Tekmapro : Journal of Industrial Engineering and Management
Vol. 20, No. 2, Tahun 2025, Hal. 147-159
e-ISSN 2656-6109. URL: http://tekmapro.upnjatim.ac.id/index.php/tekmapro

The Effect of Firm Size, Environmental Cost, and Carbon Emission Disclosure on Company Performance

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ABSTRACT

Climate change is an urgent global challenge that has influenced policy at both the national and international levels. Global temperature increases, rising sea levels, and heightened intensity of natural disasters are tangible consequences of greenhouse gas emissions, primarily generated by industrial activities and the use of fossil fuels. Indonesia is recorded as one of the world's largest contributors to carbon emissions, particularly from the energy sector. This situation has driven demands for companies to take responsibility for the environmental impacts they cause. This study aims to analyze the influence of firm size, environmental costs, and carbon emission disclosure on financial performance (ROA) in companies listed on the Indonesia Stock Exchange in the energy sector for the research period of 2021-2023. The research design used is a causal study aimed at testing the influence of independent variables on dependent variables. With a combined cross- sectional and time series data structure, the regression model used is panel data regression. The findings indicate that the selected model is the Random Effect Model (REM), with the research findings showing that firm size has a significant positive impact on ROA, environmental costs do not have a significant negative impact on ROA, and carbon emission disclosure has a significant negative impact on ROA.

Keywords: *Financial Performance, Firmsize, Environmental Costs, Carbon Emissions Disclosure.*

A. INTRODUCTION

Today, climate change is one of the biggest challenges and most pressing environmental issues facing the world. This issue has become a major focus on both national and international agendas. Various countries and organizations are seeking sustainable solutions for their businesses. Not only Indonesia, but all countries around the world are prioritizing discussions and the implementation of regulations related to climate change. Companies in various countries are expected to contribute to addressing sustainability issues. The rising global average temperature, melting polar ice caps, rising sea levels, and increased frequency and intensity of natural disasters such as floods, droughts, and storms are evidence of climate change. Most of these changes are caused by human activities, such as company and individual operations, particularly greenhouse gas emissions generated through the burning of fossil fuels, deforestation, and industrial activities. The increasing number of environmental damage cases serves as evidence of the public's limited awareness of the importance of environmental conservation. Therefore, there is a need for commitment from both individual entrepreneurs and companies to prioritize environmental protection (Gilby et al., 2021).

Based on the British Petroleum CO2 Emissions-Statistical Review of World Energy 70th Edition (BP, 2021) report, Indonesia is included in the list of countries with the highest carbon dioxide emissions in ASEAN. From 2010 to 2020, Indonesia ranked as the highest contributor to carbon dioxide emissions. From 2019 to 2022, the energy sector was the sector that contributed the most to carbon emissions. The second country with the highest carbon emissions after China was the United States. According to the Congressional Budget Office (2024), the manufacturing sector accounted for 12% of U.S. greenhouse gas emissions in 2021. According to the *Global Carbon Budget 2023* by Friedlingstein et al. (2023), Indonesia is among the top three countries contributing the largest share of global carbon emissions from land-use change between 2013 and 2022, alongside Brazil and the Democratic Republic of the Congo.

In 2023, global carbon dioxide emissions from fossil fuels reached a record high, estimated at 36.8 billion tons of CO2, with Indonesia as a significant contributor, ranking sixth, with an increase in emissions of 18.3%. This increase was caused by the use of fossil fuels, particularly coal (Suprayigi Y, 2023). At the same time, the United States—a primary emitter—managed to reduce its greenhouse gas emissions by approximately 1.9% in 2023, even as its economy expanded (King et al., 2024). This aligns with findings from the Global Carbon Project showing a roughly 3% decline in fossil-fuel CO_2 emissions in the U.S., mainly driven by decreased coal usage (Jackson et al., 2023).

