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Voluntary Disclosure: The Role of Institutional Ownership as a Moderating Variable Between Carbon Emission Disclosure to Financial Performance

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ABSTRACT

Voluntary disclosure, especially disclosure of carbon emissions in mining companies, is still low. The purpose of this study is to analyze the impact of carbon emission disclosure on financial performance and to find out whether the ownership of institutions can moderate the impact of carbon emission disclosure on financial performance. The data for this study was collected from annual reports and sustainability reports. The sample for this research is 305 mining companies and transportation companies listed on the Indonesia Stock Exchange and Malaysia Stock Exchange in 2018 - 2022. The research model used is moderated regression analysis (MRA). The research results show that carbon emission disclosure has a negative effect on financial performance and institutional ownership can moderate the effect of carbon emission disclosure on financial performance. Disclosure of carbon emissions is so expensive that some companies do not disclose it. Disclosing information about carbon would be an advantage for companies.

INTRODUCTION

A company must have a goal, and that is to make a profit. Profit is the difference between revenue and total costs (Barney 2018). Profitability ratio analysis can be used to determine a company's profits. Company profits can be calculated using profitability ratios. Ratios of profitability are used to determine a company's capacity to receive revenue or profits (Petchsakulwong and Jansakul 2018). A profitability ratio is a kind of analytical ratio that is used to measure financial performance. A company's financial performance is used as an indicator of its accomplishments during a specified time period.

The company will improve its financial performance in order to attract investors. When investors make investment decisions, they consider not only a company's financial performance but also non-financial information (Davern, Gyles, Hanlon, and Pinnuck 2019). Non-financial performance and relevant information are called voluntary disclosures (Scaltrito 2016). Developing countries still have low voluntary disclosure rates (Mahmudah, Yustina, Dewi, and Sutopo 2023; Zaini, Samkin, Sharma, and Davey 2018). In fact, voluntary disclosure is important for companies because it can provide information for investors when making investment decisions (Sihombing, Agoes, and Santoso 2017).

The company will report more detailed information to attract investors (Trisnawati, Wardati, and Putri 2022). Investors will be interested in the company's disclosures if they are of good quality (Chen, Li, and Wang 2011). The information reported by the company can include disclosures of social and environmental responsibility. This responsibility is a form of corporate contribution to the well-being of society (Barauskaite and Streimikiene 2020; Li, Liao, and Albitar 2019). In terms of environmental responsibility, companies contribute to the mitigation of climate change caused by global warming. Global warming has the potential to lead to an increase in greenhouse gases (GHGs), such as carbon dioxide (CO₂) (Al-Ghussain 2019). According to the Indonesian Minister of Transportation, 342 million tons of carbon emissions were produced in the ASEAN region, with Indonesia producing around 27 percent of those emissions (Amalia 2022). According to the

International Energy Agency, the world's largest production of carbon dioxide reached a record by 2022, as energy production grew by 0.9% to 36.8 gigatons (VOA Indonesia 2022).

Increased carbon dioxide production will lead to increasingly worrying environmental problems as it will impact environmental and health problems (Lee, Min, and Yook 2015; Tang, Sun, Ma, Bai 2020). Carbon dioxide can be caused by a company's operating activities, mining and energy companies are the main sources of carbon emissions (Aguirre-Villegas and Benson 2017; Othman and Jafari 2016; Desai, Raval, Baser, and Desai 2022). Governments and some groups will put more pressure on environmentally exposed companies (Alfani and Diyanty 2020). So it will need the cooperation of many parties to solve the issue. The company wants to contribute to the solution by disclosing carbon emissions. Robaina and Madaleno (2020) contend that higher levels of carbon disclosure would improve financial performance.

The company is also trying to protect its reputation, one of which is by reporting carbon emission disclosures. Companies that disclose carbon emissions will have an impact on the company's reputation. A company's reputation will improve if it discloses its carbon emissions (Gallego-Álvarez, Segura, and Martínez-Ferrero 2015). Companies need to involve various parties in disclosing carbon emissions. One of the parties involved is the shareholder. In a company, there's a share ownership structure, one of which is institutional ownership. Institutional ownership refers to the proportion of a company's shares that are owned by various institutions, including banks, insurance companies, social security funds, mutual funds, and government (El-Diftar, Jones, Ragheb, and Soliman 2017; Lin and Fu 2017). According to Shen, Zheng, Adams, and Jaggi (2020), the existence of institutional investors will result in an increase in the amount of carbon information that is disclosed. As a result, institutional investors' monitoring is important, because institutional investors are frequently perceived to be under pressure, they are more active in making sure the company is on the right course (Ogabo, Ogar, and Nuipoko 2021). If institutional ownership is related to financial performance, the company's financial performance will improve (Abedin, Haque, Shahjahan, and Kabir 2022; Drobotz, Ehlert, and Schröder 2021; Hsu and Wang 2014; Lin and Fu 2017).

