Carbon Emissions Disclosure: Return on Assets, Leverage and Media Exposure

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Abstract. The purpose of this study is to prove the hypothesis that return on assets, leverage projected by debt to equity ratio and media exposure affect the disclosure of carbon emissions. This type of research uses a quantitative approach. The population in this study are mining companies listed on the IDX in 2018-2022. The total population is 52 companies. Researchers apply a non-probability sampling method, which will specifically be carried out using purposive sampling method, then a total sample of 26 companies is found. The data collection technique used in this exploration is the documentation strategy. Then the data analysis uses multiple linear regression analysis method to analyze the effect of independent variables on the dependent which is processed using Statistical Program for Social Science (SPSS) 25 software program. Based on hypothesis testing, the results show that media exposure has a positive and significant effect on carbon emission disclosure. Meanwhile, Return on Asset and Debt to Equity Ratio have no significant effect on carbon emission disclosure.

Keywords: Leverage, Media Exposure, Return on Assets

INTRODUCTION

According to the International Energy Agency (IEA), global carbon dioxide (CO2) emissions from energy combustion and industrial activities reached 36.8 gigatons in 2022, an increase of 0.5 gigatons from the previous year. This increase is mainly due to coal and oil combustion, which rose by 1.6% and 2.5% respectively. While emissions from natural gas and industrial activities declined, total emissions remained at a record high, exacerbating global climate change (1).

The increase in global carbon emissions reported by the IEA has a direct impact on climate change. CO2 emissions from burning coal and petroleum increase the concentration of greenhouse gases in the atmosphere, leading to global warming. This warming triggers various climate changes, including an increase in the earth's average temperature, melting of polar ice caps, sea level rise, and extreme weather such as storms and floods. As a result, ecosystems are disrupted, and human life is threatened by increasingly unstable environmental conditions.
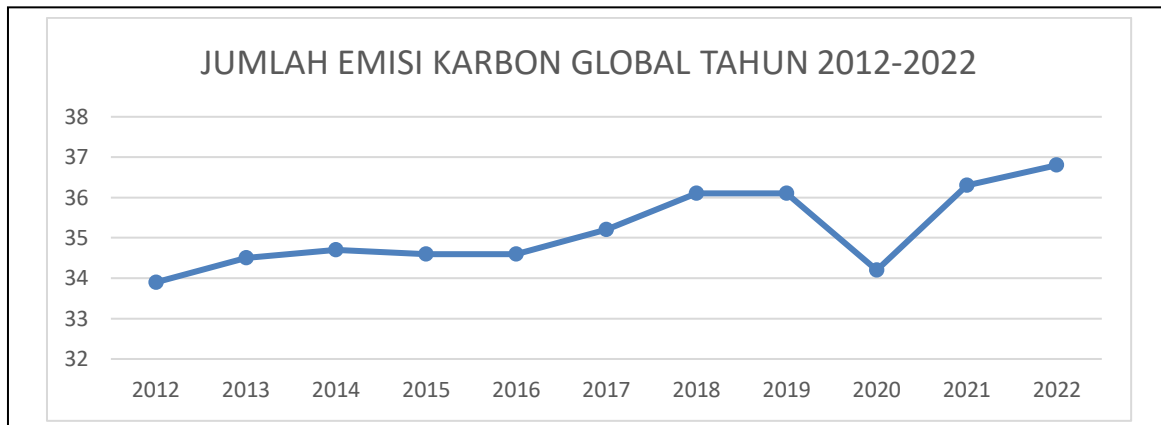
Figure 1: Total Global Carbon Emissions 2012-2022 (1)

This proves that in the last decade, there has been a shift in the issues of financial science studies from initially only studying traditional financial issues. Such as investment decisions, capital structure decisions, dividend policies, agency problems and information asymmetry problems; has shifted to sustainable finance issues such as environmental and social issues related to financial performance. Reducing carbon emissions has a positive effect on the company's financial performance because companies that reduce carbon emissions will receive support and legitimacy from all their stakeholders when the company carries out its business activities (2).

Humanity is currently facing two interconnected and increasingly urgent global challenges: climate change and the environmental crisis. Both problems have spread across the globe, threatening the survival of people, ecosystems and our planet. Since the 19th century, climate change has increased significantly, mainly due to human activities. One of the main causes is the use of fossil fuels such as natural gas, coal and petroleum in various industrial sectors. The burning of these fossil fuels releases greenhouse gases (GHGs) that retain the sun's heat and result in a rise in temperature on earth. The main cause of climate change is global warming. Human activities, especially the burning of fossil fuels such as coal, oil and gas, produce greenhouse gas emissions (3). These gases act like a blanket wrapped around the Earth, trapping the sun's heat and increasing temperatures. Examples of greenhouse gas emissions include carbon dioxide and methane, which come from using gasoline to drive cars, coal to heat buildings, and land and forest clearing. The global commitment to reducing greenhouse gas production and addressing the impacts of climate change is reflected in the various international instruments that have been created and are being implemented in phases (4).