Operational activities of companies, particularly in the energy sector, and the exploitation of natural resources as primary production materials often have negative impacts on the environment. As awareness of environmental damage continues to grow, demands and regulations are being imposed on companies to take responsibility for the environmental impacts caused by their operational activities. Companies are implementing various efforts and adjustments in response to the transformation of environmental and social conditions, which ultimately affect the company's performance. Company performance can be reflected through the use of financial performance ratios, such as Return on Assets. A company's financial performance illustrates its ability to manage and optimize its financial resources, including income, expenses, assets, and liabilities. Additionally, financial performance reflects the company's effectiveness in generating profits, which are used to ensure the company's long-term sustainability.

Previously, research related to company performance and the environment has been extensively studied. However, there are inconsistencies in some of the findings. According to Aljaaidi and Hassan (2020), larger companies, characterized by a greater number of

employees and executives, show less than optimal performance because firm size does not contribute significantly to company performance. These findings are also supported by research by Arifaj et al. (2023). Meanwhile, according to Ali and Fatima (2023), smaller companies have better cost and managerial efficiency and resource utilization than large-scale companies.

This study integrates Legitimacy Theory and Signaling Theory to explain how corporate characteristics and environmental strategies influence financial outcomes. In line with Legitimacy Theory, environmental costs—defined as expenditures for environmental protection—and carbon emission disclosure serve as tools for securing societal approval, while Signaling Theory suggests that firm size, measured by total assets, communicates market stability and capacity to implement sustainability measures. Financial performance, proxied by Return on Assets (ROA), reflects the company's efficiency in generating profits from its resources. Although prior research has examined these factors individually, the results remain inconclusive and often neglect their combined influence, particularly in high-emission, regulation-intensive sectors such as Indonesia's energy industry. This study addresses this gap by analyzing the simultaneous effects of firm size, environmental costs, and carbon emission disclosure on financial performance, providing new insights into their interplay within a sector facing strong environmental and regulatory pressures.

Prior studies have explored the effects of firm size, environmental costs, and carbon emission disclosure on financial performance, yet most have examined these variables separately and produced inconsistent results. Little is known about their simultaneous influence in high-emission, regulation-intensive industries such as Indonesia's energy sector. This study fills that gap by analyzing how these factors jointly affect financial performance during 2021–2023, a period of post-pandemic recovery and strengthened environmental policies. The re-examination is necessary not only to clarify prior contradictions but also to capture sector-specific dynamics that may alter the relationship between corporate attributes, environmental strategies, and profitability.

This study employs multiple linear regression analysis to examine the simultaneous influence of firm size, environmental costs, and carbon emission disclosure on financial performance. Compared to qualitative or purely descriptive approaches, regression analysis allows for precise quantification of relationships among variables while controlling for other influencing factors, thus providing more robust and generalizable conclusions. Alternative statistical techniques, such as correlation analysis, can reveal associations but cannot effectively isolate the unique contribution of each predictor when multiple variables are involved. Similarly, methods like ANOVA are suitable for group comparisons but are less capable of capturing continuous, multidimensional relationships in panel or cross-sectional financial data. The chosen regression framework therefore offers the advantage of addressing the research objectives with higher analytical precision and the ability to test hypotheses on both the direction and magnitude of effects within the complex setting of the energy sector.

B. LITERATURE

B.1. Legitimacy theory

Legitimacy theory, originally proposed by Dowling and Pfeffer in their book entitled The Management of Organization (Puspitaningrum & Indriani, 2021). This theory discusses the importance of openness from the social community for the success and sustainability of a company. In this theory, it is not only related to legal compliance and regulations, but also involves the views of a company by the community and stakeholders. This theory focuses on the interaction between companies and the community, because the community is an important factor in the sustainable development of a company. Thus, the legitimacy theory indirectly

influences a company's financial performance. When a company fails to comply with norms or rules, such as failing to maintain the surrounding environment in its operational activities, it may lead to the rejection of the company's existence, which could threaten its sustainability (Ramadhani et al., 2022).

