



The Role of Profitability and Environmental Performance in Affecting Carbon Emission Disclosure with Media Exposure as Moderation

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Abstract

This study examines how profitability and environmental performance affect the level of carbon emissions disclosure among energy sector companies listed on the Indonesia Stock Exchange. It also considers the role of media exposure in influencing this relationship. It looks at 107 sets of observational data from the years 2019 to 2024. Data analysis is conducted in EViews 13; the analysis uses panel data and applies a Random Effects Model along with Moderated Regression Analysis (MRA). The results show that how well an organization takes care of the environment has a big impact on how much it shares information about its carbon emissions, and this connection becomes even stronger when the organization is covered by the media. Meanwhile, profitability has no effect, and media exposure does not moderate the relationship. This research contributes by demonstrating that public pressure through media exposure is more effective in encouraging environmental transparency than internal economic motivation (profitability) and acts as a catalyst that strengthens positive corporate signals to reduce information asymmetry. In practice, these findings inform regulators in optimizing the publication of environmental performance ratings as an external oversight instrument to improve carbon accountability in the energy sector.

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Introduction

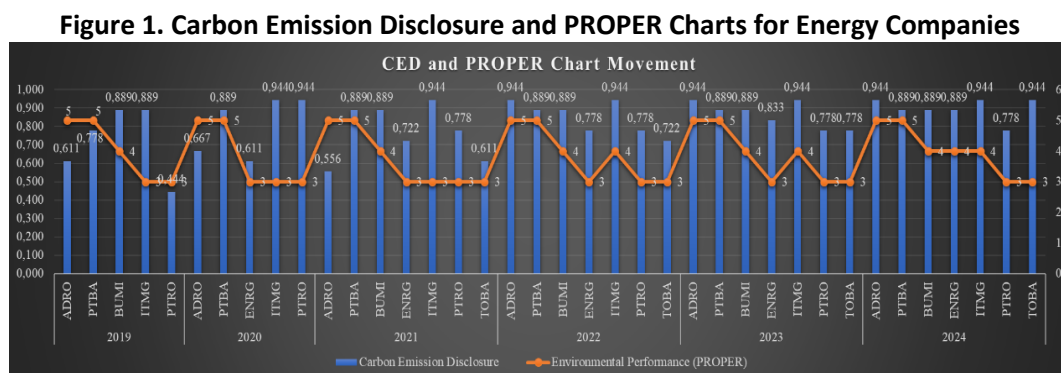
Companies are really important for the Indonesian economy. As companies and their industries continue to grow, this has both positive and negative effects, with climate change and environmental damage being the biggest concerns (Hilmi et al., 2020). This is an important problem that the government needs to address. Every Indonesian citizen has the right to a healthy environment, as stated in Article 28H of the 1945 Constitution. Global warming, driven by increased greenhouse gas (GHG) emissions, is a major problem. This is shown by data from EDGAR, which is the Emissions Database for Global Atmospheric Research:

According to EDGAR data, Indonesia ranked 7th among the world's largest CO₂ emitters in 2023, with 674.54 million tons of CO₂, accounting for 1.73% of global emissions. The first achievement was by China, with 13,259.64 million tons of CO₂, accounting for 33.98%. Meanwhile, Canada recorded the lowest achievement, with 575.01 million tons of CO₂, accounting for 1.47%. In response to this issue, the government has set a 41% emissions reduction target by 2030, as stipulated in Presidential Regulation No. 98 of 2021. However, the emissions reporting process remains voluntary.

According to Hasjanah (2024) on the IESR (Institute for Essential Services Reform) website, Indonesia, a country with abundant natural resources, is determined to reach Net-Zero Emissions (NZE) by 2060, or perhaps even sooner. To achieve this sustainable future, one important sector in Indonesia is making a big difference, and that's the energy sector, as shown in the table below:

The energy sector accounts for the largest share of emissions, at 73%, while the construction and real estate sectors contribute the least, at only 10-12%. The energy sector's primary source of high emissions comes from the combustion of coal, oil, and natural gas to generate electricity and provide heating, while the construction and real estate sectors contribute to building materials, heating/cooling, and urbanization. This indicates that dependence on fossil fuels remains dominant and is a major source of environmental pressure, particularly related to climate change.

The following graph shows the energy sector phenomenon summarized in evidence from several companies during the 2019-2024 period:



Source: Data processed by researchers, 2026

Figure 1 shows how Carbon Emission Disclosure (CED) relates to environmental performance, as measured by PROPER. Companies with high scores for how well they care for the environment usually provide more accurate and consistent information about their carbon emissions each period. Although fluctuations are inevitable, this is evident in the example of ADRO, which received a gold (5) environmental performance rating each period, but achieved different CEDs: 0.611 in 2019, 0.667 in 2020, 0.556 in 2021, and finally increased in 2022 and remained stable in the following two years, 2023 and 2024, reaching 0.944.

