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The Relationship Between Profitability, Managerial and Institutional Ownership on Carbon Emission Disclosure

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Abstract: This study examines the relationship between profitability, managerial ownership, and institutional ownership with carbon emission disclosure in energy sector companies listed on the Indonesia Stock Exchange during the period 2021 to 2023. Carbon emission disclosure is a form of corporate environmental accountability that reflects transparency and commitment to sustainability. Using stakeholder theory as the theoretical framework, this study employs purposive sampling and obtains a sample of 20 companies with 60 firm-year observations. The data is collected from secondary sources, such as annual and sustainability reports, and analyzed using panel data regression with the EViews 12 software. The results show that profitability and managerial ownership are positively associated with carbon emission disclosure, while institutional ownership shows no significant relationship. These findings suggest that internal financial performance and ownership by management contribute to increased environmental transparency, whereas institutional investors may not consistently influence disclosure practices in the energy sector.

Keyword: Carbon Emission Disclosure, Profitability, Managerial Ownership, Institutional Ownership.

INTRODUCTION

One of the environmental problems that has emerged is global warming, which is largely caused by an excess of greenhouse gases in the atmosphere, which can cover the planet and reflect heat radiation back to the surface. Due to land clearing and forest fires, as well as the burning of fossil fuels such as coal, gas, and oil, this has become uncontrollable. Efforts to reduce emissions are being made in the sectors that contribute the most to emissions, such as forestry, land use, waste management, transportation, and others (Kholmi et al., 2020).

In response to this issue, many countries, including Indonesia, have committed to reducing greenhouse gas emissions. Indonesia, as one of the world's largest emitters, is striving to reduce the impact of greenhouse gases through government regulations under Law

No. 17 of 2004, which aims to significantly reduce greenhouse gas emissions. In this context, the energy sector is one of the main focuses, as it contributes significantly to total national carbon emissions (Nastiti & Hardiningsih, 2022).

One of the key findings from the Energy Flow Balance and Greenhouse Gas Emissions Balance Report published by the Central Statistics Agency is that the industrial processing sector saw an increase of 120,840 tons in carbon emissions from 2021 to 2022. While emissions from other sectors decreased slightly, the overall impact on greenhouse gas emissions across all sectors in Indonesia remained significant, with total industrial emissions increasing by 119,520 tons from 2021 to 2022. Companies in the energy sector in Indonesia are often under public and regulatory scrutiny regarding carbon emissions management and reporting (Suherman & Kurniawati, 2023). In this context, carbon emissions disclosure by companies is crucial as a form of social and environmental responsibility.

Therefore, profitability influences carbon emissions disclosure. High profitability indicates strong financial conditions, enabling companies to have greater flexibility and capacity to allocate additional resources, both in terms of labor and finance, required to improve the quality of carbon emissions reporting and disclosure (Apriliana, 2019). According to Sandi et al. (2021) in their research, profitability influences carbon emissions disclosure. Conversely, according to Solekhah & Ickhsanto (2022), profitability does not influence carbon emissions disclosure.

Managerial ownership with equity in a company is typically motivated to enhance the company's image, particularly in relation to sustainability. Companies can enhance their reputation as environmentally conscious organizations by disclosing their carbon emissions. This can attract investors who prioritize sustainability (ESG). Additionally, environmental issues that could impact business success in the long term may lead them to opt for transparent carbon emissions reporting to avoid legal issues and maintain the company's reputation (Liu et al., 2023). According to research by Wibowo et al. (2022), managerial ownership positively influences carbon emissions disclosure. This finding contradicts Sari & Susanto (2021), who found that managerial ownership does not influence carbon emissions disclosure.

Constitutional ownership guarantees the rights of companies or shareholders to manage their businesses in accordance with internal policies and national laws, including environmental policies. In terms of carbon emissions disclosure, companies are responsible for ensuring that their internal policies are in line with government regulations on carbon emissions reporting. Carbon emissions disclosure is a key aspect of companies' efforts to demonstrate transparency and accountability for the environmental impact of their operational activities (Wiransyah & Tafdil Husni, 2024). According to Cohen et al (2023) in their research, constitutional ownership has a positive effect on carbon emissions disclosure, unlike the research by Sari & Susanto (2021) which states that constitutional ownership has no effect on carbon emissions disclosure.