B.2. Signaling theory

Signaling theory was first proposed in Michael Spence's 1973 research paper titled Job Market Signaling. Signaling theory provides an explanation of a theory involving two parties. These two parties are company management as the internal party and investors as the external party. The internal party acts as the signal sender, while the external party acts as the signal receiver. To assist investors in assessing a company's prospects, management applies signaling theory as the basis for its actions in communicating relevant information (Brigham & Houston, 2010). The signals provided take the form of information related to actions already taken to fulfill the owners' objectives. Signal theory involves signals in the form of information required by external parties. This information is used as a basis for making decisions regarding loans or investments.

B.3. Financial performance

Company performance is a reflection of the level of achievement of an entity in reaching its predetermined targets. In line with the strategic objectives of a company, one of which is the sustainability of the company itself. Financial performance is the main indicator of an entity's performance, showing the extent to which the entity has succeeded in achieving its objectives. Company performance can be measured using various indicators, including Return on Assets, Return on Equity, Return on Sales, Tobin's Q, and Current Ratio (Emous et al., 2021). In the study conducted, Return on Assets was set as the indicator for measuring company performance. Companies that strive to comply with applicable norms or regulations in line with the explanation of legitimacy theory, as well as monitor all company stakeholders, can encourage an increase in company performance, especially in the financial aspect (Ramadhani et al., 2022).

B.4. Firm size

Firm size is an indicator that reflects the scale of an entity. In general, firm size can be measured from several aspects such as total assets, total sales, log size, number of employees, and others. This is supported by research (Puspitaningrum & Indriani, 2021) which states the categories of firm size mentioned in Law No. 9 of 1955, which states that companies are categorized into three groups, namely small, medium, and large companies.

B.5. Environmental cost

The next factor is environmental cost. To fulfill its social function in the environmental field, a company will carry out various activities, which require a budget known as environmental cost (Ermaya & Mashuri, 2020). The quality of an environment is the result of a company's operational activities. To maintain the company's environment, costs known as environmental costs are required. The expenditures incurred must be categorized in an informative manner for each required budget. The disclosure made by the company regarding the environmental costs incurred will increase the company's transparency. According to Bhana et al. (2023), environmental costs are defined as operational costs and environmental protection costs that can be classified as non- common costs and social costs.

B.6. Carbon emission disclosure

The next factor is carbon emission disclosure. A company's motivation to carry out its operational activities is not only to prioritize profits, but also to pay attention to various environmental aspects. This creates awareness and concern among business actors. This concern drives the need for corporate information disclosure. Carbon emission disclosure is a

practice of corporate responsibility to disclose the impact of a company's operational activities on the environment. Thus, companies transparently convey information about carbon emissions generated from their operational activities.

C. RESEARCH METHOD

C.1. Research type

This study uses a quantitative approach. It examines the relationship between firm size, environmental cost, and carbon emission disclosure (independent variables) on financial performance, which is measured through Return on Assets (ROA) as the dependent variable. Secondary data was used as the data source, obtained from the Indonesia Stock Exchange (IDX) website at www.idx.co.id/ and the websites of each company related to annual financial reports and sustainability reports, using documentation techniques from official and reliable sources.

C.2. Population and sample

The population in this study consists of all energy sector companies listed on the Indonesia Stock Exchange (IDX) during the period 2021–2023. The energy sector was chosen because it is closely related to activities that have a significant impact on the environment. Therefore, companies in this sector have a high level of environmental responsibility. This necessitates environmental expenditure to meet existing regulatory standards.

The sample was determined using purposive sampling, based on specific criteria in line with the research objectives. The research sample criteria are as follows:

1. Energy sector entities listed on the Indonesia Stock Exchange during the period 2021–2023
2. Energy sector entities that published financial reports ending on December 31 during the period 2021–2023
3. Energy sector entities that published sustainability reports throughout the period 2021–2023.

C.3. Data collection method

In this study, data collection was conducted through literature review and documentation. The literature review included an examination of relevant theories and previous studies to support the research framework. Documentation was carried out by collecting financial data and information obtained from annual financial reports and sustainability reports of energy sector companies listed on the Indonesia Stock Exchange for the period 2021–2023. All data was obtained from the official website of the Indonesia Stock Exchange, company websites, and trusted financial data platforms.