Even though the results have fluctuated, the results show that when businesses pay more attention to environmental management, they are more likely to share information about carbon emissions in a clear and open way. On the other hand, companies with poor environmental performance often share carbon

emissions data that varies widely and isn't reliable. This situation also supports the idea that how well a company protects the environment can be a major reason it shares information about its carbon emissions in the energy industry.

Disclosure of carbon emissions is an example of how companies share environmental information, and it is included in the additional report required under PSAK, a set of financial accounting standards (Wirawan & Setijaningsih, 2022). Rini et al. (2021) say that companies do not have to report their carbon emissions in their sustainability reports because it's optional and not required by rules, which means few companies actually do. Every company is required to have sufficient involvement with natural resources. Therefore, for companies to disclose carbon emissions, they are not only required to focus on maximizing profits but also to demonstrate greater environmental protection and concern.

One reason companies choose to share information about their carbon emissions is that it can affect their profits. A high profitability ratio indicates that a company has sufficient funds, which helps determine whether it will report its carbon emissions (Sekarini & Iwan, 2021). In this study, profitability is assessed using Return on Assets (ROA) as outlined by (Alfriansyach & Deni 2024). So, profitability can serve as a measure of a company's accountability to the environment.

Another factor is environmental performance. Companies that do well at protecting the environment are more likely to continue improving, remain committed, and work towards environmental goals (Lisadi & Elvira, 2023). Companies try to reduce the harm caused by environmental issues as part of their responsibility to society (Priliana & Ermaya, 2023). To earn the trust of the public and other interested parties, companies are advised to share information clearly and openly. In this conversation, the Ministry of Environment and Forestry (KLHK) uses its PROPER score program to assess performance, and the results are shown in 5 different color levels: (1) Black, (2) Red, (3) Blue, (4) Green, and (5) Gold.

Corporate Carbon Emission Disclosure (CED) requires media to convey information about company activities to the public, such as media exposure. The media play a crucial role in social mobility (Loru, 2023). Media exposure aims to facilitate stakeholders and the public, including investors, in monitoring and obtaining information on environmental conditions, company financial performance, and carbon emissions disclosures (Hidayat et al., 2022). Therefore, it can be concluded that media exposure is a means for companies to communicate information about their social responsibilities, such as carbon emissions disclosures.

The state of the art in this research aims to determine how profitability and environmental performance affect CED, with media exposure as a factor influencing this relationship. Previous research has shown inconsistent and mixed results. Furthermore, the moderating role of media exposure has not yielded strong conclusions and remains contradictory across studies. This study brings together the research by Larasati et al. (2020) and adds environmental performance to the synthesis of research from (Abdullah et al., 2020). This study focused on the energy sector during the 2019-2024 period and employed media exposure as a moderating factor, a departure from previous research.

Previous studies on profitability and carbon emission disclosure yielded significant results (Alfriansyach & Deni, 2024). The results of this study show that highly profitable companies are more likely to disclose information about their carbon emissions. This is because these companies are perceived as having greater financial and resource capacity to support such disclosures. On the other hand, this finding is supported by studies conducted by (Abdullah et al., 2020; Meiryani et al., 2023; Syahdanti & Marietza, 2024). Previous studies have inconsistent or insignificant results (Larasati et al., 2020; Melja et al., 2022; Lestari et al., 2024; Kristhalia et al., 2025).

When it comes to environmental performance, a prior study by Abdullah et al. (2020) found a significant influence on CED. These results show that businesses with top environmental scores are more likely to share information about their carbon emissions. This means companies are trying to make their environment better in more ways. Other research that supports these results includes work by (Setiawan & Iswati, 2019;

Yusuf, 2020; Jannah & Narsa, 2021; Melja et al., 2022; and Dwinajayanti et al., 2024). However, studies by Kholmi et al. (2020); Ulupui et al. (2020); and Herdiawan and Dewi (2023) show the opposite, indicating no significant influence. This is because there is insufficient oversight of companies' carbon emissions reporting, leading to poor execution of carbon emissions disclosure.

