, 2021), (Pratiwi et al., 2021), and (Akhiroh & Kiswanto, 2016). The correlation between profitability and carbon emission recognition can be delineated in the subsequent formulation of the hypothesis:

H1: Profitability has a positive impact on carbon emission disclosure

The Impact Of Leverage On Carbon Emission Disclosure

Utilizes assets and funding sources by a business entity with fixed expenses to augment prospective shareholder profits. Additionally, leverage is the degree to which a business can utilize fixed-burden assets and funds to achieve organizational objectives and maximize business owners' wealth. Leverage is a metric used to ascertain the relationship between an organization's total debt and assets. Leverage can impose liabilities and hazards on a company if its financial situation deteriorates. In addition to accruing increasing interest charges, third parties may penalize the organization. A high-leverage company is susceptible to significant creditor pressure (Asyari & Hernawati, 2023). The degree of carbon emission disclosure decreases as the level of company debt increases because a required obligation is calculated from incoming income. This study aligns with previous research (Sekarini & Setiadi, 2022; Mujiani et al., 2019; Deantari et al., 2019; Florescia & Handoko, 2021; Widastutik & Khafid, 2021) that supports the notion that leverage positively impacts

carbon emission recognition. Thus, the hypothesis formulation for the relationship between leverage and recognition of carbon emissions is as follows:

H2: Leverage positively impacts carbon emission disclosure.

The Impact Of The Board Of Commissioners Size On Carbon Emissions Disclosure

Board of Commissioners membership is a critical element of corporate governance. Typically, the Board of Commissioners comprises a cohort of individuals entrusted with the duty of supervising administration and the trajectory of the corporation or institution, in addition to offering counsel to the board of directors. Typically composed of individuals not affiliated with the company's administration, the Board of Commissioners ensures that the organization is operated in the shareholders' best interests. The Board of Commissioners may establish committees to assist in performing its duties; the composition and responsibilities of these committees differ by the company's scale and intricacy. The correlation between the number of members of the board of commissioners in each corporate entity and the magnitude of the board of commissioners is examined in this study.

Managing issues about information asymmetry between principals and agents, which arises from divergent interests between the two in agency theory (Nisa & Ratmono, 2019), is a responsibility of the Board of Commissioners. Conversely, the board of commissioners serves or is involved in formulating disclosure policies, including those about environmental disclosure (e.g., carbon emission disclosure).

According to research conducted by Zanra et al. (2020) and Pratama (2021), there exists a positive correlation between the magnitude of the board of commissioners and carbon emissions disclosure. Pertains specifically to the board of commissioners' capacity to exercise oversight over environmental disclosures, including those concerning carbon emissions, and its involvement in monitoring initiatives associated with environmental stewardship. Thus, the hypothesis formulation for the relationship between the magnitude of the Board of Commissioners and the recognition of carbon emissions is as follows by this statement:

H3: The size of the Board of Commissioners positively impacts carbon emission disclosure.

The Impact of the Size of the Board of Directors on the Carbon Emissions Disclosure

The Board of Directors, as specified in the articles of association, comprises a cohort of individuals elected by shareholders to execute corporate governance in the company's best interests. The board of directors occupies the third highest position in the organizational structure of public corporations in Indonesia, following the General Meeting

of Shareholders (GMS) and the Board of Commissioners. In addition, the board of directors may be characterized as the preeminent governing body entrusted with ensuring that all stakeholders adhere to legal requirements. In this study, the magnitude of the board of directors is correlated with the number of board members present at each corporate entity. Legitimacy theory posits that the board of directors must bestow legitimacy upon the organization's activities. This can be achieved by disclosing carbon emissions to meet societal demands. Consequently, a corporation with a more extensive board of directors may be compelled to divulge carbon emission-related information to a more significant degree.

According to research (Pratama, 2021) and (Simamora et al., 2022), the recognition of carbon emissions is positively impacted by the magnitude of the board of directors. Thus, the relationship between the magnitude of the board of directors and the carbon emissions disclosure can be expressed as the following hypothesis, according to the above reasoning:

H4: The size of the board of directors has a positive impact on carbon emission disclosure.