The phenomenon observed indicates that carbon emissions disclosure plays a significant role in reducing carbon emissions in companies through appropriate decisions. This study aims to analyze the impact of profitability, managerial ownership, and institutional ownership on carbon emissions disclosure.

METHOD

Metode Penelitian

The population used in this study was all energy sector companies listed on the Indonesia Stock Exchange from 2021 to 2023. The population consisted of 74 companies in the energy sector in Indonesia listed on the IDX and the websites of the relevant entities. This

study found 20 companies and 60 observation samples that could be used as samples in this study.

Tabel 1. Operational measurement of variables

No	Variable	Measurement	Scale
1	Carbon emission disclosure	$\frac{\text{The total number of scores 1 that company can express}}{\text{Maximum score of GRI 305 items (7 items)}}$	Rasio
2	Profitability	$\frac{\text{net profit}}{\text{Total asset}}$	Rasio
3	Managerial Ownership	$\frac{\text{Total Share Owned by management}}{\text{NUMBER OF SHARE OUTSTANDING}}$	Rasio
4	Institutional Ownership	$\frac{\text{Total Share Owned by institution}}{\text{NUMBER OF SHARE OUTSTANDING}}$	Rasio

Data Analysis Techniques

Sugiyono (2019) The technique used in data analysis in this study is panel data regression analysis using Eviews 12 software, with tabular data in the form of cross-section and time series, involving companies in the energy sector from 2021 to 2023.

According to Napitupulu et al (2021), regression estimation for panel data utilizes several tests, such as:

a. Common Effects

The Common Effects Model, also known as Pooled Least Squares (PLS), is the most basic form of panel data model, where cross-sectional and time-series data are combined without considering differences between individuals or over time. This model assumes that the behavior of all entities (e.g., companies) is uniform throughout the observation period. The estimation of this model is performed using the Ordinary Least Squares (OLS) method.

b. Fixed Effects

The Fixed Effects Model is also known as the Least Squares Dummy Variable (LSDV) model. This model accommodates differences between entities through variations in the intercept values. In its implementation, this model uses dummy variables to capture variations between units (such as companies), which can be caused by internal factors such as work culture, managerial systems, and incentives. However, this model still assumes that the regression slope between entities is the same

c. Random Effects

The Random Effects Model or Error Component Model (ECM), also known as the Generalized Least Squares (GLS) technique, assumes that differences between entities are captured in the error component. The advantage of this approach is its ability to address heteroskedasticity issues in panel data, resulting in more efficient estimates

Chow Test

The Chow test is conducted to determine whether the most appropriate model to use in panel regression analysis is the Fixed Effects Model (FEM) or the Common Effects Model (CEM). This test is based on comparing the F-statistic value with the F-table value. If the F-statistic value is greater than the F-table value, the null hypothesis (H_0) stating that the appropriate model is the Common Effects Model is rejected, making the Fixed Effects Model more suitable for use. In addition, the test results can also be seen from the probability value in the Redundant Fixed Effect test. If the probability value is less than 0.05, then H_0 is rejected and FEM becomes the model of choice because it is considered to be better at capturing differences in characteristics between entities.

Hausman Test

The Hausman test aims to select the most appropriate model between the Fixed Effect Model (FEM) and the Random Effect Model (REM). In this test, the null hypothesis (H_0) states that the appropriate model is Random Effect, while the alternative hypothesis (H_1) states that Fixed Effect is more appropriate. The basis for decision-making can be seen from the p-value or Chi-Square value. If the p-value is < 0.05 or the calculated Chi-Square value is greater than the Chi-Square table value, then H_0 is rejected. Thus, the Fixed Effect model is selected because it is considered more consistent and unbiased in capturing the effect of independent variables on dependent variables in panel data.