This research is novel in combining profitability, environmental performance, and media exposure, while also examining the moderating role of media exposure in the relationships between profitability and CED, both of which are related to environmental performance. Previous research generally only examined a subset of variables. Furthermore, this research focuses on the energy sector, the largest contributor to emissions at approximately 73%, using data from 2019 to 2024. It also adds a theoretical perspective on profitability, using resource dependence theory (RDT). Larasati et al. (2020) explored the role of media exposure as a moderator, based on previous studies showing that it can moderate the relationship between profitability and carbon emission disclosure. This study also examined whether media exposure might moderate the relationship between environmental performance and carbon emissions disclosure, building on findings from (Syabilla et al., 2021). However, findings that are inconsistent with these two studies are those of (Abdullah et al., 2020; Wirawan & Setijaningsih, 2022). Because the results varied, this study was conducted to address the gap and examine the effects of the moderating factors.

This study helps build on the ideas of resource dependency theory, legitimacy theory, and signaling theory. This means that companies in the energy sector should use CED to demonstrate trustworthiness by helping regulators assess the effectiveness of the PROPER program and Indonesia's carbon economy policy. This research is structured in several sections. This research makes several important contributions. First, it contributes theoretically by strengthening the relationship between legitimacy theory and signaling theory in explaining the motivation of energy sector companies in Indonesia to implement carbon emission transparency. Second, it demonstrates that environmental performance influences carbon emissions disclosure, a relationship reinforced by media exposure. This carbon transparency is used by companies for reputational strategies, not just for cost. For investors, CED can be used as an indicator of corporate sustainability. Third, this research contributes to regulators (such as the Ministry of Environment and Forestry) in evaluating the effectiveness of the PROPER program and the use of media publications to encourage carbon accountability in corporate sectors with high emissions. Fourth, for the government, media, and environmental performance publications can serve as external control tools to improve compliance.

Literature Review

Resource Dependence Theory (RDT)

The theory emerged in 1978 and was first introduced by Jeffrey Pfeffer and Gerald R. Salancik in their book, "The External Control of Organizations: A Resource Dependence" (Ozturk, 2021). Bakri et al. (2024) state that the theory is a basic rule that companies need to follow to interact with other companies in their environment and obtain the resources they need. They define this theory as the principle that companies must be able to engage in transactions with other companies in their environment to obtain resources. This idea connects to making money because when a company makes more profit, it's usually easier to see how well it's doing. So, companies are seen as having more resources to participate in efforts to share environmental information, such as reporting on carbon emissions (Alfriansyach & Deni, 2024).

Legitimacy Theory

The idea was first introduced by two well-known researchers, Dowling & Pfeffer, in 1975. It suggests that companies try to align their actions with the social values they care about. So, legitimacy theory focuses more on how companies interact with society (Loru, 2023). Ghozali (2020) explains legitimacy theory as a concept that focuses on the ongoing need for companies to demonstrate they operate within society's accepted rules and standards. This theory relates to environmental performance. Companies that do a good job protecting the environment are more likely to share their carbon emissions openly, which helps them be

responsible and accountable. This can help the company build a better image and keep good relationships with its stakeholders, and the same goes the other way around.

Signaling Theory

This idea emerged in 1973, when Michael Spence first introduced it in his work "Job Market Signaling." [Asyari and Erna \(2023\)](#) pointed out that the information companies share can affect how people decide to invest. Companies provide both financial and non-financial information. Meanwhile, business people use this information to understand how the company has been doing, what it's like right now, and what might happen next. Before investing, investors look for the latest, complete, and accurate information ([Ramadhani et al., 2025](#)). The signals mentioned in this theory concern information sharing and the capacity to send positive signals. Positive signs (good news) show that the company has chances for long-term growth, and the opposite is also true. This idea is about how much people see in the media, acting as a middle factor that affects how profit levels influence a company's environmental performance. This impact on carbon emissions disclosure occurs because the media shares good news, which is welcomed by people outside the company, including the public and other stakeholders. This positive signal (good news) is likely to attract public attention and encourage investment in the company.

Carbon Emission Disclosure

Carbon emissions disclosure is an accounting method used to present the carbon use associated with a company's activities in annual reports ([Kholmi et al., 2020](#)). This includes how companies communicate and demonstrate their sense of responsibility to the public. Therefore, comprehensive disclosure can improve a company's image in the community and demonstrate its concern for carbon emissions from industrial activities ([Iislamiyah et al., 2024](#)). Carbon emission disclosure focuses more on understanding the company's actions and how they contribute to environmental issues, such as global warming ([Maryono & Yuli, 2024](#)). Carbon emission disclosure is part of the main section in the Corporate Social Responsibility (CSR) report, which is the Sustainability Report. Even though the practice in Indonesia is still optional, not every company shares these disclosures ([Rini et al., 2021](#)).