The Impact Of Proper Rating On Carbon Emissions Disclosure

Proper Rating is a company performance assessment program in the environment established by the Ministry of Environment and Forestry (Maqfirah & Riswan Yudhi Fahrianta, 2022). A thorough evaluation will result in the company acquiring a reputation or image due to environmental management practices. Five colors are utilized to evaluate the image: gold, green, blue, red, and black. The most exemplary corporations are denoted by gold, signifying their successful implementation of ongoing and comprehensive environmental management practices. Alternatively, should a company sustain two consecutive blacklistings, legal action may be taken against the company, and its operations may be halted.

The Ministry of Environment and Forestry implements a program known as proper (Company Performance is not a Program). This Program aims to incentivize businesses to adopt effective environmental management systems, thereby enhancing their capacity to minimize waste (Dewi & Aldhani, 2021). According to research (Prasetya & Raka Adi, 2018; Dewi & Aldhani, 2021; Maqfirah & Riswan Yudhi Fahrianta, 2022), the proper rating significantly and positively affects carbon emissions disclosure. Thus, the correlation between accurate categorization and acknowledgment of carbon emissions can be delineated in the subsequent formulation of the hypothesis:

H5: Proper rating positively impacts carbon emission disclosure.

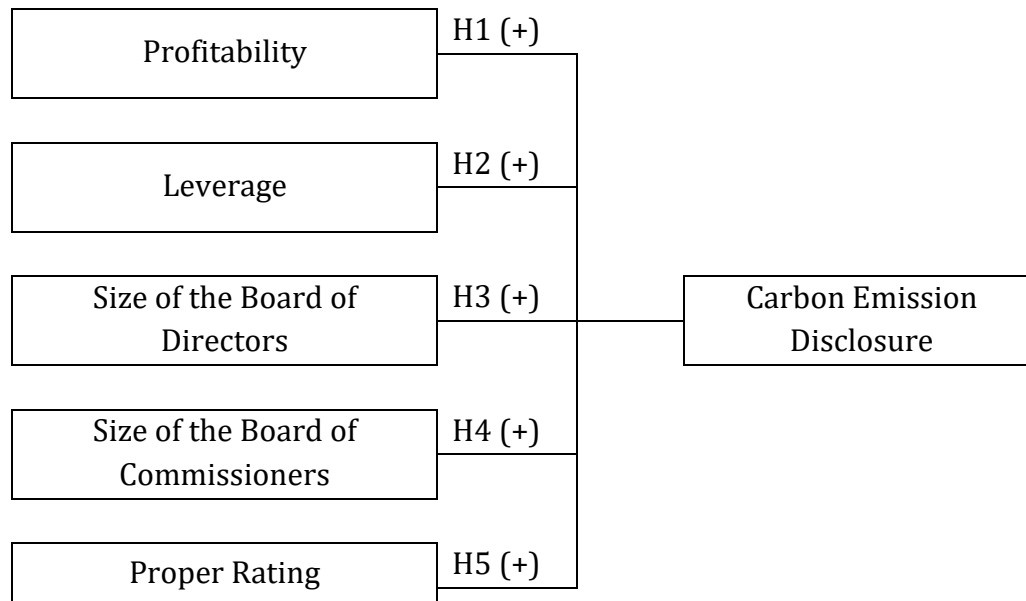


Figure 1. Research Conceptual Framework

This study employs a quantitative research design and utilizes secondary data obtained from www.idx.co.id and the official websites of each company, specifically annual reports and sustainability reports of energy sector companies. The research sample consists of 82 companies. Documentation and content analysis are employed to gather data for this study. Information is recorded or documented in the annual and sustainability reports of energy sector companies registered on www.idx.co.id for 2019-2022.

The investigation employed descriptive statistical analysis, hypothesis testing, classical assumption testing, and multiple linear regression analysis; all were performed using IBM SPSS version 16.0 software. With the following sample selection criteria, the population of interest in this study consists of all energy sector companies listed on the Indonesia Stock Exchange between 2019 and 2022:

- Energy sector companies that have released comprehensive sustainability reports and annual reports (Annual report) between 2019 and 2022 on the company's official website and the www.idx.com page.
- Energy sector firms that comprehensively issue financial reports, with annual reporting periods concluding on December 31st.
- Energy sector firms that have maintained a satisfactory level of performance for four consecutive years obtain listing on the Indonesian stock exchange.

- d. Energy sector firms that, for four consecutive years, disclose either explicitly or implicitly policies or items about carbon emissions (minimum of one policy or one item about carbon emissions disclosure).

