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CLIMATE CHANGE MITIGATION ON INVESTOR REACTION: THROUGH FINANCIAL PERFORMANCE DIGITAL TRANSFORMATION AND BANK PERFORMANCE

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Abstract
This study aims to examine climate change mitigation Carbon Emissions Disclosure and Green Investment on Investor Reaction through Financial Performance. This research is classified as associative quantitative research. The type of data used is secondary data obtained from www.idx.co.id and the company's website. The population in this study were non-financial sector companies listed on the Indonesia Stock Exchange (IDX) for the 2020-2022 period. While the sample of this study was determined by purposive sampling method so that 41 sample companies were obtained. The analysis method used is Panel data Model Regression analysis and testing the mediation hypothesis is done by using the Sobel test. The results of this study indicate that Carbon Emissions Disclosure has a significant effect on Investor Reaction, Green Investment has no effect on Investor Reaction, Financial Performance has a significant effect on Investor Reaction, Carbon Emissions Disclosure has no effect on Financial Performance, Green Investment has a significant effect on Financial Performance, Financial Performance is unable to mediate the effect of Carbon Emissions Disclosure on Investor Reaction, and Financial Performance is able to mediate the effect of Green Investment on Investor Reaction.

Keywords: Carbon Emissions Disclosure, Green Investment, Financial Performance, Investor Reaction

1. Introduction

The increase in temperature that occurs on the earth's surface today is receiving real attention along with the issue of global warming that occurs due to the continued increase in emissions, resulting in climate change. According to the IPCC (Intergovernmental Panel on Climate Change) special report of 2023, the climate hazards that the world will face during the 21st century are primarily caused by global warming that will exceed 1.5°C. Global warming occurs from the long-term aggregation of atmospheric pollution, leading to high concentrations of greenhouse gas (GHG) emissions into the atmosphere at a very high rate.

The environmental, social and economic impacts of climate change are increasingly evident and significant. Economic damage due to climate change has been detected in sectors affected by climate change, such as agriculture, forestry, fisheries, energy, and tourism. In the publication of the Global Carbon Project in 2023, Indonesia is ranked as the sixth largest contributor to carbon emission production in the world (Global Carbon Atlas, 2022).

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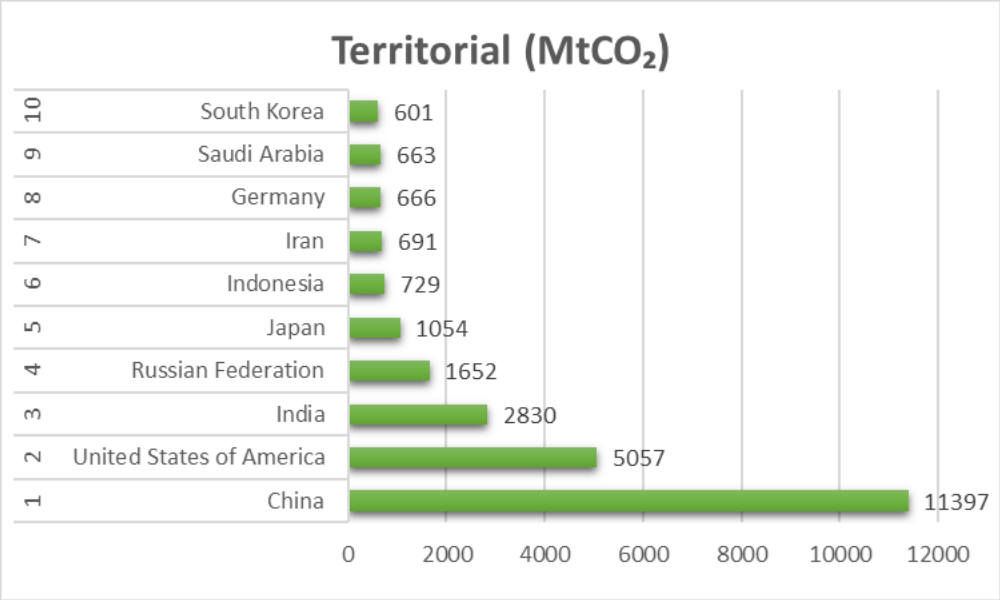
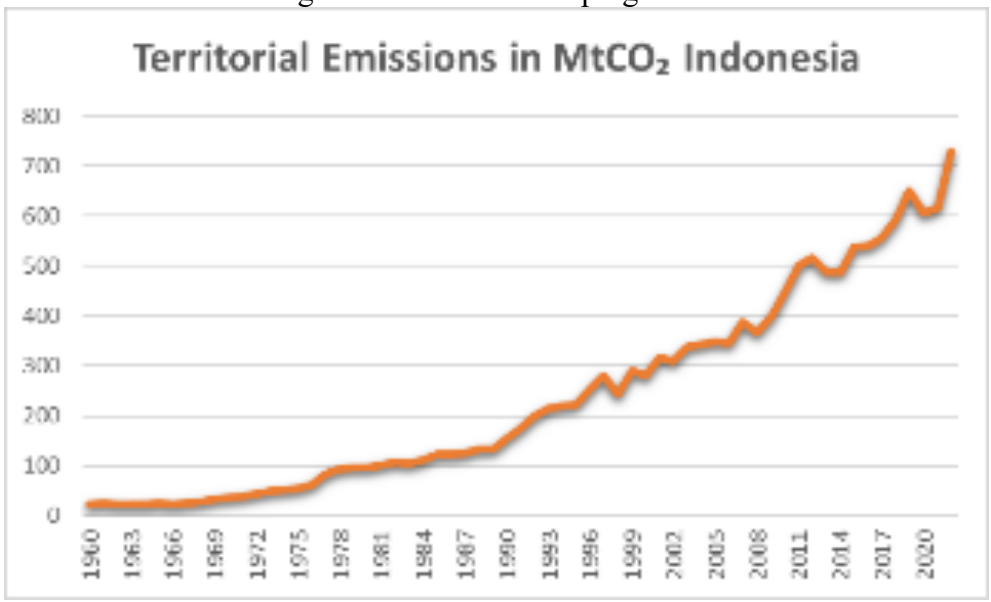


Source: Global Carbon Project (2023)

Figure 1. Ranking of Countries with the Largest Production of Carbon Dioxide Emissions in the World in 2022

According to the report, by 2022 Indonesia will emit 729 million tons of carbon dioxide from coal use, oil and gas activities (flaring and industrial processes), gas flaring, and cement manufacturing. In the past, business owners only paid attention to financial returns without considering social and environmental consequences. This led to a lot of pollution and environmental damage, which had a huge impact on people's daily lives.