Profitability

A company's ability to generate profits over a given period, based on how much it owns, how much it has invested, how much it sells, and how much it is worth to its shareholders, is called profitability ([Mardjono & Astutie, 2022](#)). This ratio also plays a role in how much carbon emissions a company reports. Profitability is commonly used as a standard for measuring a company's accountability to the environment ([Tana & Bernadetta, 2021](#)). High profits help companies handle public pressure more easily. This allows companies with higher profits to allocate more resources to share environmental information, such as how much carbon they emit, than companies with lower profits ([Hidayat et al., 2022](#)). Return on Assets (ROA) is typically used to measure a company's profitability by showing its ability to generate returns from its assets. Increasing profitability can make it more likely that a company will have high-quality earnings information, as higher profits often indicate efficient operations ([Namira & Tristiarini, 2025](#)).

Environmental Performance

According to [Ifada et al. \(2021\)](#), environmental performance refers to a company's efforts to use resources wisely, reduce environmental harm caused by its activities, and enhance environmental management in the areas where it operates. Environmental performance is assessed through the PROPER program, which stands for the Company Performance Rating Program in Environmental Management. The program began as a government initiative in collaboration with the Ministry of Environment and Forestry (KLHK). This program demonstrates the Ministry's efforts to encourage companies to protect the environment. Proper assessment results are released at regular intervals, which can lead to positive or negative media coverage for companies depending on how well they follow the rules ([Winandha et al., 2025](#)). Most companies included in the PROPER index have strong environmental practices, whereas those not included tend to prioritize rapid profit growth ([Maulana & Sumaryati, 2025](#)). According to [Rachman et al. \(2025\)](#), the PROPER program is designed to help companies improve their environmental performance, reduce adverse environmental

impacts, and build green practices within the company. The PROPER rating has five color groups: 5 is gold, 4 is green, 3 is blue, 2 is red, and 1 is black (Mar'ati & Darsono, 2022).

Media Exposure

In this study, media exposure is used as a moderating factor. This variable helps control company activities and gives management information and news that the public, including investors, can review and understand (Asyari & Erna, 2023). So, the media is important because it helps people learn about businesses and makes companies more likely to discuss environmental issues, such as carbon emissions (Muslih & Septia, 2024). The media serves as a means for stakeholders to monitor how a company behaves and assess the outcomes, whether good or bad (Anggraeni & Eka, 2025). The more a company's activities are covered by the media with accurate and helpful information, the better its reputation tends to be, and the opposite is also true.

The Effect of Profitability on Carbon Emission Disclosure

A metric that indicates how well a company generates profits is called the profitability ratio (Zanra et al., 2020). Profitability indicates how well a company makes money, but it also helps determine how the company can care for the environment (Hidayat et al., 2022). Research by Ulupui et al. (2020); Meiryani et al. (2023); and Alfriansyach and Deni (2024) has found a strong link between a company's profitability and the extent of its carbon emissions disclosure. Higher profitability makes it easier for a company to handle pressure, as there is sufficient financial capacity to take on responsibilities such as disclosing environmental information, such as carbon emissions (Hidayat et al., 2022). The theory used to strengthen the argument is the Resource Dependence Theory, or RDT. The relationship between interdependence and profitability is that when companies earn higher profits, they tend to become more open and honest. So the company is seen as having more resources available for sustainability efforts, such as reporting environmental information and disclosing carbon emissions (Alfriansyach & Deni, 2024).

H1: *Profitability has an effect on carbon emission disclosure*

The Effect of Environmental Performance on Carbon Emission Disclosure

The company's actions are meant to keep profits steady and also to ensure the environment is protected. Building a healthy, green environment requires the smart, eco-friendly use of energy and resources. Environmental performance is closely linked to the amount of carbon reported by companies (Hidayat et al., 2022). Companies that do a good job of protecting the environment demonstrate their efforts to keep it safe (Rini et al., 2021). Research by Abdullah et al. (2020); Hidayat et al. (2022); Meiryani et al. (2023); and Dwinajayanti et al. (2024) showed a strong link between a company's environmental performance and the extent of its carbon emissions disclosure. The idea that backs this up is called legitimacy theory. Legitimacy theory is understood as a theory explaining how companies must continually demonstrate that they are acting within society's rules and expectations. This is because better environmental performance, measured by PROPER, leads to more carbon emission disclosures. This helps people trust companies more, which makes the companies more credible (Sekarini & Iwan, 2021).