Lagrange Multiplier Test

The Lagrange Multiplier (LM) test is used to determine whether the most appropriate model is the Random Effect Model (REM) or the Common Effect Model (CEM). The null hypothesis (H_0) states that the appropriate model is the Common Effect, while the alternative hypothesis (H_1) states that the Random Effect model is more appropriate. This test is typically conducted using the Breusch-Pagan LM Test. If the probability value (p-value) of the LM test result is less than 0.05, then H_0 is rejected and REM is chosen as the most appropriate model. This indicates that the variance between entities can be better explained by the error component in the Random Effect model.

Normality Test

The normality test serves to determine whether the independent and dependent variables are normally distributed or not (Sirait et al., 2018).

Multicollinearity Test

The multicollinearity test in this study aims to test whether there is correlation between independent variables in the regression model. In a good regression model, there should be no correlation between independent variables (Marini, 2019).

Heteroscedasticity Test

The heteroscedasticity test is conducted to determine whether there are differences in residual variance between observations in the regression model (Aprilyani Dewi & Budiadnyani, 2024).

The Partial Test

The partial test (t-test) aims to determine the extent to which each independent variable individually influences the variation in the dependent variable (Yesiani et al., 2023).

The Simultaneous Test

The F test, also known as the simultaneous test, is used to determine whether all independent variables used in the regression model collectively influence the dependent variable (Maryono & Ermawati, 2024).

Coefficient of Determination Test

The coefficient of determination (R^2) is used to assess how well the model explains the variation in the dependent variable (Ghazali, 2016).

RESULT AND DISCUSSION

Stakeholder Theory

Stakeholder theory was first introduced by R. Edward Freeman in 1984 in his book *Strategic Management: A Stakeholder Approach*. This theory states that the long-term success of an organization depends heavily on its ability to manage relationships with stakeholders, i.e., individuals or groups that can influence or be influenced by the achievement of organizational goals. Stakeholders in the context of a company include shareholders, management, employees, the government, the community, customers, financial institutions, and other parties with an interest in the company's activities.

Carbon Emission Disclosure

According to Sekarini & Setiadi (2022), carbon emissions disclosure is a practice whereby companies voluntarily or regulatively disclose the amount of greenhouse gas emissions (carbon dioxide and others) generated from their operational activities. The main objective is to increase transparency towards stakeholders such as investors, the government, and the general public.

Profitability

Profitability is a company's ability to generate profits or earnings over a specific period of time, as well as a measure of the company's overall performance. It is believed that profits can influence a company's value. Profitability reflects the balance between revenue and the ability to generate business profits at various levels of activity, so this ratio reflects the efficiency and success of all managed operations (Estuti & Hendrayanti, 2020).

Managerial Ownership

Managerial ownership refers to the percentage of company shares owned by management members, such as directors or commissioners. The larger the proportion of shares owned by management, the higher their interest in the company's success, as this success directly affects their personal profits as shareholders. High managerial ownership provides incentives for management to manage the company more responsibly and sustainably, including transparency in disclosing information related to carbon emissions (Almuaromah & Wahyono, 2022).

Institutional Ownership

Institutional ownership refers to the proportion of company shares owned by financial institutions such as banks, pension funds, insurance companies, or mutual funds. Institutional shareholders typically have significant influence in directing company policy due to their substantial investments (Putri et al., 2022). Institutional ownership is chosen because it enhances oversight of company management through pressure from financial institutions, such as banks or pension funds, to implement good governance. Institutional shareholders tend to demand more transparent and comprehensive reporting on carbon emissions, as they focus on Environmental, Social, and Governance (ESG) aspects. With their influence, companies are encouraged to comply with environmental regulations, report carbon emission data in detail, and implement clear sustainability strategies (Amran et al., 2015).

Analisis Statistik Deskriptif

Descriptive statistical analysis analyzes data by describing or depicting the collected data as it is without intending to make conclusions that apply to the general public or generalizations (Septyadi & Bwarleling, 2020).