International meetings that have been routinely held through the Conference of the Parties (COP) forum. COP is a meeting where country leaders gather to discuss solutions to global climate change. At its 26th event, the COP had four focus issues to discuss, including the importance of climate change mitigation such as switching to electric vehicles, ending deforestation with financial assistance, drafting rules for the global carbon market and mobilizing resources for developing countries.



Source: Global Carbon Project (2023)

Figure 2. Indonesia's Carbon Dioxide Emissions Production

According to the Global Carbon Project, the production of carbon dioxide emissions in Indonesia from 1960-2022 continues to increase every year. This urgent phenomenon of climate change makes stakeholders increasingly understand that companies have the main intention to gain profits along with increasing future value. An economic concept that focuses on economic development and meeting the needs of the current generation without compromising the future value of the company. Jeopardizing the ability of future generations to meet their needs is a good economy.

Therefore, there is a change in trend, profit oriented to sustainable oriented where companies are increasingly thinking about environmental aspects for the sustainability of their business (Ladista et al., 2023). Legitimacy theory explains that company legitimacy will be seen when there is a difference between the values owned by the company and society, so the company will try to get recognition by carrying out its operations in accordance with the norms prevailing in society. Signal theory explains that company reports can provide signals for all information presented and will affect the decision-making process by users of the report, whether the results are positive signals or negative signals.

Negative community responses to climate change mitigation efforts by companies can occur for several reasons, such as lack of community awareness due to not fully understanding the importance of such efforts, lack of transparency companies do not provide sufficient information about climate change mitigation efforts undertaken, companies may not involve communities in climate change mitigation efforts, causing communities to feel uninvolved in such efforts and less supportive of such efforts.

One of the strategies of the Ministry of Environment and Forestry (KLHK) in efforts to control climate change is through the implementation of the Climate Village Program (ProKlim) based on the Regulation of the Minister of Environment and Forestry of the Republic of Indonesia Number P.84/Menlhk-Setjen/Kum.1/11/2016 concerning the climate village program. This strategy is to increase the involvement of communities and other stakeholders in strengthening adaptation to the impacts of climate change and reducing greenhouse gas emissions and providing recognition for climate change adaptation and mitigation efforts that have been carried out to improve welfare at the local level in accordance with regional conditions.

However, as awareness of the importance of environmental stewardship and sustainability increases, many companies are beginning to pay attention to the environmental impacts of their operations and are working to reduce these impacts. The Indonesian government has also issued a number of fiscal incentives to attract private investment in green projects and green industries (Putri & Agustin, 2023). Climate change mitigation efforts by companies are social and environmental responsibilities that must be fulfilled by every company. It is hoped that investors will be increasingly interested in investing in green projects and providing support to climate change mitigation efforts.

Investors need clear information to make decisions regarding the consideration of the investment activities they will carry out, so that they can get a return on the investment results. The information needed is not only limited to financial information, but also non-financial information including information about environmental responsibility (Asyari & Hernawati, 2023). Public trust affects the growth of stock trading volume and stock returns so that it can trigger investor reactions in making investment decisions.

Action to achieve environmental sustainability began in 1997 with the Kyoto Protocol, a form of international agreement that aims to encourage countries in the world to take part in addressing the issue of environmental damage, especially the effects of gas

emissions from the six most dangerous greenhouse gases (GHG) in building the concept of sustainability. Carbon emissions disclosure contains information on historical and prospective carbon performance to internal and external stakeholders as well as other climate-related information; for example, qualitative information on carbon emissions reduction outlook or strategies (Pitrakkos & Maroun, 2020).

Carbon disclosure is a solution that companies can use to reduce their carbon emissions. Based on previous research, companies voluntarily disclose carbon data to gain legitimacy and meet stakeholder demands, or to demonstrate to third parties their commitment to actual carbon reduction (Zuhrufiyah & Anggraeni, 2019). Researches previously about disclosure emissions carbon emissions disclosure which affects investor reactions still experience different results (inconsistent). The results of Asyari & Hernawati's research, (2023) show that disclosure of carbon emissions has a significant negative effect on investor reactions. And the results of research by Asmaranti et al., (2020) show that disclosure of carbon emissions has a positive effect on investor reactions. Meanwhile, in the research of Saputri, (2022) and Yuliani, (2020) stated that disclosure of carbon emissions has no effect on investor reaction.

The next factor in climate change mitigation efforts is green investment. The concept of green investment has become a national and international concern. Internationally, Indonesia has ratified the United Nations Framework Convention on Climate Change (UNFCCC) into Law Number 16 of 2016. Nationally, Indonesia needs to shift to green investment due to environmental damage and the mandate of the 1945 Constitution of the Republic of Indonesia regarding national economic development. Green investment is an effort made to help overcome environmental problems and support by providing important procedures in participating in protecting the environment (Ramadhani & Astuti, 2023).

Even though investment aims to make a profit, investment must still provide benefits for a fair society, without distinguishing the status of the community with investors and others according to applicable laws and regulations. Investors choosing environmentally-focused investments are driven by a variety of reasons. In general, some investors are motivated by financial concerns. In addition, private investors are concerned in their investments with realizing environmental and/or social goals. The Indonesian capital market currently has four indices that are oriented towards strengthening Environmental, Social, Governance (ESG).

This allows them to participate in positive changes to the environment while gaining financial benefits. The results of research by Tanasya & Handayani, (2020) & Asyari & Hernawati, 2023) show that green investment affects investor reactions. Meanwhile, research (Aeni & Murwaningsari, 2023) shows that green investment has no effect on investor reactions. Previous research on green investment that affects investor reactions still experiences different results (inconsistent).

These studies indicate the benefits of disclosing carbon emissions and green investment and the need for empirical research on climate change mitigation efforts, but there are inconsistencies that may be due to the influence of other variables that were not controlled by previous researchers or due to other variables that mediate the relationship between disclosure of carbon emissions and green investment to investor reactions, namely financial performance. Financial performance the company is very important because financial performance reflects the way the company runs its business, this can be seen through the profits earned, the debt it borrows, and the assets or wealth owned by the company (Suripto & Lucas, 2023).

This study develops the research of Orozco et al. (2018) by placing financial performance variables as mediating variables and investor reactions as dependent variables. Investors expect a return in their investment activities in the form of stock returns. Investors will react to companies that have good effectiveness so that they can get a greater level of return. The company has the responsibility to continue to improve and maintain its financial performance so that it remains good in the eyes of investors so that investors are loyal in investing their capital, this is done by the company by issuing financial reports which have the aim of providing company financial information to external parties.

Research on climate change mitigation efforts is very important to do, considering that the government continues to strive to increase investment in both conventional and non-conventional sectors, and can provide information and input to investors to become one aspect of consideration in making an investment. This study also examines whether the disclosure of carbon emissions and green investment affects financial performance and its impact on investor reactions.