The impact of climate change. Climate change has become one of the biggest issues facing the world today. Disclosure of carbon emissions is a crucial first step for companies in meeting this challenge (5). This research can help understand the extent to which companies disclose their carbon emissions and how this relates to efforts to mitigate the impacts of climate change.

Legitimacy theory explains a company's efforts to ensure its operational activities are accepted and considered legitimate by external stakeholders such as society and government, by complying with applicable norms, values and rules. Legitimacy is important for the sustainability of company operations, because without legitimacy, companies can face threats from community demands to fulfill their rights and protect the environment. Therefore, companies are encouraged to be transparent in presenting and disclosing environmental issues

in their reports, to maintain the trust and support of stakeholders and ensure their business continuity (6).

In accordance with legitimacy theory, disclosure of carbon emissions is a way for companies to make a "social contract" with society in terms of protecting the environment. Improving environmental performance and disclosing carbon emissions will provide benefits for companies to avoid reputational risk, reduced operating costs, fines and legal proceedings.

According to (7), the disclosure of carbon emissions is the extent of disclosure of information regarding environmental responsibility by companies related to carbon emissions. Broadly speaking, carbon emission disclosure is a process by which companies publicly report the amount of greenhouse gas emissions resulting from their operational activities. It aims to increase transparency, demonstrate commitment to the environment, and meet stakeholder demands and government regulations related to environmental management. This disclosure helps companies reduce reputational risk, potential operational costs, and legal fines. Equation (1) describe the method used in this study.

$$CED = \Sigma di/M \tag{1}$$

Profitability is the company's ability to generate profits effectively and efficiently. In general, the profit generated by the company comes from sales and investment income made by the Company (8). (9) revealed that the relationship between profitability and disclosure of carbon emissions is that companies with good financial conditions are able to pay the finances needed for voluntary reporting and disclosure of carbon emissions (10). In this study using the following formula:

$$Return\ on\ Asset = \frac{Net\ profit\ After\ Tax}{Net\ Asset} \tag{2}$$

High profitability makes companies better able to carry out environmental responsibility (6). Companies with high profitability are considered more likely to disclose carbon emissions than companies with low profitability.

Leverage in this study is calculated using the Debt to Asset Ratio (DAR) with the calculation comparing total debt to total company assets (11). This ratio shows the extent to which the company's assets are financed by debt. The higher this ratio, the greater the proportion of assets funded by debt, which indicates a higher level of leverage and financial risk in the study using the following:

$$Debt\ to\ Asset\ Ratio = \frac{Total\ Liabilities}{Total\ Asset} \tag{3}$$

Media Exposure

The social contract between entities and society is the main basis of legitimacy theory. This theory focuses on the relationship between companies and society through government regulations. In general, legitimacy theory assesses how media news contributes to the increasing pressure of public demands on companies. The media plays a crucial role in social mobilization, such as in environmental groups. In addition, the media is also important in disseminating information to the public, including information about company activities. The media has an important role in social mobilization movements, such as groups interested in the environment. The media also plays an important role in communicating information to the public. Information about company activities is also information that can be communicated to the public (12)

In this study, media exposure is measured using dummy variables, namely by giving a score of "1" to companies that disclose information about corporate carbon emissions in sustainability reports, company websites, and giving a score of "0" to companies that do not disclose information about corporate carbon emissions.
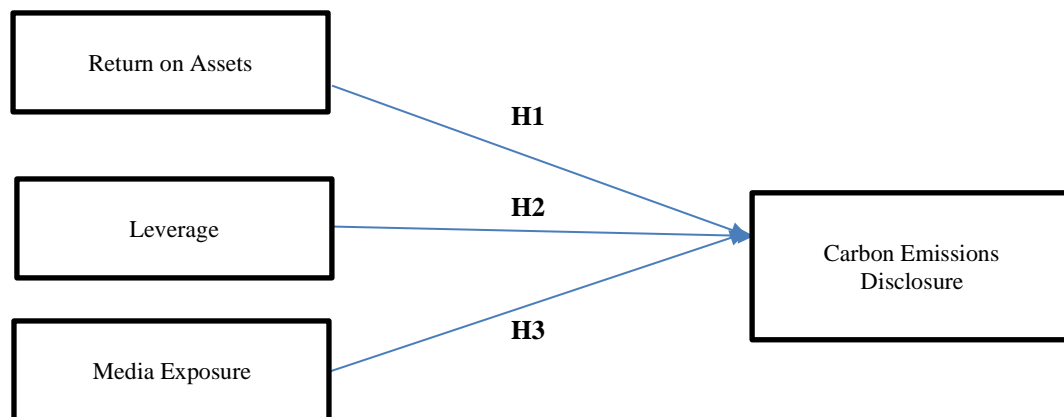
Figure 2: Framework of Thoughthis