Table 1. Sampling Criteria

Sample Criteria	Amount
Energy sector companies listed on the Indonesian Stock Exchange (BEI) for the 2019-2022 period	83
Energy sector companies that did not report financial reports and sustainability reports in the 2019-2022 period, respectively	(69)
Energy sector companies that do not have a proper level in the 2019-2022 period, respectively	(2)
Energy sector companies that do not disclose carbon emissions (at least one policy related to carbon emissions)	(0)
Samples that meet the criteria	12
Total company observations during the 2019-2022 observation period (12 X 4)	48

Source: Output SPSS 16.0

Operational Definition and Variable Measurement

The subject of investigation in this study pertains to the organization's disclosure of carbon emissions. In this study, profitability, leverage, the size of the board of directors, the size of the board of commissioners, and proper rating comprise the independent variables. The operational variables utilized in this research are as follows.

1. Carbon emission disclosure

The extent to which companies disclose information about their environmental responsibility regarding carbon emissions is the subject of carbon emissions disclosure in this study (Maqfirah & Riswan Yudhi Fahrianta, 2022). Carbon emissions disclosure at depth The present study employs the Carbon Table Disclosure Project Checklist, structured into five sections: accountability for carbon emissions, climate change, greenhouse gases, energy use accounting, and reducing greenhouse gas emissions and associated costs. A score of "1" will be assigned to each item that exposes the item, while a score of "0" will be deducted for each item that does not reveal the item. Using the subsequent formula, the scores derived from each entity will be divided by 18 by the total number of items.

$$CED : \frac{\text{Total Items disclosed} \times 100\%}{18}$$

2. Profitability

The profitability ratio indicates management effectiveness in executing operational activities and determines the capacity of a business to generate profits (Mujiani et al., 2019). An increase in profitability positively correlates with how a company utilizes its assets to generate profits. In this study, profitability is determined using the ROA ratio and the subsequent formula:

$$\text{Profitability} : \frac{\text{Net Profit after Tax}}{\text{Total Assets}}$$

3. Leverage

Leverage is a metric used to ascertain the proportion of a company's assets to its total debt. A high-leverage company is susceptible to significant creditor pressure (Asyari & Hernawati, 2023). In this study, leverage is calculated utilizing the debt-to-asset ratio (DAR) and the subsequent formula:

$$\text{Leverage} : \frac{\text{Total amount of debt}}{\text{Total Assets}}$$

4. Size of the Board of Commissioners

The board of Commissioners is a significant organizational entity of the company that assumes responsibilities for oversight operations and offers counsel to the board of Directors. The dimensions of the boards of commissioners utilized in this study are determined by summing the membership counts of the boards of commissioners at each energy sector company, as established in prior research (Pratama, 2021; Dharmawan et al., 2016).

5. Size of the Board of Directors

The board of directors is regarded as the preeminent governing body and ensures all stakeholders comply with legal requirements. The determination of the board of directors' size in this study is accomplished through the computation of the number of board members for each company operating in the energy sector, as established by previous research (Pratama, 2021; Dharmawan et al., 2016).

6. PROPER rating

The Ministry of the Environment established the Proper Rating, an environmental management company performance rating assessment program (Maqfirah & Riswan Yudhi Fahrianta, 2022). In this study, appropriate evaluations are classified into five distinct categories based on specific criteria: gold rank is assigned a score of five, green rank is given a score of four, blue rank is given a score of three, red rank is shown a score of two, and black rank is demonstrated a score of one.

RESEARCH AND RESULTS

The obtained research data was subjected to data analysis, which included classical assumption tests, hypothesis tests, multiple linear regression tests, and descriptive statistical analysis. The results of this data analysis are detailed in the subsequent table.

Table 2 Descriptive Statistical Analysis Result

	N	Minimum	Maximum	Mean	Std. Deviation
Profitability	48	-0.98	0.45	0.064	0.18001
Leverage	48	0.01	0.96	0.4452	0.22907
Size Board of Directors	48	2	11	5.6042	2.12122
Size Board of Commissioners	48	2	8	5.0417	1.64974
Proper Rating	48	0	5	3.3958	1.64691
CED	48	0.11	0.83	0.5594	0.20336
Valid N (listwise)	48				

Source: Output SPSS 16.0

Based on the analysis table above, Profitability (X1) has an average value of 0.064 with a minimum value of -0.98 and a maximum value of 0.45, as shown in the analysis table above. Thus, the mean return on assets (ROA) for firms operating in the energy sector is 0.064. In contrast, the deviation value of the organization is greater than the mean value. Suggests that the average value needs to depict the entire data set adequately. In contrast, the variable "leverage" (X2) exhibits a range of values from 0.01% to 0.96, with an average value of 0.4652.