Table 2. Deskriptive Statistic Test Result

	ROA	KM	KI	CED
Mean	0.111500	0.046222	0.662554	0.569048
Median	0.091885	0.013178	0.684401	0.571429
Maximum	0.454267	0.330174	0.879079	1.000000
Minimum	0.000171	0.000308	0.119193	0.142857
Std. Dev.	0.093775	0.066430	0.174171	0.322662
Skewness	1.122469	2.024634	-0.954516	0.109846
Kurtosis	4.389152	7.393941	3.183641	1.553423
Jarque-Bera	17.42372	89.25821	9.195313	5.352123
Probability	0.000165	0.000000	0.010075	0.068834
Sum	6.690022	2.773336	39.75326	34.14286
Sum Sq. Dev.	0.518827	0.260361	1.789793	6.142517
Observations	60	60	60	60

Referring to Table 2, the total number of samples (n) is 60 data points, with the lowest profitability of 0.000171 and the highest of 0.454267, with an average of 0.111500 and a standard deviation of 0.093775. Managerial ownership reached a minimum of 0.0000308 and

a maximum of 0.330174, with an average of 0.046222 and a standard deviation of 0.066430. Institutional ownership had a minimum value of 0.119193 and a maximum of 0.879079, with an average of 0.662554 and a standard deviation of 0.174171. Carbon emissions disclosure ranges from a minimum of 0.142857 to a maximum of 1.0000, with an average of 0.569048 and a standard deviation of 0.322662.

Table 3. Chow Test Result

Redundant Fixed Effects Tests
Equation: Untitled
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	9.362820	(19,37)	0.0000
Cross-section Chi-square	105.553501	19	0.0000

Referring to Table 3, the Cross-section F probability value is 0.0000, which is < 0.05 , so the recommended model is the Fixed Effect Model (FEM).

Table 4. Hausman Test Result

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	2.984557	3	0.3940

Referring to Table 4, the Cross-section random probability value obtained is 0.3940, which is > 0.05 , so the appropriate model is the Random Effect Model (REM).

Tabel 5. Lagrange Multiplier Test Results

Lagrange Multiplier Tests for Random Effects
Null hypotheses: No effects
Alternative hypotheses: Two-sided (Breusch-Pagan) and one-sided (all others) alternatives

	Test Hypothesis		
	Cross-section	Time	Both
Breusch-Pagan	28.52127 (0.0000)	0.008389 (0.9270)	28.52966 (0.0000)
Honda	5.340531 (0.0000)	0.091592 (0.4635)	3.841091 (0.0001)
King-Wu	5.340531 (0.0000)	0.091592 (0.4635)	1.735245 (0.0413)
Standardized Honda	5.924015 (0.0000)	0.581195 (0.2806)	0.899875 (0.1841)
Standardized King-Wu	5.924015 (0.0000)	0.581195 (0.2806)	-0.200024 (0.5793)
Gourieroux, et al.	--	--	28.52966 (0.0000)

Sumber : Data diolah Eviews 12, 2025

Referring to Table 5, the cross-section figure obtained from Breush-Pagan is 0.0000, which is < 0.05 , so the model is appropriate based on this test, which is random effects.

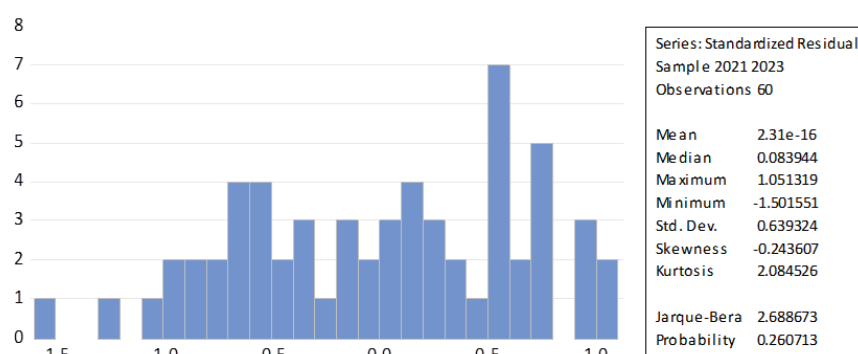
Tabel 6. Panel Data Regression Results

Dependent Variable: PL
Method: Panel Least Squares
Date: 03/26/25 Time: 20:45
Sample: 2021 2023
Periods included: 3
Cross-sections included: 32
Total panel (balanced) observations: 96