H_1: Return on Asset has a significant effect on disclosure of carbon emissions
H_2: Leverage has a significant effect on disclosure of carbon emissions
H_3: Media Exposure has a significant effect on the disclosure of carbon emissions

METHODOLOGY

This research uses a quantitative approach. Data and information collection is done by means of literature study. The data used is secondary data in the form of company financial reports for 2020-2022 by independent auditors. The sample in this study were mining sector companies listed on the Indonesia Stock Exchange. To obtain a representative research sample, it was carried out using purposive sampling technique. The sample used must meet several criteria, namely:

a) Mining sector manufacturing companies listed on the Indonesia Stock Exchange in 2020-2022;
b) Mining sector manufacturing companies that publish annual reports and sustainability reports consecutively during 2020-2022;
c) Mining sector manufacturing companies that disclose at least one information related to carbon emissions in their sustainability reports during 2020-2022;
d) Mining companies that have sustainability reports or other websites related to the disclosure of carbon emissions.

Table 1 Sampling

Description	Total
Population: Mining companies listed on the BEI	52
Companies that meet the criteria:	
1. Mining companies that do not have annual reports that are available in full on the IDX website in the 2020-2022 period.	(2)
2. Mining companies that do not have sustainability reports or other media related to carbon emission disclosure	(18)
3. Mining companies that do not disclose carbon emissions (includes one policy/item related to carbon emissions contained in the CDP	(6)

checklist)	
Companies that meet the criteria	26

Based on Table 1, there are 22 companies that meet the criteria, because the research period is three years, the total number of samples is 78 samples.

RESULTS AND DISCUSSION
Statistic Descriptif

Table 2. Descriptif Statistics

	N	Minimum	Maximum	Mean	Std.Deviation
CED	78	.33333	.83333	.64886	.10344
ROA	78	-.24619	.61634	.10944	.15629
DER	78	.01271	5.25044	.97049	1.01730
MED	78	0	1	.58	.497
Valid N (listwise)	78				

Based on table 1, the carbon emission disclosure variable shows an average value of 0.64886, the highest value is 0.83333 which occurred at PT Adaro Energy Indonesia Tbk in 2022, then the lowest value is 0.33333 which occurred at PT Elnusa Tbk in 2020, with a standard deviation value of 0.10344.

The Return on Asset variable shows an average value of 0.10944, the highest value is 0.61634 which occurred at PT Golden Energy Mines Tbk in 2022, then the lowest value is -0.24619 which occurred at PT Apexindo Pratama Duta Tbk in 2022, with a standard deviation value of 0.15629.

The Leverage variable projected by the Debt to Equity Ratio shows an average value of 0.97049, the highest value is 5.25044 which occurred at PT Central Omega Resources Tbk in 2021, then the lowest value is 0.01271 which occurred at PT Astrindo Nusantara Infrastruktur Tbk in 2022, with a standard deviation value of 1.01730.

The Media Exposure variable shows an average value of 0.58, the highest value is 1 which occurred at PT Adaro Energy Indonesia in 2022, then the lowest value is 0 which occurred at PT Ratu Prabu Energi Tbk in 2020, with a standard deviation value of 0.497.

Coefficient of Determination

Table 3. Koefisien Determinasi

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.283[a]	.080	.043	.10120

a. Predictors: (Constant), MED, ROA, DER
b. Dependent Variable: CED

In the table above, the R Square value is 0.80 or 80%. This means that the Return on Asset, Leverage and Media Exposure variables can explain the disclosure of carbon emissions by only 80%, while the remaining 20% is another factor not examined in this study.

Model Fit Test (F test)

Table 4 Model Fit Test (F Test)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.066	3	.022	2.150	.0.036[b]
	Residual	.758	74	.010		
	Total	.824	77			

a. Dependent Variable: CED
b. Predictors: (Constant), MED, ROA, DER

The results of testing the suitability of the model or F test, stating the sig value. $0.036 \leq$ 0.05 means that the data model in this study is suitable for examining the disclosure of carbon emissions.