Prevention of environmental damage from the smallest to the largest scope is important because the damage is caused by human actions. Humans must have a sense of responsibility to fix it. Therefore, the effect of disclosure of carbon emissions and green investment on investor reactions with financial performance as an intervening variable was tested again. Therefore, the authors are interested in compiling research with the title "climate change mitigation on investor reactions: through financial performance".

2. Theoretical Background

2.1 Legitimacy theory

Legitimacy theory is one of the most mentioned theories in the field of social and environmental accounting (Yatie & Tandika, 2019). The disclosure mechanism of carbon emissions and green investment is a practice of corporate responsibility to society environmentally. This is in line with legitimacy theory which explains that companies must carry out activities in accordance with the limits and norms of society. Likewise, Ladista et al. (2023) and Ramadhani & Astuti (2023) state that legitimacy theory has been used in accounting studies to develop a theory of corporate responsibility disclosure on the environment to help companies improve their reputation.

2.2 Signaling Theory

According to Spence, M. (1973), signal theory is the behavior of management in companies in conveying directions to investors regarding management strategies and views on future prospects. Signaling theory plays an important role in explaining the company's financial performance and investor reactions. By understanding information asymmetry and how companies use signals to communicate their conditions, investors can make more informed and informed investment decisions (Sari et al., 2020). The positive signal given by the company is information disclosure. The company, for example, presents financial and non-financial information that can be considered by shareholders in making their investment decisions.

2.3 Investor Reaction

The presentation of annual financial reports, and sustainability is one of the most important means of communication between internal companies and outside investors (Pevzner et al., 2015). Investor reaction can be observed with the abnormal return indicator. Abnormal return is the excess derived from the actual return to the normal return. And normal return is the return expected by investors (Asyari & Hernawati, 2023). In this study, the Cumulative Abnormal Return proxy is used with the adjusted model. Therefore, there will be an abnormal return or surprise return when financial reports containing information are published. Vice versa, if the financial statements do not have the information expected by investors, they will not provide abnormal returns. The scale in measuring this variable is the CAR ratio scale which can be calculated using the following formula:

$$\text{CARit} = \sum_{t=-n}^{t=+n} \text{ARit}$$

2.4 Carbon Emissions Disclosure

Disclosures made by companies with the benefit of assessing carbon emissions generated with the intention of reducing carbon emissions in Indonesia are called carbon emission disclosure (Priliana & Ermaya, 2023). Based on its nature, disclosure is classified into two, namely mandatory and voluntary disclosure. Items from the Global Reporting Initiative (GRI) 305 are used to explain carbon emission disclosure by measuring various aspects related to greenhouse gas (GHG) emissions (Kurnia et al., 2020).

Direct GHG emissions disclosures (305-1) present direct GHG emissions from major sources that generate GHG emissions, indirect GHG emissions disclosures (305-2), other indirect GHG energy emissions disclosures (305-3), GHG emissions intensity disclosures (305-4) present GHG emissions intensity per unit of production or per unit of energy used, and GHG emissions reduction disclosures (305-5), present measures taken to reduce GHG emissions, such as carbon storage, fuel switching, and behavior change.

The scoring in the study is only based on disclosure items, but in this study using a disclosure scale. The scoring of the quantity of carbon emission disclosure in this study adapts Gunawan & Abadi (2017), which is as follows:

Table 1. Carbon Emissions Disclosure Scoring Index

Score	Information
0	No information is disclosed in accordance with the indicators
1	Sentence
2	Paragraph
3	2-3 paragraphs
4	4-5 paragraphs
5	>5 paragraphs

Source: Gunawan & Abadi (2017)

The scores obtained are then summed up to get the total score of each company. Carbon emission disclosure is calculated using the following formula:

$$\text{CED} = \frac{\sum \text{Xit}}{\text{n}}$$

2.5 Green Investment

The following expenditures are defined as corporate green investment: expenditures related to technological transformation and R&D, industrial waste and various pollutants managed, clean and renewable project construction, ecological environment restoration management and afforestation (Chen & Ma, 2021). The main objective of green investment is to promote environmentally friendly business practices, reduce carbon emissions, and support the transition to a sustainable economy.

The ideal green investment is one in which more allocation is invested in prevention and detection activities, namely the cost of preventing and detecting environmental damage such as the cost of selecting suppliers and raw materials, purchasing waste treatment equipment, measuring waste levels, and others. This is done to reduce internal failure costs such as waste treatment costs and external failure costs such as the cost of cleaning up the surrounding environment polluted by waste, so as to reach the point of zero damage. green investment will be calculated using the formula from the research of Chen & Ma (2021), namely:

$$\text{GI} = \frac{\sum \text{Biaya Lingkungan}}{\sum \text{Aset}}$$

2.6 Financial Performance

Sari et al. (2020) defines financial performance as a description of the financial condition of a company in a certain period which is then analyzed so that the shortcomings and achievements that have been achieved by the company can be known. The purpose of measuring financial results is very important to know, because the measurements made can affect decision-making behavior within the company. This research is measured by Return on Sales (ROS), before investing investors will see the profit or profit generated by the company because profit is also one of the important factors used to assess the company's financial performance. The formula used to determine how much the ROS value of a company is:

$$\text{ROS} = \frac{\text{Laba Sebelum Pajak dan Bunga}}{\text{Penjualan}} \text{ x } 100\%$$

2.7 Non-financial Sector Companies

In 2020 to 2022 there were 824 companies listed on the Indonesia Stock Exchange, which were divided into 719 non-financial sector companies and 105 financial sector companies, so it can be concluded that companies belonging to the non-financial sector are the majority of companies listed on the Indonesia Stock Exchange (IDX). Companies that are included in the non-financial sector are companies that are included in the basic materials, consumer cyclicals, consumer non-cyclicals, energy, healthcare, industrials, infrastructure, properties & real estate, technology, transportation & logistics sectors. Research in non-financial sector companies is carried out to focus on one sector, namely the non-financial sector. This is done because companies in the non-financial sector are more extensive in disclosing variables because there are several sectors.