Consequently, the mean DAR value for firms operating in the energy sector is 0.4652. The organization's deviation value is diminished compared to the mean value. This means the average value can symbolize the entire data set. The variable denoting the magnitude of the board of directors (X3) exhibits a range from 2 to 11, with an average value of 5.6042. In contrast, the average value of the board of commissioners' size (X4) is 5.0417, with a range of 2 to 8 as its minimum and maximum values, respectively.

In contrast, the proper rating (X5) ranges from 0 to its minimum and 5 maximum values, respectively. The average value, meanwhile, is 4.0833. Indicates that a gold rating is the greatest possible for a company operating in the energy sector. In contrast, an analysis of the company's carbon emissions disclosure value (Y) across 48 companies revealed an average of 0.5594%; the company deviation value was less than the company's mean value; therefore, the mean value can be relied upon to represent the entire set of data.

Table 3. Multicollinearity Test Results

Coefficients ^a			
Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	Profitability	0.707	1,414
	Leverage	0.732	1,366
	Board of Directors	0.613	1,632
	board of Commissioners	0.659	1,517
	PROPER rating	0.866	1,155
a. Dependent Variable: CED			

Source: Output SPSS 16.0

The multicollinearity test results indicate that the VIF value is less than 10, and the tolerance value for each variable is more significant than 0.10. This finding suggests that the independent variables do not exhibit any correlation, indicating that the regression equation model used in this study is devoid of multicollinearity.

Table 4. Autocorrelation Test Results

Model Summary ^b		
Model	Change Statistics	Durbin-Watson

	R Square Change	F Change	df1	df2	Sig. F Change	
1	0.317	3,902	5	42	0.005	1,582
a. Predictors: (Constant), Proper Rating, Size Board of Directors, Profitability, Leverage, Size Board of Commissioners						
b. Dependent Variable: CED						

Source: Output SPSS 16.0

The findings of the autocorrelation test conducted on the research variables indicate that the Watson Dubin value is 1.582, accompanied by dL and dU values of 1.316 and 1.772, respectively. Df 1 equals five, and df 2 equals forty-two. The absence of autocorrelation in the research data can be inferred from the Durbin-Watson value, which is equal to the product of the dL and dU values.

Table 5. Heteroscedasticity Test Results

Coefficients(a)						
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	Q	Sig.
1	(Constant)	0.253	0.064		3,964	0,000
	Profitability	0.041	0.097	0.072	0.420	0.677
	Leverage	0.006	0.075	0.013	0.079	0.937
	Board of Directors	-0.008	0.009	-0.167	-0.905	0.370
	Board of Commissioners	-0.009	0.011	-0.146	-0.818	0.418
	Proper Rating	-0.010	0.010	-0.170	-1,095	0.280

Source: Output SPSS 16.0

The outcomes of the heteroscedasticity above test indicate that the absolute residuals of all research-independent variables have significance values greater than 0.05. suggests that heteroscedasticity does not manifest itself.

Table 6. Normality Test Results

One-Sample Kolmogorov-Smirnov Test		
		Unstandardized Residuals
N		48
Normal Parameters	Mean	0
	Std. Deviation	0.16803774
Most Extreme Differences	Absolute	0.091
	Positive	0.063
	Negative	-0.091
Kolmogorov-Smirnov Z		0.630
Asymp. Sig. (2-tailed)		0.822
a. Test distribution is Normal.		

Source: Output SPSS 16.0

The significance value of 0.822, more significant than 0.05, as determined by the normality test, suggests that the residual value follows a normal distribution. The assumption of normality in the regression analysis has thus been satisfied.