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.547286	0.619313	-2.498390	0.0154
AKO	0.028260	0.017625	1.603375	0.1144
LKD	-0.014388	0.010467	-1.374599	0.1746
UP	0.054352	0.020826	2.609791	0.0116
BTD	10.14781	3.422338	2.965170	0.0044
AKO_BTD	0.242170	0.205414	1.178937	0.2433
LKD_BTD	-0.066964	0.199242	-0.336092	0.7380
UP_BTD	-0.229011	0.109177	-2.097622	0.0404

Referring to Table 6, through the Random effects model in panel data analysis, the regression equation results obtained are:

$$\text{LOG_CED} = -0.0848253749402 + 0.115923493195 \cdot \text{LOG_ROA} + 0.126444814774 \cdot \text{LOG_KM} - 0.380756776913 \cdot \text{LOG_KI} + [\text{CX}=\text{R}]$$


Figure 1 Normality Test Results

According to Figure 1, the normality test results using the Jarque-Bera method show a statistical value of 2.688673 with a probability of 0.260713. It can therefore be concluded that the regression model residuals are normally distributed, so the normality assumption has been fulfilled.

Table 7. Muticollinearity Test

	LOG_ROA	LOG_KM	LOG_KI
LOG_...	1.000000	-0.006112	0.421477
LOG_KM	-0.006112	1.000000	-0.118402
LOG_KI	0.421477	-0.118402	1.000000

According to the data in Table 7, the correlation coefficient between ROA and KM is $-0.006112 < 0.9$, ROA and KI is $0.421477 < 0.9$, and KM and KI is $-0.243062 < 0.9$. Based on the results of the three independent variables. Thus, it can be concluded that there is no multicollinearity in this regression model.

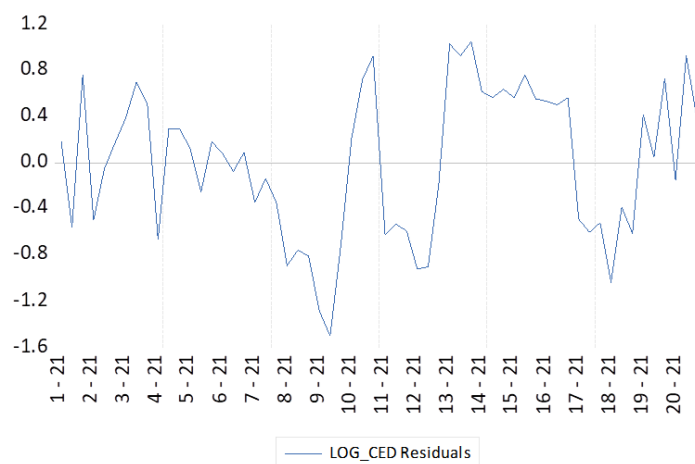


Figure 2. Heteroscedasticity Test

From the image, it can be concluded that the residual graph (blue) does not exceed the limits (500 and -500), meaning that the residual variance is the same (Napitupulu et al., 2021). Therefore, it can be concluded that this model does not exhibit or is free from heteroscedasticity.

Table 8. Partial Test Results

Dependent Variable: LOG_CED
Method: Panel EGLS (Cross-section random effects)
Date: 06/22/25 Time: 18:14
Sample: 2021 2023
Periods included: 3
Cross-sections included: 20
Total panel (balanced) observations: 60
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.084825	0.283163	-0.299564	0.7656
LOG_ROA	0.115923	0.046369	2.500007	0.0154
LOG_KM	0.126445	0.052126	2.425770	0.0185
LOG_KI	-0.380757	0.214893	-1.771846	0.0819

1. The following is a discussion of the t-test analysis of the three independent variables based on the t-test table for panel data regression above with a significance level of 0.05 and $df = (\text{number of samples} - 2) = (60 - 2 = 58)$, resulting in a t-table value of 2.0007.
2. The t-test results for profitability show that the calculated t-value is higher than the t-table value, i.e., $2.500 > 2.007$. The probability of 0.0154 is less than 0.05. Therefore, profitability is stated to be related to carbon emissions disclosure. The t-test results for managerial ownership show that the calculated t-value does not reach the t-table value, i.e., $2.425 < 2.007$. The probability value of 0.0185 is less than 0.05. Therefore, managerial ownership is stated to be related to carbon emissions disclosure.
3. The t-test results for institutional ownership show that the calculated t-value exceeds the table t-value, i.e., $1.771 < 2.007$. The probability of 0.081 is greater than 0.05. Therefore, institutional ownership is not related to carbon emissions disclosure.