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2.8 Hypothesis Formulation

The variables that will be tested in this research will be developed in a conceptual framework which can be described as follows:

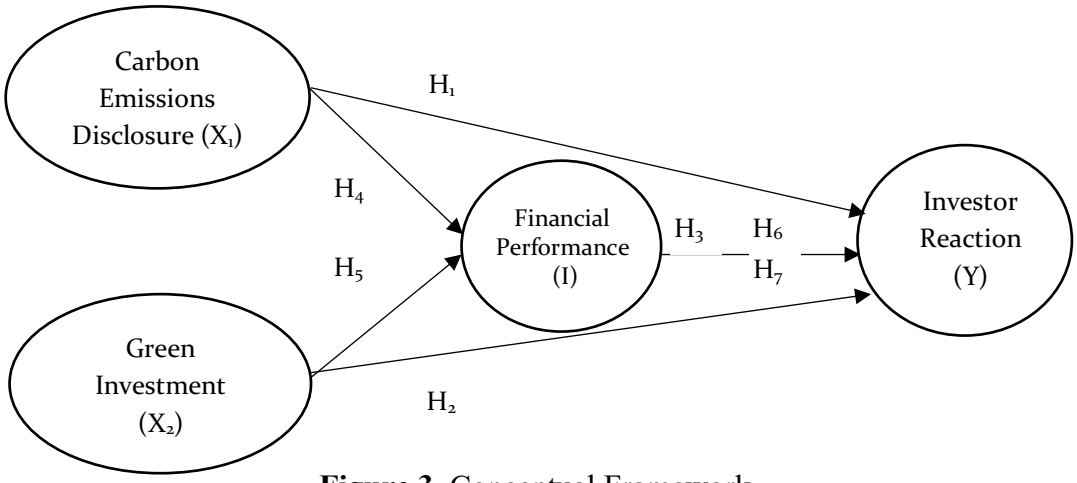


Figure 3. Conceptual Framework

H1: It is suspected that carbon emission disclosure affects investor reaction
H2: It is suspected that green investment affects investor reaction.
H3: It is suspected that financial performance affects investor reaction
H4: It is suspected that carbon emission disclosure affects financial performance
H5: It is suspected that green investment affects financial performance
H6: It is suspected that carbon emission disclosure affects investor reaction through financial performance.
H7: It is suspected that green investment affects investor reaction through financial performance.

3. Methods

The data used in this study are secondary data obtained through financial reports, annual reports and sustainability reports of non-financial sector companies listed on the Indonesia Stock Exchange for the 2020-2022 period obtained through the official website of the Indonesia Stock Exchange and or the official website of the company that was sampled. The sample in this study were 41 companies for 3 years so that a total of 123 observation data were obtained.

The method used in sample selection is purposive sampling method with several criteria selected, including:

a) Non-financial sector companies listed on the Indonesia Stock Exchange during the study period.
b) The company provides and publishes annual reports and sustainable reports which also contain financial reports by disclosing GRI Standard indicators that can be accessed during the research period.
c) Companies that published stock indices during the study period.
d) Companies that did not experience losses during the study period.
e) Companies that have complete research variables.

The data that has been collected is then analyzed using descriptive statistics, panel data quality test, regression analysis, classical assumption test (normality test, multicollinearity, heteroscedasticity and autocorrelation), hypothesis testing (t statistical test, f statistical test and coefficient of determination), path analysis and Sobel test.

Analysis of the data obtained in this study will use the help of computer technology, namely the Econometric Views (EViews) version 12 application program. The regression equation formulation used in this study is as follows:

Model Equation 1:

$CAR = \beta 0 + \beta_{11}CED + \beta_{12}GI + \beta_{13}ROS$

Model Equation 2:

$ROS = \beta 0 + \beta_{21}CED + \beta_{22}GI$

Model Equation 3:

$CAR\ it = \beta 0 + \beta_{31}ROS$

Description:

CAR : Investor Reaction
β0 : Constant
β1. β2. β3 : Regression Coefficient
CED : Carbon Emissions Disclosure
GI : Green Investment
ROS : Financial Performance

Ghozali (2019), says that path analysis shows that the independent variable can have a direct effect on the dependent variable and can also have an indirect effect on the dependent variable through intervening variables. With the model regression equation as follows:

$CAR = \beta 0 + \beta_1 CED + \beta_2 GI + \beta_3 ROS + \varepsilon_3$

Baron and Kenny (1986) then suggested using the Sobel test to calculate the indirect effect with the following formula:

$$Sab = \sqrt{b2\ Sa2 + a2\ Sb2 + Sa2\ Sb2}$$

4. Results And Discussion

4.1 Descriptive Statistics

The purpose of descriptive statistics is to provide an overview of the characteristics of the research variables consisting of disclosure of carbon emissions, green investment, financial performance to investor reactions.

Table 2. Descriptive Statistics Results

	Investor Reaction (Y)	Carbon Emissions (X1)	Green Investment (X2)	Financial Performance (I)
Mean	-0.002698	0.920325	0.003183	0.147082
Median	-0.000800	1.000000	0.001900	0.112100
Maximum	0.087200	1.000000	0.019300	0.985500
Minimum	-0.123300	0.200000	0.000260	0.000200
Std. Dev.	0.038249	0.167410	0.003388	0.158781
Jarque-Bera	3.431276	182.9688	329.3537	1205.195
Probability	0.179849	0.000000	0.000000	0.000000
Sum	-0.331900	113.2000	0.391500	18.09110
Sum Sq. Dev.	0.178483	3.419187	0.001401	3.075795
Observations	123	123	123	123

Source: EViews ver-12 data processing (2024)

From the results of descriptive statistics, the analysis is as follows:

a) Descriptive statistical results for the Investor Reaction variable (Y) show the value of the minimum value is -0.123300 owned by PT Wijaya Karya Beton Tbk in 2022. The

maximum value is 0.087200 owned by PT Bukit Asam Tbk in 2022 with an average value (mean) of -0.002698 and a deviation (standard deviation) of 0.038249.

b) The results of descriptive statistics for the Carbon Emissions Disclosure variable (X1) show a minimum value of 0.200000 owned by PT Astra Agro Lestari Tbk in 2020. The maximum value is 1.000000 owned by PT Ace Hardware Indonesia Tbk, PT Adhi Karya (PERSERO) TBK, PT Astra Agro Lestari Tbk, PT Akr Corporindo Tbk, PT Austindo Nusantara Jaya Tbk, PT Aneka Tambang Tbk, PT Astra International Tbk, PT Astra Otoparts Tbk, PT Barito Pacific Tbk, PT Bumi Serpong Damai Tbk, PT Charoen Pokphand Indonesia Tbk, PT Elnusa Tbk, PT XL Axiata Tbk, PT Impack Pratama Industri Tbk, PT Vale Indonesia Tbk, PT Indocement Tunggal Prakarsa Tbk, PT Jasa Armada Indonesia Tbk, PT Indo Tambangraya Megah Tbk, PT Japfa Comfeed Indonesia Tbk, PT Jasa Marga (Persero) Tbk, PT PP London Sumatra Indonesia Tbk, PT Merdeka Copper Gold Tbk, PT Merck Tbk, PT Multi Bintang Indonesia Tbk, PT Samindo Resources Tbk, PT Pan Brothers Tbk, PT Phapros Tbk, PT Cikarang Listrindo Tbk, PT Bukit Asam Tbk, PT Petrosea Tbk, PT Siloam International Hospitals Tbk, PT Solusi Bangun Indonesia Tbk, PT Semen Indonesia (Persero) Tbk, PT Saratoga Investama Sedaya Tbk, PT Tower Bersama Infrastructure Tbk, PT Total Bangun Persada Tbk, PT United Tractors Tbk, PT Unilever Indonesia Tbk, PT Wijaya Karya (Persero) Tbk, and PT Wijaya Karya Beton Tbk in 2020, 2021 and 2022, the average value (mean) of 0.920325 and a deviation (standard deviation) of 0.167410.