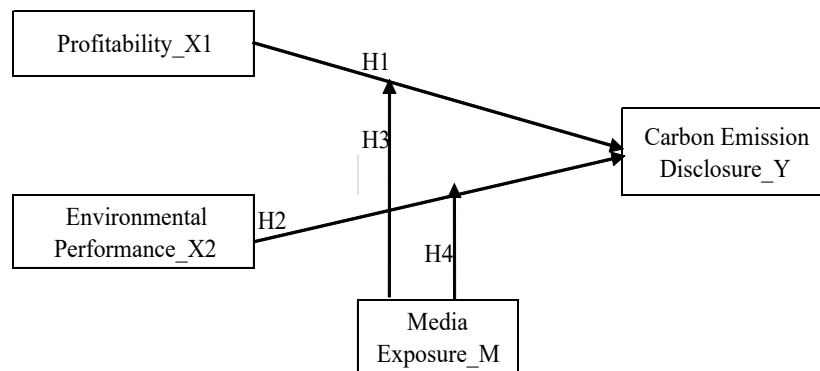
H2: *Environmental Performance has an effect on carbon emission disclosure*

Media Exposure Moderates the Effect of Profitability on Carbon Emission Disclosure

Citra and Usman (2025) interpret media exposure as a means for companies to disclose information about themselves to the media. Media exposure can serve as a communication channel for identity and information about a company's activities. Furthermore, media exposure can be a catalyst for social mobility, particularly among groups concerned with environmental issues (Larasati et al., 2020). Media exposure helps share important information with the public, such as stakeholders and investors. The idea that backs this up is called Signaling Theory. The idea is important here because when a company is very profitable, it shows that the business is doing well financially, is well managed, and cares about the environment. In addition, to keep this signal strong, companies can share information about their carbon emissions to show they are being honest and serious about protecting the environment. A study by Larasati et al. (2020) found that media exposure can affect the relationship between a company's profitability and the amount of information it shares about its carbon emissions.

H3: Media exposure moderates the effect of profitability on carbon emission disclosure**Media Exposure Moderates the Effect of Environmental Performance on Carbon Emission Disclosure**

According to [Abdullah et al. \(2020\)](#), media exposure helps disseminate information about a company's activities to the public. This information is important for companies because it helps them create a better impression with the people they work with and rely on. The media does more than just share information; it also plays a direct role in how much companies choose to disclose about their environmental impact. The idea that supports this conversation is called Signaling Theory. This theory explains how a company's information signals, like being open about its environmental practices, work. This information makes investors happy or excited because it shows companies that care about the environment, which makes people want to invest in them ([Bahriansyah & Yoremia, 2022](#)). Companies that do a better job of protecting the environment are more likely to share information about their carbon emissions. Because of this, companies will get more attention from the media, which shares information that sends a good message to people or society, and the opposite is also true. A study by [Syabilla et al. \(2021\)](#) found that the extent of people's media exposure affects the link between a company's environmental performance, measured using PROPER, and the extent of its carbon emissions disclosure.

H4: Media exposure moderates the effect of environmental performance on carbon emission disclosure**Conceptual framework**

Source: Data processed by researchers, 2026

Figure 2. Conceptual Framework Model

Method

This study used number-based methods to examine how profitability and environmental stewardship affect the amount of information a company shares about its carbon emissions, and to assess how media attention changes this relationship. This study uses panel data. Panel data is made by combining data that tracks changes over time with data from different groups or individuals at a single point in time ([Mardjono & Chen, 2020](#)). The analysis tool can be executed with EViews 13, and secondary data is used for it. The regression model uses Moderated Regression Analysis. The study included energy sector companies listed on the Indonesia Stock Exchange (IDX), and data were collected from 2019 to 2024. The sampling method used was purposive sampling, which was designed to choose sample data based on the following criteria:

1. Companies that fully disclose all their data in their annual and sustainability reports, including details about carbon emissions, on their websites and on the IDX during the observation period.
2. Companies that made money during the time we were looking at.
3. Companies that received the KLHK PROPER rating.

Based on the sample criteria, here is a table showing the results of the sample selection:

Table 1. Sample Selection Results

No	Information	Year 2019-2024
A. Population		
	Energy Sector Companies listed on the IDX during the research period	448
B. Sample		
Sample Criteria		
1.	Companies that do not publish annual and sustainability reports, including those that do not include carbon emission disclosure information.	(220)
2.	Companies that do not earn profits	(29)
3.	Companies that do not receive the KLHK PROPER rating	(92)
	Total	107

Source: Data processed by researchers, 2026

After adjusting for the purposive sampling criteria, 107 observational data points met the criteria for the study sample. These variables are measured using the formula in Table 2 below:

Table 2. Variable Measurement

Variable	Measurement	Data Source
A. Dependent:		
Carbon Emission Disclosure	$CED = \frac{\text{Number of items disclosed}}{\text{Maximum score}}$	Sustainability Report
Referring to the 18 adoption disclosure items from the research Choi et al., (2013)	(Asyari & Erna, 2023)	
B. Independent:		
1. Profitability	$ROA = \frac{\text{Net Profit (Profit After Tax)}}{\text{Total Asset}} \times 100\%$	Annual report
	(Larasati <i>et al.</i> , 2020)	
2. Environmental Performance	Score 5 (Gold) = Very Good Score 4 (Green) = Good Score 3 (Blue) = Fair Score 2 (Red) = Poor Score 1 (Black) = Very Poor	PROPER
Referring to the 5-point PROPER rating from the Ministry of Environment and Forestry	(Mar'ati & Darsono, 2022)	
C. Moderation:		
Media Exposure	Janis-Fadner Coefficient Formula	
	1. $\text{if } e > c = \frac{(e2 - ec)}{t2}$	News Media (Kompas, Tribun, Suara Merdeka, detik.com dsb)
	2. $\text{if } c > e = \frac{(ec - e2)}{t2}$	
	3. $\text{if } c = e = 0$	
	(Mashuri & Ermaya, 2020)	

Source: Data processed by researchers, 2026

The data used is secondary data. The regression method uses panel data regression with hypothesis testing via Moderated Regression Analysis (MRA) to examine how profitability and environmental performance affect carbon emissions disclosure, and how media exposure influences the relationship between these two factors. The research data underwent several testing steps, such as checking basic statistics, selecting the appropriate model, and testing hypotheses using methods such as the t-test, F-test, and R-squared test. Therefore, the regression equation model used in this study is written as:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 M + \beta_4 X_1 * M + \beta_5 X_2 * M + e$$

Description:

Y represents carbon emission disclosure (CED), α represents a constant, $\beta_1 - \beta_5$ represent regression coefficients, X_1 represents profitability, X_2 represents environmental performance, M represents media exposure, $X_1 * M$ represents the interaction between profitability and media exposure, $X_2 * M$ represents the interaction between environmental performance and media exposure, and e represents the standard error or confounding variable.

Result and Discussion

Descriptive Statistical Analysis

Descriptive statistical analysis provides a general idea of what's happening by examining a data set. This typically includes the summary statistics of the observed data: maximum, minimum, average (mean), and standard deviation (Ghozali, 2021). The following is a description of the data processing output:

Table 3. Descriptive Statistical Analysis Output Results

Variable	Total Data	Maximum	Minimum	Mean	Std. Deviasi
CED	107	0,944	0,444	0,819	0,114
Profitability	107	61,760	0,020	14,361	15,425
Environmental performance	107	5,000	3,000	3,691	0,744
Media exposure	107	1,000	0,055	0,602	0,245
Profitability*Media exposure	107	40,969	0,020	8,396	0,555
Environmental performance*Media exposure	107	4,477	0,165	2,216	0,974

Source: Output results processed with EViews 13, 2026

According to Table 3, the carbon emissions disclosure variable (Y) has the highest value for ADRO in 2022-2024, GEMS in 2023-2024, INDY in 2021-2024, ITMG in 2022-2024, and PGAS in 2024. The lowest value was achieved by ABMM in 2021 and 2024; AKRA in 2020; BSSR in 2022-2024; ENRG in 2022; and KKG in 2024. The standard deviation is lower than the average, indicating that the amount of carbon emissions information shared by companies does not vary much from one company to another.

The results in Table 3 show that the profitability variable (X_1) reached its highest value in 2022, with GEMS achieving the highest value. The lowest value was achieved by TOBA in 2023. The average value being less than the standard deviation indicates that the companies' profitability varies significantly.

The results in Table 3 show that the environmental performance variable (X_2) reached its highest value for ADRO, INDY, and PTBA during 2019-2024. The lowest scores were achieved by ABMM from 2019 to 2024, ADMR from 2023 to 2024, AKRA from 2019 to 2024, BSSR from 2021 to 2024, and BYAN from 2021 to 2024. The mean score exceeds the standard deviation, indicating that these companies have similar levels of environmental performance and are quite consistent with one another.

The results in Table 3 show that the media exposure variable (M) achieved the highest scores for ABMM in 2021-2022, AKRA in 2020 and 2022, TEBE in 2022-2023, and TOBA in 2022-2023. The lowest score was achieved by ENRG in 2022. The mean score, which is higher than the standard deviation, indicates that media exposure levels are quite similar across these companies.

Table 3 shows the highest score for the interaction between profitability and media exposure ($X1*M$) in 2022. The lowest score was achieved by TOBA in 2023. The mean score is less than the standard deviation, indicating significant differences: some companies have interaction scores significantly higher than the average, while others are significantly lower. This suggests that the interaction effect is not uniform across companies; therefore, the role of media exposure in shaping the relationship between profitability and carbon emissions disclosure may differ across companies.