There are 87 energy sector companies in Indonesia, with a total of 261 observations. Based on the criteria outlined in this study, the total number of samples used that meet the above criteria is 103 samples from 41 companies over three years, with an unbalanced panel data structure, meaning only companies with complete data were included.

C.4. Data analysis method

After obtaining the required data, the next process is data processing and analysis. The data obtained is then processed using Microsoft Excel 2019 and Eviews 12. The following is an explanation of the data analysis techniques used in this study.

1. Descriptive Statistical Analysis

According to Ghozali (2018), descriptive statistics are descriptions or components that can provide explanations about data that can be seen through the mean, standard deviation, variance, minimum and maximum values.

2. Panel Regression Analysis

According to Ghozali (2018), in addition to measuring the relationship between two or more variables, multiple linear regression analysis has another use, namely to show the direction of the relationship between the dependent variable and the independent variable. This study aims to determine the positive or negative effect of firm size, environmental cost, and carbon emission disclosure on financial performance, either simultaneously or partially.

The calculation form of panel regression analysis is shown by the following equation:

$$ROA = \alpha + \beta 1Firmsize + \beta 2ENVCOS + \beta 3CARBON + \varepsilon \quad (1)$$

Keterangan:

ROA = *Financial Performance*
α = Konstanta
β = Regression coefficient
Firmsize = *Firm Size*
ENVCOS = *Environmental Cost*
CARBON= *Carbon Emission Disclosure*
ε = Residual error (*Error*)

Panel model processing is carried out in the following stages:

a. Performing Panel Model Estimation

There are three panel model estimates, namely the Common Effect Model (CEM), which shows no differences in behavior between companies and between years; the Fixed Effect Model (FEM), which shows differences in behavior both between individuals (cross section) and between times (time series); and the Random Effect Model (REM), in which differences in behavior are represented by differences in error.

b. Conduction model selection testing consisting of:

- Chow test which aims to choose whether the right model is CEM or FEM with the hypothesis Ho the right model is CEM and Ha the right model is REM. Decision making if the cross section chisquare p-value ≤ 0.05 then Ho is rejected and vice versa if the cross section chisquare p-value> 0.05 then Ho is accepted.

- Hausman testing is carried out if the Chow test results are selected FEM. Hausman testing aims to choose whether the right model is REM or FEM with the hypothesis Ho the right model is REM and Ha the right model is FEM. Decision making if p-value cross section random ≤ 0.05 then Ho is rejected and vice versa if p-value cross section random > 0.05 then Ho is accepted.

- LM testing is carried out if the Chow test results are selected CEM. LM testing aims to choose whether the right model is CEM or REM with the hypothesis Ho the right model is CEM and Ha the right model is REM. Decision making if the Breusch Pagan p-value ≤ 0.05 then Ho is rejected and vice versa if the Breusch

Pagan p-value> 0.05 then Ho is accepted If the selected model is CEM then a classic assumption test is carried out consisting of normality, multicollinearity, autocorrelation and heteroscedasticity.

c. Theory Testing

- Simultaneous Significance Test (F Test)

  According to Ghozali (2018) the F test is a test used to determine whether the independent variables used by researchers in the regression model have a significant effect on the dependent variable. The level of significance value used is 0.05. If the significant value of F <0.05 means that the independent variable simultaneously affects the dependent variable. There are provisions owned by the F test, namely if the significant value of F < 0.05 then H0 is rejected and H1 is accepted, and vice versa if F> 0.05 then H0 is accepted and H1 is rejected.

- Test Coefficient of Determination (R2)

  According to Ghozali (2018) the coefficient of determination test is a test conducted to measure how far the level of the model's ability to explain the dependent variable is used. The coefficient of determination is between 0 or 1. A value closer to 1 means that the better because the independent variable provides the information needed to describe the dependent variable. A small coefficient of determination means that the level of ability of the independent variables used to explain the dependent variable is fairly limited.