c) The results of descriptive statistics for the Green Investment variable (X2) show a minimum value of 0.000260 owned by PT Japfa Comfeed Indonesia Tbk in 2022. The maximum value is 0.019300 owned by PT Elnusa Tbk in 2021 with an average value (mean) of 0.003183 and a deviation (standard deviation) of 0.003388.

d) The results of descriptive statistics for the Company Performance variable (I) show that the minimum value of 0.000200 is owned by PT Jasa Armada Indonesia Tbk in 2020, 2021 and 2022. The maximum value of 0.985500 owned by PT Saratoga Investama Sedaya Tbk in 2021 with an average value (mean) of 0.147082 and a deviation (standard deviation) of 0.158781.

4.2 Panel Data Regression Estimation

Table 3. Conclusion of Testing the First Panel Data Regression Model Direct Effect

No	Methods	Testing	Results
1	Chow Test	Common Effect Vs Fixed Effect	Fixed Effect
2	Hausman Test	Fixed Effect Vs Random Effect	Fixed Effect

Source: EViews ver-12 data processing (2024)

Table 4. Conclusion of Second Panel Data Regression Model Testing Indirect Effect

No	Methods	Testing	Results
1	Chow Test	Common Effect vs Fixed Effect	Fixed Effect
2	Hausman Test	Fixed Effect vs Random Effect	Random Effect
3	Langrange multiplier Test	Common Effect dan Random Effect	Random Effect

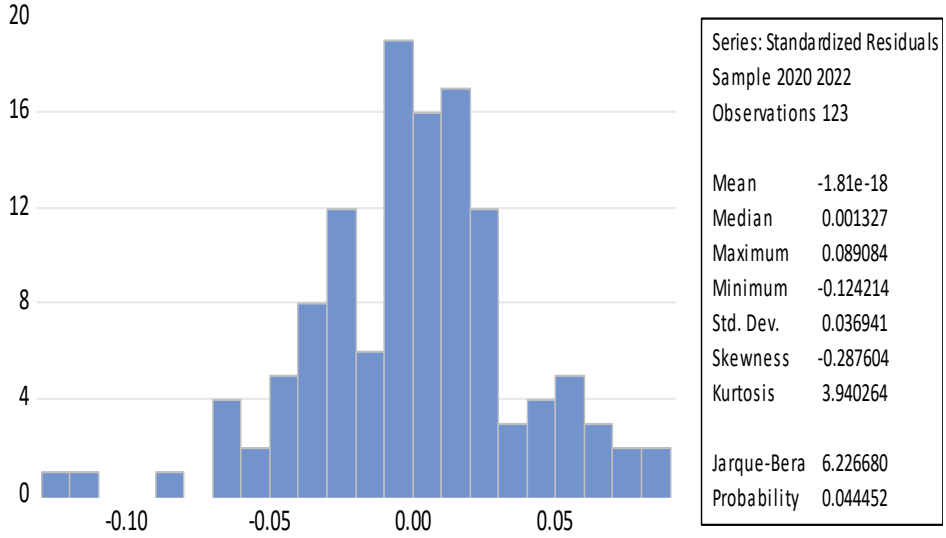
Source: EViews ver-12 data processing (2024)

Based on the test results, it can be concluded that the model chosen to test the regression of the first model of direct influence is Fixed Effect, and the model chosen to test the regression of the second model of indirect influence is Random Effect.

4.3 Classic Assumption Test

4.3.1 Normality Test

The normality test is used to determine whether the regression model has a normal distribution (distribution) of data or not. The following are the results of the normality test in this study:



Source: EViews ver-12 data processing (2024)

Figure 4. Normality Test Results

Based on Figure 4.1, the results of the normality test on the histogram graph above show that the Jarque-Bera value is 6,226,680, while the probability value is 0.044452 which is smaller than the significance of 0.05. So, it can be concluded that the data in this study is not normally distributed. This happens because the data studied varies, consisting of 41 companies for 3 years so that there are 123 observations.

Based on this fact, it does not rule out the possibility of an abnormal distribution. This is supported by the assumption of the Central Limit Theorem which explains that for studies that have more than 30 observations, the normality assumption can be fulfilled ignored (Gujarati, 2015).

4.3.2 Multicollinearity Test

In this study, the presence of multicollinearity symptoms can be seen from the correlation value between variables. According to Ghozali (2019), if the correlation between X1 and X2 exceeds 0.8, this indicates multicollinearity. The multicollinearity test results are shown in the following table:

Table 5. Multicollinearity Test

	CED (X1)	GI (X2)	ROS (I)
CED (X1)	1.000000	0.153097	0.153097
GI (X2)	0.1530097	1.000000	-0.101984
ROS (I)	0.031485	-0.101984	1.000000

Source: EViews ver-12 data processing (2024)

Based on the multicollinearity test results in Table 4.4, it can be concluded that there are no symptoms of multicollinearity between the variables of carbon emission disclosure, green investment and financial performance. Based on the output in the table, the correlation between X1 and X2 is 0.153097, the correlation between X1 and I is -0.101984, and the correlation between X2 and I is -0.101984.

4.3.3 Heteroscedasticity Test

Table 5. Heteroscedasticity Test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.003985	0.012349	0.322739	0.7475
CED (X1)	0.023412	0.013249	1.767152	0.0798
GI (X2)	0.478069	0.658576	0.725914	0.4693
ROS (I)	0.004417	0.013876	0.318339	0.7508

Source: EViews ver-12 data processing (2024)

Based on the Glejser test results in Table 4.5, all probability values of the tested variables are greater than 0.05. Thus, it can be concluded that the residuals have a homogeneous variant and the assumption of heteroscedasticity is met, which means that the data used in the second research model is free from symptoms of heteroscedasticity.