The results of table 3 for the interaction between environmental performance and media exposure ($X2*M$) show the highest value achieved by INDY in 2023. The lowest value was achieved by ENRG in 2021. The average value exceeds the standard deviation, indicating that this interaction is generally more stable and balanced in companies in the energy sector, meaning that the effect of environmental performance on carbon emission disclosure is quite similar across companies.

After that, the research data was handled by applying a logarithmic transformation. This logarithmic transformation was applied to reduce the impact of outliers and very high values, making the data more consistent.

Model Selection Analysis

Table 4. Model Selection Analysis Result

CHOW TEST				
Effect Test	Statistic	Prob	Selected	Model Requirements
Cross-section F	2,007688	0,0116	(Prob > 0,05) = CEM (Prob < 0,05) = FEM	- ✓
HAUSMAN TEST				
Test Summary	Chi-Sq Statistic	Prob	Selected	Model Requirements
Cross-section random	2,404476	0,7908	(Prob > 0,05) = REM (Prob < 0,05) = FEM	✓ -
LAGRANGE MULTIPLIER TEST				
Test Summary	Cross-section	Prob	Selected	Model Requirements
Breusch-Pagan	7,409031	0,0065	(Prob > 0,05) = CEM (Prob < 0,05) = REM	- ✓

Source: Output results processed with EViews 13, 2026

A. Chow Test

The Chow test helps find out which model is better for panel data regression: the common effects model or the fixed effects model. The criteria are determined by the cross-section probability F. If F is greater than 0.05, the CEM model is chosen. If the probability value is less than 0.05, the FEM model is chosen, and the Hausman test is carried out (Ghozali, 2021). Table 4 shows the results from the Chow test. The table shows that the cross-section probability F is 0.0116, which is smaller than 0.05. So, the decision is to use the fixed effects model, and the next step is to perform the Hausman test.

B. Hausman Test

The Hausman test helps figure out which model is better for the panel data regression—whether it should be the random effects model or the fixed effects model. The criteria are determined by the chance of selecting a random cross-section. If the p-value is greater than 0.05, the REM model is chosen, and the Lagrange multiplier test is conducted. If the p-value is less than 0.05, the FEM model is selected (Ghozali, 2021). Looking at Table 4, which shows the Hausman test results, the p-value for the random cross-section model is 0.7908, which is greater than 0.05. So, the random-effects model is chosen, and the Lagrange multiplier test is conducted.

C. Lagrange Multiplier Test

This test helps determine whether the panel data regression model is better estimated with the random effects model or the fixed effects model. The criteria are determined by the Breusch-Pagan cross-section probability value. If the probability value is greater than 0.05, the CEM model is chosen. If the probability value is less than 0.05, the REM model is chosen (Ghozali, 2021). From Table 4, which shows the results of the Lagrange multiplier test, we can see that the Breusch-Pagan cross-section probability value is 0.0065. This value is less than 0.05, so we conclude that the model is a random-effects model (REM) based on panel data regression. Therefore, there is no need to perform classical assumption tests.

Hypothesis Test

Table 5. Hypothesis Test Results

Variable	Coefficients	Sig. (Prob)	Decision
CED	-0,296	0,0001	
Profitability	0,014	0,2833	H1 Rejected
Environmental performance	0,382	0,0026	H2 Accepted
Media exposure	-0,335	0,0262	
Profitability*Media exposure	0,069	0,1207	H3 Rejected
Environmental performance*Media exposure	0,62	0,0234	H4 Accepted
F-Statistic		3,5834	
Probability F		0,005	
Adjusted R ²		0,1086	

Source: Output processed with EViews 13, 2026

The Effect of Profitability on Carbon Emission Disclosure

In Hypothesis 1, Table 5 shows that profitability (X1), measured by ROA, has a p-value of 0.283, which is greater than 0.05. So, when we decided to **reject hypothesis H1**, it means that profitability and ROA do not have any impact on carbon emission disclosure. The results show that whether companies have high or low profits hasn't affected the extent of disclosure. This is because revealing information is seen as a decrease in profits, or vice versa (Melja et al., 2022). These results don't match what resource dependence theory would predict, but they agree with several other studies like those by (Larasati et al., 2020; Kholmi et al., 2020; Hidayat et al., 2022; Dharma et al., 2024; Arsy & Amin, 2025; and Kristhalia et al., 2025). These studies say that being profitable doesn't influence how much companies talk about their carbon emissions.