- Partial Significance Test (t test)

  According to Ghozali (2018) the t test is a test that shows the magnitude of the influence value of each independent variable on the dependent variable under study. Testing of the basic regression results has a significant value of 5% or α = 0.05. The t test testing criteria are if the significance value of the t test> 0.05 then Ho is accepted and Ha is rejected, and vice versa if the significance value of the t test <0.05 then Ho is rejected and Ha is accepted.

C.5. Variables and Operational Definitions

- Financial Performance
  The dependent variable in this study is financial performance. The proxy used to measure company performance is the Return on Assets Ratio (ROA). This ratio is able to estimate the entity's capability to earn profit from assets.

$$ROA = \frac{\text{Net Income}}{\text{Total Assets}} \quad (2)$$

- Firm Size
  The main independent variables considered in this study are firm size, environmental cost, and carbon emission disclosure. The proxy applied to measure Firm size is the total assets owned by the company.

(3)

$$\text{Firm size} = \text{Ln (total asset)}$$

- Environmental Cost
  Based on Babalola (2012) and Ermaya and Mashuri (2020) environmental costs are measured through the ratio between the budget spent on activities from CSR to net income. The proxy used to measure environmental performance is the activity of corporate responsibility for the environment.

$$\textit{Environmental Cost} = \frac{\text{CSR Activity Fee}}{\text{Net profit}} \quad (4)$$

- Carbon Emission Disclosure
  Furthermore, carbon emission disclosure is used as a ratio obtained from the comparison between the realization of carbon emission disclosure and the applicable carbon emission disclosure standard. The following are the criteria for items of carbon emission disclosure: In this study, carbon emission disclosure will be measured based on indicators from the Carbon Disclosure Project framework. CDP is a global initiative that provides a reporting system for companies. This reporting system is used to disclose environmental impacts, especially related to climate change, greenhouse gas emissions, and mitigation strategies. Each disclosure will be given a score of 1 if the information is disclosed in the company's report. It will then be given a score of 0, if it is not disclosed. The total score of all items will be calculated to obtain the disclosure level of the company's carbon emission disclosure.

Table 1
Criteria of scoring *carbon emission disclosure*

No.	Category	Item	Description
1	Climate Change: Risks and Opportunities	CC-1	Assessment/description of the risks (regulatory, physical or general) relating to climate change and actions taken or to be taken to manage the risks
		CC-2	Assessment/description of current (and future) financial implications, business implications and opportunities of climate change
2	GHG Emissions Accounting	GHG-1	Description of the methodology used to calculate GHG emissions (e.g. GHG protocol or ISO)
		GHG-2	Existence external verification of quantity of GHG emission– if so by whom and on what basis
		GHG-3	Total GHG emissions– metric tonnes CO2-e emitted
		GHG-4	Disclosure of Scopes 1 and 2, or Scope 3 direct GHG emissions
		GHG-5	Disclosure of GHG emissions by sources (e.g. coal, electricity, etc.)
		GHG-6	Disclosure of GHG emissions by facility or segment level
		GHG-7	Comparison of GHG emissions with previous years

3	Energy Consumption Accounting	EC-1	Total energy consumed (e.g. tera-joules or peta-joules)
		EC-2	Quantification of energy used from renewable sources
		EC-3	Disclosure by type, facility or segment
4	GHG Reduction and Cost	RC-1	Detail of plans or strategies to reduce GHG emissions
		RC-2	Specification of GHG emissions reduction target level and target year
		RC-3	Emissions reductions and associated costs or savings achieved to date as a result of the reduction plan
		RC-4	Cost of future emissions factored into capital expenditure planning
5	Carbon Emission Accountability	ACC-1	Indication of which board committee (or other executive body) has overall responsibility for actions related to climate change
		ACC-2	Description of the mechanism by which the board (or other executive body) reviews the company's progress regarding climate change

D. RESULT AND DISCUSSION

D.1. Descriptive Statistic

The results of the descriptive statistical calculation of the research variables can be seen in table 3. For the Financial Performance variable results in an average value of 12.854%). The standard deviation value of 17.1 shows that the variation in ROA between one company and another is quite heterogeneous, the maximum value of 61.635% is owned by GEMS in 2022 while the minimum value of -26% is owned by the FIRE company