4.3.4 Autocorrelation Test

Autocorrelation testing is done using the Durbin Watson (DW) method and the criterion for no autocorrelation is if DU < DW < (4-DU). The results of the autocorrelation test are shown in the following table:

Table 6. Autocorrelation Test

Mean dependent var	-0.002698
S.D. dependent var	0.038249
Akaike info criterion	-4.720516
Schwarz criterion	-3.714531
Hannan-Quinn criter.	-4.311887
Durbin-Watson stat	2.144314

Source: EViews ver-12 data processing (2024)

Table 7. Durbin Watson Calculation

N	D	DL	DU	4-DL	4-DU
123	2.1443	1.6561	1.7559	2.3439	2.2441
1.7559< 2.1443< 2.2441					

Source: Secondary data processed, (2024)

From the output presented in table 4.6, the DW (Durbin-Watson) value is 2.1443, and the criteria for values that do not experience autocorrelation are 1.7559 < 2.1443 < 2.2441. So, the result obtained is that there is no autocorrelation in the regression analysis of the second model.

4.4 Panel Data Regression Analysis

Table 8. Panel Data Regression Analysis First Model Direct Effect

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.390939	0.107222	-1.738351	0.1860
CED	0.406093	0.910291	2.829290	0.0059
GI	0.361906	0.295387	0.172716	0.8633
ROS	2.295369	0.440238	2.155827	0.0041

Source: EViews ver-12 data processing (2024)

Based on table 4.8, the panel data regression equation can be arranged as follows:

$$Y = -0.390939 + 0.406093*X1 + 0.361906*X2 + 2.295369*I + e$$

Based on the regression test results, it can be concluded that,

a) The constant value of -0.390939 indicates that if the independent variable is considered absent, there will be an increase in Investor Reaction of -0.390939.
b) The regression coefficient for Carbon Emissions Disclosure is 0.406093 with a positive coefficient direction. This means that if there is a 1 unit change in the Carbon Emissions Disclosure variable, there will be an increase in the dependent variable Investor Reaction of 0.406093 assuming other variables are constant.
c) The regression coefficient for Green Investment is 0.361906 with a positive coefficient direction. This means that if there is a 1 unit change in the Green Investment variable, there will be an increase in the dependent variable Investor Reaction by 0.361906 assuming other variables are constant.
d) The regression coefficient value of the mediating variable Financial Performance is 2.295369 with a positive coefficient direction, this means that if there is an increase of 1 unit in the Financial Performance variable, it will increase the dependent variable Investor Reaction by 2.295369 assuming other variables are constant.

Table 9. Panel Data Regression Analysis Second Model Indirect Effect

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.271815	1.003198	-0.633546	0.0862
CED	0.204251	0.439342	0.274329	0.5386
GI	2.532317	1.068175	0.706419	0.0294

Source: EViews ver-12 data processing (2024)

Based on Table 4.9, the first model panel data regression equation can be formulated as follows:

$$I = -2.271815 + 0.204251*X1 + 2.532317*X2 + e$$

Based on the regression test results, it can be concluded that,

a) The constant value of -2.271815 indicates that if the intervening variable is considered absent, there will be a decrease in Financial Performance of - 2.271815.
b) The regression coefficient for Carbon Emissions Disclosure of 0.204251 means that if there is a 1 unit change in the Carbon Emissions Disclosure variable, there will be an increase in the intervening variable Financial Performance of 0.204251 assuming other variables are constant.
c) The regression coefficient for Green Investment of 2.532317 means that if there is a 1 unit change in the Green Investment variable, there will be an increase in the intervening variable of Financial Performance of 2.532317 assuming other variables are constant.

4.5 Hypothesis Test

4.5.1 F Test Results

To find out whether all the independent variables included in the model have a joint influence on the dependent variable by using this test

Table 10. First F Test Results Direct Effect

R-squared	0.824197	Mean dependent var	-0.002698
Adjusted R-squared	0.728507	S.D. dependent var	0.038249
S.E. of regression	0.019930	Akaike info criterion	-4.720516
Sum squared resid	0.031378	Schwarz criterion	-3.714531
Log likelihood	334.3117	Hannan-Quinn criter.	-4.311887
F-statistic	8.613196	Durbin-Watson stat	2.144314
Prob(F-statistic)	0.000000		

Source: EViews ver-12 data processing (2024)

From the results of Table 10, it can be seen that the significance value of F is 0.00, which is lower than the α value of 0.05. Therefore, it can be concluded that the independent variables of Carbon Emissions Disclosure and Green Investment as well as the mediating variable of Financial Performance jointly affect the dependent variable, namely Investor Reaction.

Table 11. Second Model F Test Results Indirect Effect

R-squared	0.485029	Mean dependent var	0.173841
Adjusted R-squared	0.320045	S.D. dependent var	0.346189
S.E. of regression	0.204830	Sum squared resid	38.83429
F-statistic	2.922021	Durbin-Watson stat	1.739066
Prob(F-statistic)	0.047665		

Source: EViews ver-12 data processing (2024)

From the results of Table 11, it can be seen that the significance value of F is 0.04, which is lower than the α value of 0.05. Therefore, it can be concluded that the independent variables of Carbon Emissions Disclosure and Green Investment jointly affect the intervening variable, namely Financial Performance.

4.5.2 T Test Results

Decision making to answer the research hypothesis is carried out by comparing the probabilities with the degrees of freedom used. The results of the hypothesis test are displayed in the following t test

Table 12. First Model T Test Results Direct Effect

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.390939	0.107222	-1.738351	0.1860
CED	0.406093	0.910291	2.829290	0.0059
GI	0.361906	0.295387	0.172716	0.8633
ROS	2.295369	0.440238	2.155827	0.0041

Source: EViews ver-12 data processing (2024)

Based on table 4.12, it can be seen that:

a) The independent variable Carbon Emissions Disclosure has a significant positive effect on Investor Reaction, this can be seen from the significance value in the Carbon Emissions Disclosure table which is much smaller at 0.0059 from the α value of 0.05.
b) The independent variable Green Investment has no significant effect on Investor Reaction, this can be seen from the significance value in the Green Investment table which is much greater at 0.8633 than the α value of 0.05.
c) The mediating variable of Financial Performance has a significant positive effect on Investor Reaction, this can be seen from the significance value in the Financial Performance table which is much smaller at 0.0041 than the α value of 0.05.

Table 13. Second Model t Test Results Indirect Effect

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.271815	1.003198	-0.633546	0.0862
CED	0.204251	0.439342	0.274329	0.5386
GI	2.532317	1.068175	0.706419	0.0294

Source: EViews ver-12 data processing (2024)

Based on table 4.13, it can be seen that:

a) The independent variable Disclosure of Carbon Emissions does not have a significant effect on Financial Performance, this can be seen from the significance value in the table Disclosure of Carbon Emissions which is much greater at 0.5386 than the value of α 0,05.
b) The independent variable Green Investment has a significant positive effect on Financial Performance, this can be seen from the significance value in the Green Investment table which is smaller at 0.0294 than the α value of 0.05.