Alsaifi, Elnahass, and Salama (2020) state that carbon disclosure can improve the financial performance of companies. However, companies with a high carbon intensity tend to have low financial performance (Nguyen 2018). There are gaps in the research based on the literature review that was conducted. The disclosure of carbon emissions in past research has shown that carbon disclosures have a positive effect on financial performance (Capece, Pillo, Gastaldi, Levialdi, and Miliacca 2017; Datt, Luo, and Tang, 2019; Gabrielle and Toly, 2019; Gallego-Álvarez et al., 2015; Ganda, 2018; Hardiyansah and Agustini 2021; Lee and Cho, 2021; Siddique, Akhtaruzzaman, Rashid, and Hammami, 2021). Other studies showed different results (Desai et al., 2022; Ganda and Milondzo 2018; Han, Lee, and Wang 2020; Houqe, Opare, Zahir-ul-Hassan, and Ahmed 2022; Kurnia, Nur, and Putra 2021; Luo 2017; Muhammad and Aryani 2021; Saka and Oshika 2014; Sun, Wang, and Li 2022).

The inconsistency of previous studies motivated researchers to examine whether carbon emission disclosure could improve financial performance, with institutional ownership as a moderating variable. The research also uses control variables such as corporate size, leverage, liquidity, and cash (Alam, Safiullah, and Islam 2022; Córdova, Zorio-Grima, and Merello 2018; Detthamrong, Chancharat, and Vithessonthi 2017; Ibhagui and Olokoyo 2018; Norli, Ostergaard, and Schindele 2015; Yu, Guo, and Luu 2018). The novelty of this study is its focus on mining, energy, and transportation companies in Malaysia and Indonesia, as most of the previous research used manufacturing companies, and this research uses moderating variables. The purpose of this study is to examine the effect of carbon emission disclosure on financial performance, with institutional ownership as a moderating variable.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Agency Theory

The theory of agency describes the relationship that involves stakeholders and managers in which decision-making is given to managers (Jensen and Meckling 1976). The agency theory is a theory that explains relationships between managers and stakeholders that are conflicting due to information

asymmetry, agency-opportunistic behavior, and conflict of interest (Hussain, Rigoni, and Oriji 2018). This study is about voluntary disclosure, in particular carbon emission disclosures (CED). The disclosure of carbon emissions is still a problem due to the differences of interest between shareholders and managers, so there is an agency problem. The impact of agency problems is less optimal investment decisions and excessive spending (Ika and Ghazali 2012). When a company discloses carbon emissions, it minimizes information asymmetry and agency costs (Vitolla, Raimo, and Rubino 2020).

The impact of carbon emissions disclosure on financial performance

Awareness of caring for the environment is a shared responsibility, so it requires the involvement of various parties, including society. As a result of climate change and global warming brought on by greenhouse gas emissions, people's concerns about the environment have increased. Several studies have discussed the topic of carbon emission disclosure. According to Siddique et al (2021), disclosing carbon emissions by companies can have a positive impact on their financial performance and lead to long-term improvements. In the short term, the disclosure of carbon emissions negatively affects the company's performance (Ferrat 2021). Companies that work to minimize carbon emissions will have a positive impact on their financial performance (Gallego-Álvarez, Segura, and Martínez-Ferrero 2015). However, according to Desai et al (2022), carbon emissions disclosure has a negative influence on financial performance. The disclosure of carbon emissions is costly and will result in a decline in the value of the company (Kurnia, Emrinaldi Nur, and Putra 2021). Companies with higher carbon emissions will perform lower because of negative market reactions and higher agency expenses (Houqe et al. 2022).

Capece et al (2017) state that the disclosing carbon emissions has positive effects on financial performance. Companies that disclose carbon emissions have an environmental concern, so they can improve company performance. In line with the research, reducing carbon emissions will impact profitability, and companies that report carbon emissions will have an information advantage, so they will be protected from a reputation as a negative industry (Homroy 2023).

Disclosure of carbon emissions will also reduce pressure from stakeholders and have a positive impact on companies and the environment (Faisal, Andiningtyas, Achmad, Haryanto, and Meiranto 2018; Hahn, Reimsbach, and Schiemann 2015). As a result, the hypothesis for this study is as follows:

H₁: Disclosure of carbon emissions has a positive and significant impact on financial performance.