Descriptive statistics for company size variables produce an average value of 29.665. The standard deviation value of 1.562 shows that the variation in company size data from one company to another is not too significant. The maximum value of 32,763 is owned by the ADRO company in 2022 and the lowest value of 26,621 is owned by the FIRE company in 2022

The results of descriptive statistical calculations for environmental costs produce an average value of 0.480%, which means that the company's profit used for environmental costs is 0.480%. The standard deviation value of 0.922 shows that the variation in environmental costs incurred by one company with another is quite heterogeneous. The minimum value of 4.906% is the RIGS company in 2023 and the minimum value of 0.001% is owned by the BIPI company in 2023.

Descriptive statistics for Carbon Disclosure produced an average value of 65.912%, which means that the practice of implementing carbon emissions by companies is quite good. The standard deviation value of 25.507 shows that there is a significant variation in carbon emission disclosure data between one company and another. The minimum value of 5.556% is owned by ARTI company in 2021 and the maximum value of 94.444% is owned by PTBA in 2022.

Table 2

Descriptive Statistics of Research Variables

Variabel	Mean	Std. Dev.	Maximum	Minimum
ROA	12.854	17.140	61.635	-25.994
FIRMSIZE	29.665	1.562	32.763	26.621
ENVCOS	0.480	0.922	4.906	0.001
CARBON	65.912	25.507	94.444	5.556

Source: Data processing

D.2. Chow Testing

The Chow test results to choose the right model CEM or FEM can be seen in table 4. Information from the table shows that for the ROA model, the p-value of the cross section chisquare is 0.0000 <0.05 so that Ho is rejected (Ha is accepted) and it can be concluded that the right model for the ROA model is the Fixed Effect Model (FEM).

Table 3

Chow's test

Effects Test	Statistic	d.f.	Prob.
Cross-section Chi-square	201.448322	44	0.0000

Source: Data processing

D.3. Hausman Testing

Hausman testing is carried out if the results of the Chow test select the Fixed Effect Model (FEM). Hausman testing is used to choose whether the right model is the Fixed Effect Model (FEM) or the Random Effect Model (REM). The processing results for the Hausman test are shown in table 5. From the table, it can be seen that the p-value of the random cross section is 0.0000 <0.05, which means that Ho is rejected (Ha is accepted) so it can be concluded that the right model is FEM. Thus, the model used for testing the research hypothesis is FEM.

Table 4

Hausman's Test

Effects Test	Statistic	d.f.	Prob.
Cross-section random	72.188409	8	0.0000

Source: Data processing

D.4. HypothesisTesting

The coefficient of determination test is conducted to determine the extent to which the independent variable is able to explain the dependent variable in a model by looking at the adjusted R2 value. The results of the coefficient of determination test are shown in table 6. From the calculation results, the adjusted R2 value is 0.036557, which means that the variation

or behavior of the independent variables, namely FirmSize, ENVCOS and CARBOND, is able to explain the variation of Return on Asset by 3.6557% while the remaining 96.3443 is the variation of other independent variables that affect ROA but are not included in the model.

The processing results for the F test obtained a p-value of F of 0.082990 <0.10, thus it can be concluded that Ho is rejected (Ha is accepted) so it is proven that there will be at least one independent variable that has a significant effect on the dependent variable, namely ROA.

Table 5

Testing Theoretical Hypotheses

Variabel	Koefisien	T-Statistic	Prob.
FIRMSIZE	0.035273	1.354233	0.0893*
ENVCOS	-0.005205	-0.762214	0.2238
CARBON	-0.000562	-2.191293	0.0154**
R^2	0.064893		
Adjusted R^2	0.036557		
F-statistic	2.290085		
Prob(F-statistic)	0.082990*		

*=alpha 10% **=alpha 5%

Source: Data processing

Note: Significance levels are denoted as follows: *** p < 0.01, ** p < 0.05, * p < 0.10. This multi-level notation is used to indicate varying degrees of statistical significance.