Table 7. Multiple Linear Regression Test Results

Coefficients ^a						
Model	Unstandardized Coefficients			Standardized Coefficients		
		B	Std. Error	Beta	Q	Sig.
1	(Constant)	0.097	0.133		0.859	0.395
	Profitability	0.166	0.171	0.147	0.968	0.339
	Leverage	0.334	0.132	0.376	2,523	0.016
	Size Board of Directors	0.026	0.016	0.267	1,642	0.108
	Size Board of Commissioners	0.021	0.019	0.166	1,059	0.296
	Proper Rating	0.017	0.017	0.134	0.977	0.334
a. Dependent Variable: CED						

Source: Output SPSS 16.0

$$Y = 0.097 + 0.166X_1 + 0.334X_2 + 0.026X_3 + 0.021X_4 + 0.017X_5 + e$$

The multiple linear regression test results indicate that the constant value (α) is 0.097, which signifies that carbon emission disclosure (Y) will increase by 0.166 units if the independent variable is assumed to be 0. The profitability coefficient value is 0.166. In the interim, an increase of 0.334 in carbon emission disclosure is indicated by the leverage coefficient value of 0.334. In addition, the regression coefficient values of 0.026, 0.021, and 0.017 for the variable size of the board of directors, board of commissioners, and proper rating suggest a positive relationship between these factors and carbon emission disclosure.

Table 8. The goodness of Fit test results

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.563 ^a	0.317	0.236	0.17776
a. Predictors: (Constant), Proper Rating, Size Board of Directors, Leverage, Size Board of Commissioners, Profitability				

Source: Output SPSS 16.0

The value of the coefficient of determination indicated in the Adjusted R Square is 0.23, as shown in the table above. 23% of carbon emission disclosure can thus be accounted for by the following factors: profitability, Proper Rating, Board of Directors, leverage, and board of commissioners. In contrast, the remaining 77% is subject to the influence of extraneous variables that are not accounted for in the research model employed in this study.

Table 9. F Test Results

ANOVA ^a						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	0.617	5	0.123	3,902	0.005 ^a
	Residual	1,327	42	0.032		
	Total	1,944	47			
a. Predictors: (Constant), Proper Rating, Size Board of Directors, Leverage, Size Board of Commissioners, Profitability						
b. Dependent Variable: CED						

Source: Output SPSS 16.0

Based on the stimulant test above, it can be seen that the calculated F value is 4,154 >. The F table is 1.944 with a significant value of 0.005 or <0.05. This means that Profitability (X1), Leverage (X2), Board of Directors (X3), Board of Commissioners (X4), and Proper Rating (X5) have a stimulant influence on Carbon Emission Disclosure (Y). In this way, the research model is considered worthy of testing and proving the research hypothesis can be continued.

Table 10. T Test Results

Coefficients ^a				
		Standardized Coefficients		
Model		Beta	Q	Sig.
1	(Constant)		0.859	0.395
	Profitability	0.147	0.968	0.339
	Leverage	0.376	2,523	0.016
	Size Board of Directors	0.267	1,642	0.108
	Size Board of Commissioners	0.166	1,059	0.296
	Proper Rating	0.134	0.977	0.334
a. Dependent Variable: CED				

Source: Output SPSS 16.0

Based on the aforementioned partial test (T-Test) outcomes, the calculated leverage t value of 2,523 > from the t table of 2,018 indicates that the independent variable leverage has a positive or statistically significant impact on carbon emission disclosure because the leverage value is less than 0.05. Consequently, the hypothesis is valid. In contrast, the findings do not support the hypothesis that the size of the boards of directors, profitability, and proper rating do not significantly impact carbon emission disclosure.

The profitability has no impact on Carbon Emission Disclosure.

The findings of the hypothesis test concerning the relationship between Profitability (X1) and Carbon Emission Disclosure (Y) reveal that the significance level of this variable is 0.33, which is equal to or greater than $\alpha = 0.05$. It suggests that profitability has no discernible impact on carbon emission disclosure. The result contradicts the hypothesis (H1) that a positive relationship exists between profitability and carbon emission disclosure. As a consequence, (H1) is rejected.

Consistent with

prior investigations carried out by Prasetyo and Sri Harta Mimba (2021), Hapsari and Prasetyo (2020), Holmi et al. (2020), Florencia and Handoko (2021), Asmeri et al. (2022), and Setiadi and Prasetyo (2022), the findings of this study also indicate that carbon emission disclosure is not influenced by profitability. It suggests that a company's profitability does not incentivize or ensure carbon emissions disclosure because it is an integral part of its management policy and is not contingent on profitability (Florencia & Handoko, 2021).