T-Partial Test

Table 4. t-Test

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.612	.024		25.033	.000		
	ROA	.074	.076	.112	.977	.332	.946	1.057
	DER	-.001	.012	-.014	-.121	.904	.927	1.079
	MED	.052	.023	.250	2.220	.029	.977	1.024
a. Dependent Variable: CED								

1. Return on Asset variable has a sig value. $0.332 \geq 0.05$, with a t-statistic of 0.977. This indicates that Return on Asset has no significant effect on the disclosure of carbon emissions.
2. Leverage variable has a sig. $0.904 \geq 0.05$, with a t-statistic of -0.121 This indicates that Leverage has no significant effect on the disclosure of carbon emissions.
3. Media Exposure variable has a sig. $0.29 \leq 0.05$, with a t-statistic of 2.220, this indicates that Media Exposure has a positive and significant effect on the disclosure of carbon emissions.

CONCLUSION

Based on the results of the study, it was found that Return on Asset (ROA) and Debt to Equity Ratio (DER) have no effect on the disclosure of carbon emissions, indicating that profitability and corporate leverage are not major factors in the decision to disclose carbon emissions. In contrast, media exposure has a positive and significant effect on carbon emissions disclosure, indicating that the more public/media attention companies receive, the more likely they are to transparently disclose information about carbon emissions. This may be due to their focus on operational efficiency and profitability, as well as potential reductions in reputational risk and additional costs. Overall, carbon emissions disclosure is more influenced by other factors such as regulatory pressure, stakeholder demand, and commitment to social and environmental responsibility.

REFERENCES

Ahdiat A. Emisi Karbon Global Naik Lagi pada 2022, Pecahkan Rekor Baru [Internet]. databoks. 2023. Available from: https://databoks.katadata.co.id/datapublish/2023/03/03/emisi-karbon-global-naik-lagi-pada-2022-pecahkan-rekor-baru

Madyan M. Analisis Pengungkapan Emisi Karbon Perusahaan Indonesia. Unair News [Internet]. 2024; Available from: https://unair.ac.id/analisis-pengungkapan-emisi-karbon-perusahaan-indonesia/

Abdullah MW, Musriani R, Syariati A, Hanafie H. Carbon emission disclosure in indonesian firms: The test of media-exposure moderating effects. Int J Energy Econ Policy. 2020;10(6):732–41.

Ayu Laksani S, Andesto R, Kirana DJ. Carbon Emission Disclosure Ditinjau dari Nilai

Perusahaan, Leverage dan Media Exposure. Stud Akunt dan Keuang Indones. 2021;3(2):145–64.

Luo L, Tang Q, Lan Y. Comparison of propensity for carbon disclosure between developing and developed countries. Account Res J [Internet]. 2013 Jan 1;26(1):6–34. Available from: https://doi.org/10.1108/ARJ-04-2012-0024

Pratiwi PC, Sari VF. Pengaruh Tipe Industri, Media Exposure dan Profitabilitas terhadap Carbon Emission Disclosure. Wahana Ris Akunt [Internet]. 2016;4(2):829–43. Available from: www.idx.co.id

Amaliyah I, Solikhah B. Pengaruh Kinerja Lingkungan dan Karakteristik Corporate Governance Terhadap Pengungkapan Emisi Karbon. J Econ Manag Account Technol. 2019;2(2):129–41.

Yeni SP, Asmeri R, Yanti N. Pengaruh profitabilitas dan ukuran perusahaan terhadap carbon emissions disclosure pada perusahaan LQ-45 yang terdaftar di bursa efek Indonesia (BEI) tahun 2014-2018. Pareso J [Internet]. 2021;3(1):95–106. Available from: http://www.ecolife.com

Apriliana E, Ermaya HNL, Septyan K. Pengaruh Tipe Industri, Kinerja Lingkungan, Dan Profitabilitas Terhadap Carbon Emission Disclosure. Widyakala J. 2019;6(1):84.

Zhang S, McNicholas P, Birt. J. Australian corporate responses to climate change: the Carbon Disclosure Project. J Account. 2012;

Choi BB, Lee D, Psaros J. An analysis of Australian company carbon emission disclosures. emerald insight [Internet]. 2013; Available from: https://www.emerald.com/insight/content/doi/10.1108/01140581311318968/full/html

Wirawan J, Setijaningsih HT. Analisis Pengungkapan Emisi Karbon Di Indonesia. J Muara Ilmu Ekon dan Bisnis. 2022;6(1):235.