4.5.3 Coefficient of Determination

Table 14. First Model Determination Coefficient Results Direct Effect

R-squared	0.824197
Adjusted R-squared	0.728507
S.E. of regression	0.019930
Sum squared resid	0.031378
Log likelihood	334.3117
F-statistic	8.613196
Prob(F-statistic)	0.000000

Source: EViews ver-12 data processing (2024)

Table 414 shows that the test results of the adjusted R Square determination coefficient are 0.728507. Which means that the magnitude of Investor Reaction can be explained by the independent variables in the study of Carbon Emissions Disclosure and Green Investment and the mediating variable of Financial Performance, which is 72.85%. While the rest is explained by other variables outside this study.

Table 15. Second Model Determination Coefficient Results Indirect Effect

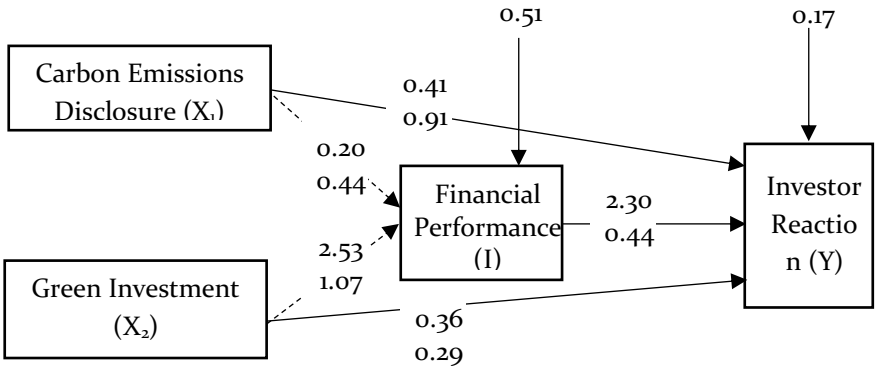
R-squared	0.485029
Adjusted R-squared	0.320045
S.E. of regression	0.204830
F-statistic	2.922021
Prob(F-statistic)	0.047665

Source: EViews ver-12 data processing (2024)

Table 4.15 shows that the test results of the adjusted R Square coefficient of determination are 0.320045. Which means that the amount of Financial Performance can be explained by the independent variables in the study, namely Disclosure of Carbon Emissions and Green Investment by 32%. While the rest is explained by other variables outside this study.

4.5.4 Path Analysis Testing

In conducting research path testing using the first model selection for the selected direct effect, namely the Fixed Effect Model and the second model for the selected indirect effect, namely the Random Effect Model, as in the following figure:



Source: EViews ver-12 data processing (2024)

Figure 5. Model 1 & 2 Path Test Results

The magnitude of the effect can be compiled with table 4.16, as follows:

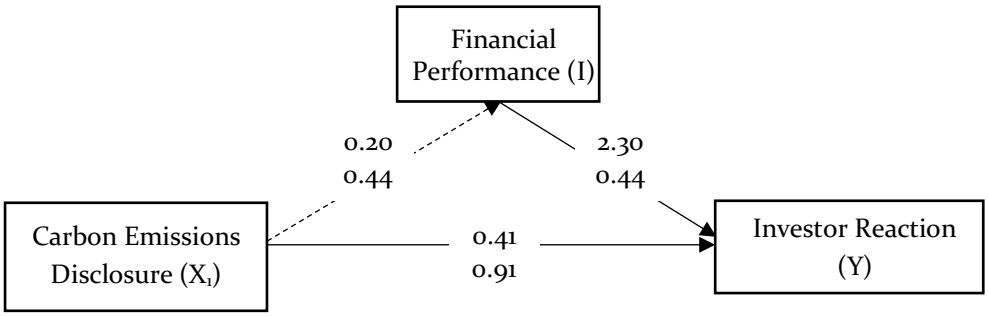
Table 16. Direct and Indirect Effect

Influence	Direct	Indirect Through ROS	Magnitude of Influence
CED to CAR	0.41		
GI to CAR	0.36		
CED to ROS		0.20	
GI to ROS		2.53	
CED through ROS to CAR			0.41*2.30 = 0.94
GI through ROS to CAR			0.36*2.30 = 0,83

Source: Secondary data processed, (2024)

4.5.4 Sobel Test

Testing the mediating effect in this study is the Sobel test to determine whether there is an indirect effect. The calculation of the coefficient, standard error and t-count value on indirect effects is presented as follows:



Source: Secondary data processed, (2024)

Figure 6. Indirect Effect of X1 through I to Y

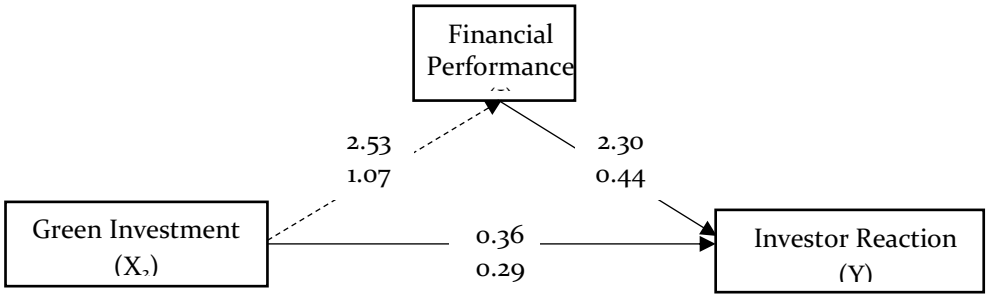
$Sab = \sqrt{((2.30)^2 (0.44)^2) + ((0.20)^2 (0.44)^2) + ((0.44)^2 (0.44)^2)}$

$Sab = 1.03$

$$t = \frac{(0.20)(2.30)}{1.03} = 0.45$$

The t-table test (n-1;0.05) (123-1;0.05) = 1.65744 while the t-count value is 0.45.

Based on the results of the t-count of 0.45 < t-table (1.657), it can be interpreted that there is no indirect effect between the Disclosure of Carbon Emissions on Investor Reaction through Financial Performance, and the actual effect is direct.



Source: Secondary data processed, (2024)

Figure 7. Indirect Effect of X2 through I to Y

Sab = √ ((2.30)^2 (1.07)^2) + ((2.53)^2 (0.44)^2) + ((1.07)^2 (0.44)^2)

Sab = 2.74

$$t = \frac{(2.53)(2.30)}{2.74} = 2{,}12$$

To determine the indirect effect between the Disclosure of Carbon Emissions

to Investor Reaction through Financial Performance using the t-table test (n- 1; 0.05) (123-1; 0.05) = 1.65744 while the t-count value is 2.12. Based on the results of the t-count of 2.12> t-table (1.657), it can be interpreted that there is an indirect effect between Green Investment on Investor Reaction through Financial Performance with a positive effect of 0.83, and the actual effect is indirect.