Tabel 9. Simultan Test Results

Weighted Statistics			
R-squared	0.202859	Mean dependent var	-0.238850
Adjusted R-squared	0.160155	S.D. dependent var	0.353936
S.E. of regression	0.324357	Sum squared resid	5.891636
F-statistic	4.750353	Durbin-Watson stat	2.049256
Prob(F-statistic)	0.005073		

Referring to Table 9, the F table value ($\alpha = 0.05$, $df1 = 4$, and $df2 = 56$) is 2.679. This result concludes that the calculated F value is higher than the F table value, namely $4.750 > 2.679$. This finding concludes that profitability, managerial ownership, and institutional ownership are simultaneously related to carbon emissions disclosure.

Uji Koefisien Determinasi (R^2)

Tabel 10. Coefficient Of Determination Test

Weighted Statistics			
R-squared	0.202859	Mean dependent var	-0.238850
Adjusted R-squared	0.160155	S.D. dependent var	0.353936
S.E. of regression	0.324357	Sum squared resid	5.891636
F-statistic	4.750353	Durbin-Watson stat	2.049256
Prob(F-statistic)	0.005073		

Referring to Table 10, it shows an Adjusted R-square value of 0.160155. It is known that 16% of the variation in carbon emissions disclosure can be explained by variations in profitability, managerial ownership, and institutional ownership, while the remaining 84% (100 adjusted R-squared value) is explained by other variables not found in this research model.

The first hypothesis (H1) asserts that profitability is related to carbon emissions disclosure. Optimizing profitability allows companies to not only focus on achieving profits but also expand their role in supporting sustainability goals. Profits obtained from business operations can be strategically allocated for investments in environmental areas such as emissions monitoring systems, clean energy use, and transparent reporting. In other words, effective profit management can serve as a catalyst in promoting more structured carbon emissions disclosure. The findings of this study are consistent with those of Apriliana (2019), Wibowo et al. (2022), and Almuaromah & Wahyono (2022), who also found that profitability is related to carbon emissions disclosure.

The second hypothesis (H2) suggests that, partially, the level of managerial ownership is related to carbon emissions disclosure. This finding indicates that optimizing the role of management as shareholders can increase commitment to environmental transparency. When managers own shares in the company, they will be more cautious in implementing policies that could impact on the company's reputation, including in terms of carbon emissions disclosure. This finding reinforces the research of Wibowo et al. (2022) and Simamora et al. (2022), which states that managerial ownership is related to carbon emissions disclosure.

The third hypothesis (H3) reveals that institutional ownership has no effect on carbon emissions disclosure. This indicates that the presence of institutional investors, such as banks, pension funds, and other financial institutions, has not yet had a significant impact on encouraging companies to report carbon emissions openly and transparently. The optimization of the role of institutions as shareholders has not been fully reflected in company policies that encourage the disclosure of environmental information. It is highly

likely that the primary focus of institutional investors in Indonesia remains centered on financial aspects and short-term profit stability, so environmental issues have not become a priority in investment considerations. However, if the oversight function of institutions is carried out effectively, companies will be more motivated to improve the quality of their reporting, including in terms of carbon emissions disclosure. In other words, the low contribution of institutional ownership to carbon emissions transparency reflects that this oversight function is not yet operating optimally. This study aligns with findings from Sari & Susanto (2021) and Suherman & Kurniawati (2023), which indicate that institutional ownership is not correlated with carbon emissions disclosure.

CONCLUSION

Profitability is related to carbon emissions disclosure, managerial ownership is related to carbon emissions disclosure, and institutional ownership is not related to carbon emissions disclosure.

Recommendations

Future researchers may add additional variables. It is recommended to add other variables such as company size, emission intensity, or foreign ownership, which may influence carbon emissions disclosure. Subsequent researchers may also change the research object to companies from other sectors. The results of this study can be used as a consideration in making investment decisions, especially in assessing a company's commitment to sustainability and environmental practices.

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