The impact of carbon emission disclosure on financial performance with institutional ownership as a moderating variable

Disclosure of carbon emissions can motivate companies to create change and performance improvements, but companies with high energy intensity experience relatively modest performance improvements (Qian and Schaltegger 2017). Companies that disclose carbon emissions need involve institutional investors because institutional investors are very concerned about carbon risk (Kordsachia, Focke, and Velte 2022). Institutional ownership of shares would encourage companies to disclose carbon emission information (El-Diftar et al. 2017). Institutional ownership also helps to reduce carbon emissions by reducing energy consumption (Safullah, Alam, and Islam 2022). Previous research showed that ownership of institutional shares also had a positive impact on financial performance (Daryaei and Fattahi 2020; Benlemlih, Arif, and Nadeem 2023; Lin and Fu 2017; Karajeh 2020). According to previous research, institutional investors have a positive impact on financial performance, as measured by Tobin's Q and ROA (Return On Asset) (Abedin et al. 2022).

According to Setiawan and Iswati (2019), companies that disclose carbon emissions provide a positive signal for the company's future. In line with the research, the disclosure of carbon emissions has a positive effect on financial performance (Gabrielle and Toly 2019). However, in previous research, the disclosure of carbon emissions had no impact on financial performance (Abdullah, Hamzah, Ali, Tseng, and Brander 2020). Disclosure of carbon emissions has a negative impact on financial performance (Choi and Luo 2021; Ganda and Milondzo 2018). So this study wanted to examine the relationships between carbon emissions disclosure and financial performance because of the inconsistencies in the results of the previous study, which made this study use institutional ownership

as a moderating variable. Moderating variables are used to strengthen the relationship between the other two variables (Dawson 2014). Based on this research, the hypothesis can be formulated as follows:

H₂: Carbon emission disclosure has a positive and significant impact on financial performance, with institutional ownership as a moderating variable.

RESEARCH METHODS

This research data is collected from the Stock Exchange and the research objects of Indonesian and Malaysian mining and transportation companies. The sampling used in this study is purposive sampling with the following criteria:

1. Mining and transportation companies listed on the Indonesian and Malaysian Stock Exchanges in 2018–2022.
2. Companies that publish sustainability reports (SR).

Table 1. Research Sample

Criteria	Number of Companies
Transportation companies listed on Indonesian and Malaysian stock exchanges	60
Transportation companies that did not report SR 2018–2022	(38)
Transportation companies reporting SR from 2018 to 2022	22
Mining companies listed on Indonesian and Malaysian stock exchanges	70
Mining companies that did not report SR for 2018–2022	(31)
Mining companies reporting SR for 2018–2022	39
Number of transportation and mining companies reporting SR in 2018–2022	61
Period of observation	5
Total observation	305

Variable Operational Definition and Measurement

The dependent variable in this study is financial performance. This is measured using the return on asset (ROA), as in the study Ganda (2018), which is calculated by dividing net profit by total asset. The measurement is considered effective in assessing a company's performance, as the ROA describes the level of profitability achieved by the company in the previous period (Tien, Anh, and Ngoc 2020). The independent variable in this study is carbon

emission disclosure. Carbon emission disclosure is used in this study using the same analysis content as in the previous study (Faisal et al., 2018; Machado, Dias, and Fonseca 2021; Muhammad and Aryani 2021; Sebrina, Taqwa, Afriyenti, and Septiari 2023). For index carbon emission assessment, use GRI-305 (emission). The assessment of the GRI standard index for carbon emission disclosure is as follows:

Table 2. Carbon Emission Disclosure Index

Category	Code	Item
Emission (GRI-305)	EM1	Emissions of direct greenhouse gases (Scope 1)
	EM2	Emissions of indirect greenhouse gases (Scope 2)
	EM3	Other indirect greenhouse gas emissions (Scope 3)
	EM4	Intensity of greenhouse gas emissions
	EM5	Reduction of greenhouse gas emissions
	EM6	Emissions of ozone-depleting substances
	EM7	Nitrogen oxides, sulfur oxides, and other significant air pollutants

Source: Global Reporting Initiative (GRI) (2016)

Based on the assessment of the GRI standard index for carbon emission disclosure, the number of items in Table 2 is 7. If the company discloses items in accordance with Table 2, it is given a score of 1 and if it does not disclose, it is scored 0. This research uses a moderating variable, which is institutional ownership. Institutional ownership is measured by the percentage of share ownership by institutional investors (Abedin et al. 2022). In addition, the research also uses control variables, including firm size, leverage, liquidity, and cash. When viewed from the size of the company, big companies will disclose more information and have a positive impact on the company's value because of their economic scale (Benkraiem, Shuwaikh, Lakhali, and Guizani 2022; Sugiyanto, Trisnawati, and Kusumawati 2021). The size of the company uses the natural logarithm of the total assets (Bennouri,