4.6 Discussion

The results of this study indicate that the disclosure of carbon emissions has a significant positive effect on investor reactions. The significance value of carbon emission disclosure is much smaller at 0.0059 than the α value of 0.05. With this explanation, the hypothesis H1 is accepted and it can be concluded that the disclosure of carbon emissions has an effect on investor reactions, meaning that the higher the company increases efforts to reduce carbon emissions, this will give a positive investor response.

The results of this study are in line with previous research conducted by, Asmaranti et al., (2020) which shows that disclosure of carbon emissions has a positive effect on investor reactions. This shows that the disclosure of carbon emissions has a positive effect on investor reactions, the company will get positive legitimacy and improve the company's image for investor reactions for the sustainability of its business.

The results of this study indicate that Green Investment has no effect on Investor Reaction. The significance value in the Green Investment table is much greater at 0.8633 than the α value of 0.05. With this explanation, the decision of hypothesis H2 is rejected and it can be concluded that Green Investment has no positive effect on Investor Reaction, meaning that the high or low environmental costs incurred by the company will not affect investor reactions to the company.

The results of this study are not in line with previous research conducted by Asyari & Hernawati, (2023) and (Cakranegara, 2021) showing that green investment has a positive effect on investor reactions. This is because investors already think that companies should allocate funds for green investment. However, the main point of attention is how concrete and effective the company's program is in carrying out the green investment.

The results of this study indicate that Financial Performance has a significant positive effect on Investor Reaction. The significance value of Financial Performance is much smaller at 0.0041 than the α value of 0.05. With this explanation, the H3 hypothesis decision can be accepted and it can be concluded that financial performance has an effect on investor reactions, meaning that the higher the company makes a profit or profit, this will give a positive investor response.

The results of this study are in line with previous research conducted by, Sari et al. (2020) and Firdausy, (2023) show that financial performance partially has a positive effect on investor reactions. Investors evaluate financial statements a company by using financial statement analysis and will use these financial statements to support decision making.

The results of this study indicate that the Carbon Emissions Disclosure variable has no effect on Financial Performance. The significance value in the Carbon Emissions Disclosure table is much greater at 0.5386 than the α value of 0.05. With this explanation, it can be decided that the H4 hypothesis is rejected and it can be concluded that the disclosure of carbon emissions has no effect on financial performance, meaning that the presence or absence of company disclosure in climate change mitigation efforts by reducing carbon emissions does not provide added value to the company and cannot improve the company's financial performance.

The results of this study are not in line with previous research conducted by Khairunisa & Pohan, (2022) and Ladista et al., (2023) which show that disclosure of carbon emissions has a positive effect on the company's financial performance. This is because the disclosure of carbon emissions is still considered a voluntary action, so companies are not required to disclose the amount of carbon emission production produced.

The results of this study indicate that Green Investment has a significant positive effect on Financial Performance. The significance value in the Green Investment table is smaller by 0.0294 than the α value of 0.05. With this explanation, the hypothesis H5 is accepted and it can be concluded that green investment has an effect on financial performance, meaning that the high or low environmental costs incurred by the company will affect the company's financial performance.

The results of this study are in line with previous research conducted by, Chariri et al., (2018) and Yatie & Tandika, (2019) stating that responsible investment and compliance with environmental ethics have shown that green investment can improve financial performance and create sustainable performance. By investing in environmentally friendly practices, companies can ensure regulatory compliance and prevent potential sanctions or lawsuits related to environmental and social violations.

The results of this study indicate that Carbon Emissions Disclosure has no effect on Investor Reaction through Financial Performance as an intervening variable. The t-calculated result of 0.45 < t-table (1.657) with this explanation, the H6 hypothesis can be rejected and it can be concluded that there is no indirect effect between Carbon Emissions Disclosure on Investor Reaction through Financial Performance, and the actual effect is direct. The intervening variable of Financial Performance is not able to mediate the effect of carbon emission disclosure on investor reaction.

The results of this study are not in line with previous research conducted by, Kurnia et al., (2020) showing that good carbon emission disclosure does not directly affect investor reactions, on the other hand financial performance mediates the effect of good carbon emission disclosure on investor reactions. Financial performance is not always able to mediate the effect of carbon emissions on investor reactions because there are additional

factors that play an important role in investors' evaluation of companies. While strong financial performance is an important indicator of corporate sustainability and stability, investors today are increasingly emphasizing environmental, social and governance (ESG) aspects in their decision-making.

The results of this study indicate that Green Investment affects Investor Reaction through Financial Performance as an intervening variable. The t-count result is 2.12 > t-table (1.657) with this explanation, the decision of hypothesis H7 is accepted and it can be concluded that there is an indirect influence between Green Investment on Investor Reaction through Financial Performance with a positive influence. The intervening variable of Financial Performance is able to mediate the effect of green investment on investor reaction, with a positive effect of 0.83, and the actual effect is indirect.

The results of this study are in line with previous research conducted by, Yatie & Tandika, (2019) which shows that green investment has a significant effect on investor reactions mediated by financial performance. Financial performance is able to mediate the effect of green investment on investor reactions in non-financial companies listed on the Indonesia Stock Exchange (IDX) can be seen from research that highlights the importance of corporate sustainability programs in influencing investor perceptions by being accompanied by the company's profit.

5. Conclusion

This study aims to measure the effect of climate change mitigation efforts on carbon emission disclosure and green investment on investor reactions through financial performance conducted in non-financial sector companies listed on the Indonesia Stock Exchange (IDX) in 2020-2022. Based on the research that has been done, it can be concluded that:

a) Disclosure of carbon emissions has a significant positive effect on investor reactions. The higher the company increases efforts to reduce carbon emissions, this will provide a positive investor response.
b) Green investment has no effect on investor reactions. High or low funds or investments related to the environment issued by the company will not affect investors' reactions to the company.
c) Financial performance has a significant positive effect on investor reactions. The higher the company generates profit or, this will give a positive investor response.
d) Disclosure of carbon emissions has no effect on financial performance. Company disclosures in climate change mitigation efforts by reducing carbon emissions do not provide added value to the company and cannot improve the company's financial performance.
e) Green investment has a significant positive effect on financial performance. High or low funds or investments related to the environment issued by the company will affect the company's financial performance.
f) Disclosure of carbon emissions has no effect on investor reaction through financial performance. There is no indirect effect between the disclosure of carbon emissions on investor reactions through financial performance, and the actual effect is direct.
g) Green Investment affects investor reaction through financial performance as an intervening variable. There is an indirect influence between Green Investment on investor reactions through financial performance with a positive influence. The intervening variable of financial performance is able to mediate the effect of green

investment on investor reactions, with a positive effect of 0.83, and the actual effect is indirect.

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