Hypothesis 1 was conducted with the aim of testing the effect of Firmsize on profitability. The processing results are shown with an estimated coefficient value of 0.035273, which means that increasing the Firmsize of the company will increase ROA and vice versa, low Firmsize will increase ROA. The t-statistic value of 1.354233 produces a p-value of 0.0893 <0.10 which means Ho is rejected and Ha is accepted so it can be concluded that Firmsize has a significant positive effect on ROA. These findings are in line with the research findings of Hutabart (2024) and Karin et al (2023) which state that Firm size has a positive and significant effect on company performance, in this case ROA. A high firmsize indicates that the company is able to develop its business well so that through an increase in the scale of the company's business, one of the measurement indicators is the increase in company assets. The increase in company firmsize has a significant impact on improving company performance in one of the measurement indicators is an increase in ROA.

Hypothesis 2 was conducted with the aim of examining the effect of environmental costs on profitability. The processing results are shown with an estimated coefficient value of -0.005205 which means that the increase in spending on environmental costs by the company will reduce ROA and conversely the decrease in environmental costs by the company will increase ROA. The t-statistic value of -0.762214 produces a p-value of 0.2238> 0.05 which means Ho is accepted so it can be concluded that it is not proven that Firmsize has a significant negative effect on ROA. The results of these findings are in line with the research findings of Ermaya and Mashuri (2020) where environmental costs prove the negative effect of environmental costs on company performance. The results of this study resulted in the effect of environmental costs having a negative and insignificant effect on ROA by considering that environmental cost spending as part of CSR spending is not yet a mandate (obligation) that must be carried out by companies so that every company, especially those

listed on the Indonesia Stock Exchange, has not entirely spent on environmental costs so that the average environmental cost spending is still relatively very low, which is only 0.48% of company profits. The negative effect of environmental costs because in the shortterm environmental costs are included in the cost group so that it has an impact on the level of corporate profits.

Hypothesis 3 was conducted with the aim of testing the effect of emission carbon disclosure on profitability. The processing results are shown with an estimated coefficient value of -0.000562, which means that the increase in the company's emission carbon disclosure will reduce ROA and conversely the decrease in emission carbon disclosure by the company will increase ROA. The t-statistic value of - 2.191293 produces a p-value of 0.0154 <0.05, which means that Ho is rejected and Ha is accepted, it can be concluded that emission carbon disclosure has a significant negative effect on ROA. These findings are in line with the research findings of Siddique et al. (2021) which reveals that carbon emission disclosure has a negative and significant effect on company performance in the short term because companies still consider it a burden (cost). Ramadhan et al (2023) in their research results reveal that carbon emissions are often associated with better financial and market performance in the long term, because transparent companies tend to be more valued by consumers and investors, thus providing strategic opportunities to create sustainable value where one of the indicators is an increase in the company's financial performance in the long term. In addition to focusing on profits, companies are responsible for the company's relationship with the environment in order to obtain legitimacy or statements from the public so that in the long run it will have a positive impact on company performance.

E. CONCLUSION

In this study, which aims to determine whether or not there is an effect of firm size, environmental costs, and emission disclosure on financial performance. This study uses the period from 2021 to 2023. Data obtained from annual financial report data and sustainability reports on energy sector companies listed on the Indonesia Stock Exchange. Based on the research that has been done, there are several conclusions that can be stated. First, the firm size variable is proven to have a positive and significant effect on the financial performance of energy sector companies listed on the Indonesia Stock Exchange (IDX) from 2021 to 2023. Thus, the first hypothesis of this study is supported. Second, the environmental cost variable is proven to have a negative but insignificant effect on the financial performance of energy sector companies listed on the Indonesia Stock Exchange (IDX) from 2021 to 2023. Third, carbon emission disclosure is proven to have a significant negative effect on the financial performance of the energy sector listed on the Indonesia Stock Exchange (IDX) from 2021 to 2023.

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