The Effect of Environmental Performance on Carbon Emission Disclosure

Hypothesis 2, shown in Table 5, indicates that environmental performance (X2), as measured by PROPER, has a probability of $0.002 < 0.05$, thus **accepting H2** and indicating that environmental performance measured using PROPER has an effect on carbon emission disclosure. The findings indicate that improved environmental performance increases the likelihood that companies disclose carbon emissions. These findings align with legitimacy theory, as disclosing a company's environmental performance is an effort to maintain the trust built within the community and ensure a healthy relationship. This finding aligns with findings by Abdullah et al. (2020); Hidayat et al. (2022); Priliana and Ermaya (2023); and Dwinajayanti et al. (2024), which found that environmental performance significantly influences carbon emission disclosure.

The Effect of Profitability on Carbon Emission Disclosure with Media Exposure as a Moderator

Hypothesis 3 shown in table 5 indicates that the interaction between profitability and media exposure (X1*M) has a probability of $0.120 > 0.05$, thus **rejecting H3**, indicating that media exposure is unable to moderate the relationship between profitability and carbon emission disclosure. This finding suggests that information on company profitability may already be sufficiently transparent; thus, media exposure does not provide additional value in encouraging companies to disclose carbon emissions. Wirawan and Setijaningsih (2022) found that information obtained through media exposure hinders investors or stakeholders from

quickly understanding and responding to news. This finding is inconsistent with signaling theory, but studies that align with it include those by (Abdullah et al., 2020 and Wirawan & Setijaningsih, 2022).

The Influence of Environmental Performance on Carbon Emission Disclosure with Media Exposure as a Moderator

Hypothesis 4 shown in table 5 indicates that the interaction between environmental performance and media exposure ($X_2 * M$) had a probability of 0.023, which is less than 0.05. So we **accept H4**, which means media exposure strengthens the connection between environmental performance and carbon emissions disclosure. The results show that using media coverage to talk about environmental problems can make companies more willing to share information about their environmental efforts. So, how well a company performs on environmental issues, as measured by PROPER, affects how much it discloses about its carbon emissions. This finding aligns with signaling theory, and a study by Syabilla et al. (2021) found that media exposure can strengthen the impact of environmental performance on carbon emission disclosure.

F Test (Simultaneous)

The F-test in research helps determine whether the entire regression model, including all variables, is statistically significant. When making decisions, we consider the F-test result. If the probability value is less than 0.05 (Prob < 0.05), it means the independent variables all have an impact on the dependent variable (Ghozali, 2021). Looking at Table 5, the p-value of 0.0050 is less than 0.05. This means that all the independent variables together have a significant effect on the dependent variable.

Coefficient of Determination (R²) Test

The coefficient of determination measures the extent to which a model explains variation in the dependent variable. Each additional independent variable increases the R² value, regardless of whether it significantly affects the dependent variable (Ghozali, 2021). The coefficient of determination is determined by the adjusted R-square value. Table 5 shows that the nominal adjusted R-square is 0.1086, indicating that the independent variable explains 10.86% of the variation in the dependent variable, with the remaining 89.14% explained by other variables not included in this study.

Conclusions and Recommendations

This study shows that profitability does not influence carbon emissions disclosure, whereas environmental performance has a strong impact. Media exposure does not moderate the relationship between profitability and carbon emissions disclosure, but it does strengthen the relationship between environmental performance and carbon emissions disclosure. Media attention does not weaken the relationship between a company's profitability and the extent of its carbon emissions disclosure. However, it does strengthen the relationship between a company's environmental performance and the extent of its carbon emissions disclosure. At the same time, all independent variables have a significant effect on the dependent variable.

Based on these results, companies should consider using environmental performance alongside other factors, such as ISO 14001. Media exposure can promote transparency in carbon emissions reporting, maintain corporate reputations, and strengthen the company's positive image regarding environmental responsibility. Regulators, particularly the government, should optimize the PROPER program as an external oversight instrument. They should consider policies that encourage mandatory carbon emissions disclosure, which is currently voluntary.

Future studies should focus on the manufacturing sector, as the energy sector yields too few results. Other factors, such as company size, debt levels, and corporate governance, should be included. Furthermore, the research timeframe and sample size can be expanded to better explain carbon emissions reporting. The relatively low R-squared value of 10.86% indicates that most changes in carbon emissions disclosure are still driven by factors not included in the research model. This study focused solely on the energy sector, so the results cannot be generalized to other industrial sectors. Simple measurements of media exposure do not fully reflect the intensity and quality of media coverage. Expanding research areas to include manufacturing

and other high-profile industries, and using more comprehensive media exposure measures, such as media sentiment analysis and the quantity and quality of news coverage.

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