The Leverage is Impact on Carbon Emission Disclosure

The significance level for the hypothesis test on the relationship between Leverage (X2) and Carbon Emission Disclosure (Y) is 0.016, less than the critical value of $\alpha = 0.05$. It suggests that leverage does indeed have a positive and statistically significant impact on Carbon Emission Disclosure. The outcome is consistent with the hypothesis (H2) that leverages positive influences on the disclosure of carbon emissions. Leverage refers to an organization's capacity to utilize funds acquired from creditors in the form of debt. Subsequently, these funds will be distributed towards financing the organization's operational expenditures, including the expense of acknowledging carbon emissions (Widiastutik & Khafid, 2021). The degree of carbon emission disclosure decreases as the level of company debt increases because a required obligation is calculated from incoming income. Consistent with findings from (Hapsoro & Ambarwati, 2018), (Mujiani et al., 2019), and (Widiastutik & Khafid, 2021), this study demonstrates that leverage significantly and positively influences carbon emission disclosure because leverage increases. So does the extent to which a company discloses its carbon emissions (Mujiani et al., 2019).

The Board Of Directors has no Impact on Carbon Emission Disclosure.

The significance level is 0.108, more significant than $= 0.05$, as determined by the hypothesis test on the relationship between the Board of Directors (X3) and Carbon Emission Disclosure (Y), which indicates that there is no positive and statistically significant relationship between the size of the board of directors and Carbon Emission Disclosure. Hypothesis (H3) is therefore rejected. Contrary to the findings of this study (Simamora et al., 2022), which indicate that the magnitude of the board of directors positively and significantly impacts carbon emission disclosure, the results of this research contradict that finding. Therefore, the number of directors on the boards of corporations does not influence carbon emissions disclosure.

The Board Of Commissioners has no Impact on Carbon Emission Disclosure.

The significance level for the hypothesis test on the relationship between the Board of Commissioners (X4) and Carbon Emission Disclosure (Y) is 0.296, more significant than $=$

0.05, which indicates there is no positive and statistically significant relationship between the size of the Board of Commissioners and Carbon Emission Disclosure.

The findings of this study contradict the hypothesis (H4) that there is a positive relationship between the magnitude of the board of commissioners and carbon emission disclosure. Nevertheless, this finding is consistent with prior research (Akhiroh & Kiswanto, 2016) that concludes carbon emission disclosure is not influenced by the magnitude of the board of commissioners. This study's findings contradict the stakeholder theory, which posits that commissioners must oversee senior management's actions to garner stakeholder support (akhiroh & Kiswanto, 2016).

The Proper Rating has no Impact of the Proper Rating on Carbon Emission Disclosure.

The significance level for the hypothesis test regarding the effect of proper rating (X5) on Carbon Emission Disclosure (Y) is 0.334, more excellent than $\alpha = 0.05$. This indicates no significant relationship exists between appropriate rating and carbon emission disclosure. Contrary to the hypothesis (H5) that appropriate rating positively influences carbon emission disclosure, this result indicates the opposite.

Contrary to Prasetya and Raka Adi (2018) and Dewi and Aldhani's (2021) findings, which suggest that proper rating positively impacts carbon emission disclosure, this result contradicts these findings. A company with a favorable appropriate rating demonstrates that it conducts its operational activities with significant regard for the community's well-being. It shows concern for the adjacent environment, which ultimately affects its profitability.

CONCLUSION AND RECOMMENDATIONS

This study aims to examine and gather empirical data regarding the impact of profitability, leverage, board of directors size, board of commissioners size, and appropriate ranking on the carbon emissions disclosure by energy sector firms listed on the Indonesia Stock Exchange from 2019 to 2022. The study encompassed a population of 82 energy sector companies, of which a sample of 12 consisted of 48 observations made over four years. According to an analysis of research data, leverage positively and significantly influences carbon emission disclosure. However, profitability, board size, board of commissioners size, proper rating, and size of the board of directors do not exhibit a positive and statistically significant impact on carbon emission disclosure. Theoretically, this research has the potential to serve as a benchmark for subsequent investigations concerning carbon emissions disclosure.

Conversely, this study will serve as a practical guide for organizations seeking to enhance their standing and assess their sustainability by divulging carbon emissions. In

addition, this research will likely provide references and insights that can contribute to expanding or refining knowledge concerning the factors that influence carbon emission disclosure. This study is subject to several limitations, the most significant of which is that the companies comprising the research population publish sustainability and annual financial reports intermittently or not regularly.