Chtioui, Nagati, and Nekhili 2018). Then other control variables, such as leverage, can reduce the negative impact of information asymmetry (Fosu, Danso, Ahmad, and Coffie 2016; Huynh, Wu, and Duong 2020). Leverage is measured by total debt divided by total assets; such measurement is in the form of a ratio. Liquidity is measured by total assets divided by total liabilities. When liquidity increases, equity is lower and the stock price is higher, and the impact of the company's performance will increase. It can be said that the company's performance will improve when its liquidity is good (Chia, Lim, and Goh 2020; Yu et al., 2018). Cash is measured by dividing cash and cash equivalents by total assets. An optimal cash rate will maximize the company's performance because, with cash ownership, it will reduce the uncertainty of cash flows (Demir and Ersan 2017; García-Teruel, and Martínez-Solano 2013).

This study uses moderation variables so it uses a model of moderated regression analysis (MRA). In this study, the equation model is as follows:

$$ROA = \alpha + \beta_1 CED + \beta_2 IO + \beta_3 CED * IO + \beta_4 SIZE + \beta_5 LEV + \beta_6 LQ + \beta_7 CASH +$$

Information:

- ROA = Return On Asset
- CED = Carbon Emission Disclosure
- IO = Institutional Ownership
- SIZE = Firm Size
- LEV = Leverage
- LQ = Liquidity
- CASH = Cash

RESULTS AND DISCUSSION

Mining and transportation companies listed on the Indonesian and Malaysian stock exchanges are examined in this study. The sample of this study consists of 61 companies listed on the Indonesian and Malaysian stock exchanges for the period from 2018 to 2022. The test in this study used E-Views 12, and this test used moderated regression analysis because this study uses moderating variables. Before testing moderated regression analysis to determine the model or panel data technique, this study was tested through the Chow test and the Hausman test. The results of these tests can be seen in Table 3.

Table 3. Results for Chow Test and Hausman Test

Chow-Test		Hausman-Test	
Effects Test	Prob.	Effects Test	Prob.
Cross-section Chi-square	0.0000	Cross-section random	0.0000

Based on the chow test, when the *p-value* is > 0.05 , the selected model is the common effect model, and when the *p-value* is < 0.05 , the selected model is the fixed effect model. The result of the chow test in this study is that the *p-value* is 0.0000, which means the *p-value* is < 0.05 so this study uses a fixed effect model. This study carried out the Chow test first, then the Hausman test.

Based on the Hausman Test, when the *p-value* is > 0.05 , the selected model is a random effect model, and when the *p-value* is < 0.05 , the selected model is a fixed effect model. The result of the Hausman test in this study is that the *p-value* is 0.0000, which means the *p-value* is < 0.05 so this study uses a fixed effect model. From both tests, between the Chow and the Hausman tests, the results showed a *p-value* < 0.05 so this study used a fixed effect model. After determining the model used in the research, this research will show a descriptive statistical analysis in Table 4.

Tabel 4. Descriptive Statistics

Variable	Mean	Median	Minimum
CED	2.0524	1.0000	0.0000
IO	0.1335	0.0377	0.0000
CED*IO	0.2374	0.0117	0.0000
ROA	0.0324	0.0310	-0.3795
SIZE	29.2198	29.1868	24.9838
LEV	0.4762	0.4871	0.0495
LQ	1.8134	1.4481	0.1737
CASH	0.0970	0.0801	0.0012

Note: N = 305

Based on table 4, descriptive statistics on this study with the period from 2018 to 2022, carbon emission disclosure (CED) has an average value of 2.0524, a median value of 1.0000 and a minimum value of 0.0000, which means that the level of carbon emissions disclosures in mining and transportation companies is still low and the levels of carbon emissions are still below average. When viewed from the minimum value, some companies have not yet disclosed carbon emissions. An average

ROA of 0.0324 means the impact of carbon emission disclosure resulted in an increase in ROA of 3.24% and a minimum ROA value of -0.3795 indicates that the company also experienced a decline in profits. Moreover, when viewed from the perspective of institutional ownership (IO), the average value of 0.1335 means institutional holdings in mining and transportation companies in 2018–2022 of 13.35%. Descriptive statistics in this study have been described in Table 4. The research also carried out the Chow test and the Hausman test to determine the model. The fixed effect model is a model that will be used in this study. The model will be used in regression tests. The regression test results can be seen in Table 5.

Table 5. Regression Test Results

Variabel	Coefficient	Prob.
CED	-0.0090	0.0049
IO	-0.1248	0.0001
CED*IO	0.0329	0.0224
SIZE	0.0934	0.0000
LEV	-0.2300	0.0000
LQ	0.0122	0.0134
CASH	0.3128	0.0002
Adjusted R-squared	0.5430	
F-statistic	6.3928	
Prob (F-statistic)	0.0000	

Note: N=305

In a regression test, when the *p-value* is < 0.05 , H_1 is accepted, and when the *p-value* is > 0.05 , H_2 is rejected. The carbon emission disclosure (CED) for *p-value* is 0.0049, meaning *p-value* < 0.05 and coefficient value -0.0090 so that the CED variable has a significant negative impact on ROA. In this study, using the moderating variable IO, the analysis uses the model of moderated regression analysis. The model can be seen in Table 5 CED*IO shows a *p-value* of 0.0224, which means a *p-value* < 0.05 and a coefficient value of 0.0329 so the IO variable strengthens the influence between CED and ROA.

Based on Table 5, this study also shows the F test and the determination coefficient (Adjusted R-squared). Table 5 shows a determination coefficient of 0.5430, then the contribution of the variable carbon emission disclosure to financial performance is 54.30%, while the remaining percentage is accounted for by other factors. As for the F test in Table 5 shows *p-value* 0.0000 (0.0000

< 0.05), it means that independent variables and control variables simultaneously affect dependent variables.

The results of this study for H_1 were rejected by using the regression test, indicating that CED had a significantly negative effect on ROA. The results are the same as previous research (Muhammad and Aryani 2021; Desai et al. 2022; Han, Lee, and Wang 2020; Houque et al. 2022). Disclosing carbon emissions can negatively impact a company's financial performance, potentially resulting in a decline in profits. According to (Muhammad and Aryani (2021), disclosing carbon emissions requires high costs. The effects of investments aimed at protecting the environment are thought to provide only a small financial benefit to the company (Alvarez 2012). Moreover, in 2020–2021, when the Covid-19 pandemic occurred, several companies experienced a decline in profits. As a result of the decline in profits, the company diminishes its investment in environmental programs. When the company's financial performance begins to recover, it will reinvest. In addition, for companies in developing countries, environmentally friendly technology is still relatively expensive, so it is necessary to provide incentives and cost efficiency (Ganda and Milondzo 2018). Disclosure of carbon emissions is expensive, this will be an advantage for companies because not all companies disclose carbon emissions. The regression test results for H_2 (received) show that the institutional ownership variable moderated the effect of carbon emission disclosure on return on assets. The findings are consistent with the research (Benlemlih, Arif, and Nadeem 2023; Kordsachia, Focke, and Velte 2022; El-Diftar et al. 2017). Institutional owners, such as banks, will work to encourage the companies they invest in to disclose their carbon emissions (El-Diftar et al. 2017).

Institutional ownership is motivated to disclose carbon emissions in order to protect their image and reputation. They assume that this disclosure will improve the value of their investment portfolio (Krueger, Sautner, and Starks 2020). Some of the institutional investors take an active part in

monitoring and improving the performance of the company. The gap between managers and agents will also be smaller because the company has institutional investors. But, institutional investors from insurance agencies are considered sensitive to pressure, which will trigger a conflict of interest because they have potential business relationships with the company (Bae, Masud, and Kim 2018; Lin and Fu 2017; Hong and Linh 2023).

CONCLUSION

This research examines the influence of carbon emissions on the financial performance of transportation and mining companies. Carbon emissions from mining operations that are expected to be environmentally sensitive must be disclosed. There will be a correlation between financial performance and carbon emission disclosure, as the disclosure of carbon emissions by a company will result in a decline in financial performance. This is due to the considerable expenses that have accrued. The findings of this study indicate that carbon emission disclosure has a significant negative impact on return on assets. Moreover, institutional ownership could moderate the effect of carbon emissions disclosures on returns on assets.

This research contributes to the fact that very environmentally sensitive companies care about carbon emission disclosure, although in financial terms the companies experience a decrease in profits as a result of the costs incurred for disclosing carbon emissions. On the other hand, it will be an advantage that not all companies disclose. This study also suggests that institutional ownership could push companies to disclose their carbon emissions.

The limitations of this research on carbon emission disclosure cannot prove whether the company actually disclosed it or not. This research only uses sustainable reports and annual reports, so hopes for future research could use other media to look at the carbon emissions disclose by the company.

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