Consequently, each organization is anticipated to release a sustainability report and a yearly report detailing its carbon emissions. This initiative aims to enhance the perception, standing, and confidence of the general public and key stakeholders. However, by gaining the public's legitimacy or trust through carbon emission disclosure, businesses will have an easier time conducting sustainable operational activities. To ensure the accuracy and completeness of future research findings, it is anticipated that a larger sample or population of companies will be utilized, along with proxies or other variables, including industry type, size of women, ISO certification, institutional ownership, media exposure, and company size.

REFERENCES

- Akhiroh, T., & Kiswanto. (2016). Determinant Of Carbon Emission Disclosures Article History. *Accounting Analysis Journal*, 5(4), 326–336. <http://journal.unnes.ac.id/sju/index.php/aaj>.
- Asmeri, R., Anggraini, M. D., & Amidah, N. Ok. (2022). Pengaruh Profitabilitas, Umur Perusahaan Dan Debt To Equity Ratio Terhadap Pengungkapan Emisi Karbon Pada Perusahaan Manufaktur Yang Terdaftar Di Bei Dari Tahun 2017-2018. *Pareso Jurnal*, 4(4), 881–898.
- Asyari, S., & Hernawati, E. (2023). Lingkungan Terhadap Reaksi Investor Dengan. 0832(September), 319–342. *Jurnal Akuntansi Trisakti*, 10 (02), 319-342.
- Cahya, B. T. (2016). Carbon Emission Disclosure: Ditinjau Dari Media Exposure, Kinerja Lingkungan Dan Karakteristik Perusahaan Go Public Berbasis Syariah Di Indonesia. *Nizham*, 05, 171–188.
- Deantari, S. A. O., Pinasti, M., & Herwiyanti, E. (2019). Faktor-Faktor Yang Mempengaruhi Pengungkapan Emisi Gas Rumah Kaca Dari Perspektif Akuntansi Hijau. *Equilibrium: Jurnal Ekonomi Syariah*, 7(1), 88. <https://doi.org/10.21043/equilibrium.v7i1.5225>.
- Dewi, G. A. A. O., & Aldhani, L. G. P. R. (2021). Pengaruh Proper Rating, Industrial Type dan Profitabilitas terhadap Carbon Emission Disclosure pada Perusahaan Manufaktur di Bursa Efek Indonesia. *Jurnal Ilmiah Mahasiswa Akuntansi) Universitas Pendidikan Ganesha*, 12(01), 1011–1025.
- Dharmawan Krisna, A., & Suhardianto, N. (2016). Faktor-Faktor yang Mempengaruhi Pengungkapan Tanggung Jawab Sosial. *Jurnal Akuntansi Dan Keuangan*, 18(2), 119–

127. <https://doi.org/10.9744/jak.18.2.119-128>.

Florescia, V., & Handoko, J. (2021). Uji pengaruh profitabilitas, leverage, media exposure terhadap pengungkapan emisi karbon dengan pemoderasi. *Jurnal Riset Akuntansi Dan Keuangan*, 9(3), 583–598. <https://doi.org/10.17509/jrak.v9i3.32412>.

Hapsari, C. A., & Prasetyo, A. B. (2020). Analyze Factors That Affect Carbon Emission Disclosure (Case Study in Non-Financial Firms Listed on Indonesia Stock Exchange in 2014-2016). *Accounting Analysis Journal*, 9(2), 74–80. <https://doi.org/10.15294/aa.v9i2.38262>.

Hapsoro, D., & Ambarwati, A. (2018). Antecedents and Consequences of Carbon Emissions' Disclosure: Case Study of Oil, Gas and Coal Companies in Non-Annex 1 Member Countries. *Journal of Indonesian Economy and Business*, 33(2), 99. <https://doi.org/10.22146/jieb.28756>.

<https://myrobin.id/untuk-bisnis/dewan-komisaris/> (2023). Apa Itu Dewan Komisaris? Definisi Dan Tugas dan Tanggung Jawab. 25 (Mei), 2023.

<https://www.esgi.ai/apa-itu-dewan-direksi/> (2023). Apa Itu Dewan Direksi? Pengertian, Tugas, dan Ide Penelitian.

Kholmi, M., Karsono, A. D. S., & Syam, D. (2020). Environmental Performance, Company Size, Profitability, And Carbon Emission Disclosure. *Jurnal Reviu Akuntansi Dan Keuangan*, 10(2), 349. <https://doi.org/10.22219/jrak.v10i2.11811>.

Maqfirah, P. A., & Riswan Yudhi Fahrianta. (2022). Faktor-Faktor yang Memengaruhi Pengungkapan Emisi Karbon Pada Perusahaan Manufaktur yang Terdaftar di BEI Periode 2016-2020. *Providing National Seminar on Accounting UKMC*, 1(1), 344–356.

Mujiani, S., Juardi, J., & Fauziah, F. (2019). Determinan Carbon Emission Disclosure Pada Perusahaan Bumh Yang Terdaftar Di Bursa Efek Indonesia Periode 2013-2017. *JIAFE (Jurnal Ilmiah Akuntansi Fakultas Ekonomi)*, 5(1), 53–64. <https://doi.org/10.34204/jiafe.v5i1.1542>.

Nastiti, A., & Hardiningsih, P. (2021). Determinan Pengungkapan Emisi Karbon. *Jurnal Ilmiah Akuntansi Dan Keuangan*, 04(01), 27–39.

Prasetya, & Raka Adi, A. Y. (2018). The Effects of Tax Avoidance, Accrual Earnings Management, Real Earnings Management, and Capital Intensity on the Cost of Equity. *Jurnal Dinamika Akuntansi*, 10(1), 71–81. <https://doi.org/10.15294/jda.v10i1.12653>.

Prasetyo, I. P. A., & Sri Harta Mimba, N. P. (2021). The Effect of Good Corporate Governance, Company Size, and Profitability on Carbon Emission Disclosure. *International Journal of Scientific and Research Publications (IJSRP)*, 11(6), 781–786.

<https://doi.org/10.29322/ijsrp.11.06.2021.p114101>.

- Pratama, Y. M. (2021). Analisis Determinan Pengungkapan Emisi Karbon Di Indonesia. *Modus*, 33(2), 120–137. <https://doi.org/10.24002/modus.v33i2.4644>.
- Pratiwi, L., Maharani, B., & Sayekti, Y. (2021). Determinants of Carbon Emission Disclosure: An Empirical Study on Indonesian Manufacturing Companies. *The Indonesian Accounting Review*, 11(2), 197. <https://doi.org/10.14414/tiar.v11i2.2411>.
- Sekarini, L. A., & Setiadi, I. (2022). Pengaruh Leverage, Profitabilitas, Ukuran Perusahaan Dan Kinerja Lingkungan Terhadap Pengungkapan Emisi Karbon Perusahaan (Studi Empiris Pada Perusahaan Pertambangan Yang Terdaftar Di Bursa Efek Indonesia Periode 2014-2018). *Kompartemen: Jurnal Ilmiah Akuntansi*, 19(2), 83. <https://doi.org/10.30595/kompartemen.v19i2.8627>.
- Simamora, R. N. H., Safrida, & Elviani, S. (2022). Carbon emission disclosure in Indonesia: Viewed from the aspect of the board of directors, managerial ownership, and audit committee. *Journal of Contemporary Accounting*, 4(1), 1–9. <https://doi.org/10.20885/jca.vol4.iss1.art1>.
- Ulupui, I. G. K. A., Maruhawa, D., Purwohedi, U., & Kiswanto. (2020). Carbon Emission Disclosure, Media Exposure, Environmental Performance, Characteristics of Companies: Evidence from Non-Financial. *IBIMA Business Review*, 2020. <https://doi.org/10.5171/2020.628159>.
- Wahyuningrum, I. F. S., Oktavilia, S., Setyadharma, A., Hidayah, R., & Lina, M. (2022). Does carbon emissions disclosure affect Indonesian companies? *IOP Conference Series: Earth and Environmental Science*, 1108(1). <https://doi.org/10.1088/1755-1315/1108/1/012060>.
- Widiastutik, R., & Khafid, M. (2021). Determinan Carbon Emission Disclosure Dengan Peringkat Proper Sebagai Variabel Mediasi Pada Perusahaan Non Keuangan Di Indonesia Tahun 2015-2019. *Jurnal Akuntansi Bisnis*, 19(1), 17. <https://doi.org/10.24167/jab.v19i1.3247>.
- Zanra, S. W., Tanjung, A. R., & Silfi, A. (2020). The Effect of Good Corporate Governance Mechanism, Company Size, Leverage and Profitability for Carbon Emission Disclosure With Environment Performance As Moderating Variables. *Bilancia: Jurnal Ilmiah Akuntansi*, 4(2), 148–164. <http://www.ejournal.pelitaindonesia.ac.id/ojs32/index.php/BILANCIA/index>.