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Relationship of Environmental Performance and Carbon Emission Disclosure to Share Return

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Abstract. This study aims to analyze the relationship between environmental performance and carbon emission disclosure to share returns. To test our hypotheses, we using 130 firm-year observations, manufacture listed firms in Indonesia Stock Exchange that included in PROPER assessment from 2013 to 2016. Ordinary least square regression result shows that environmental performance does not have a relationship to share return, while carbon emission disclosure has a positive relationship to share return. These results indicate that, in general, the market will respond to information as a particular signal toward an event that affects the firm's value, which reflected by the firm's share price. This study is crucial for the investor to consider non-financial factors such as corporate social responsibility disclosure and environmental performance in the context of select a proper investment.

Keywords: environmental performance, carbon emission disclosure, share return saham, Proper

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INTRODUCTION

Ideally, a firm has an objective that gains maximum profit to maintain its sustainability. Firm's sustainability will be maintained if a firm paid serious consideration on the social and environmental dimension (McWilliams & Siegel, 2001; Nasih et al., 2019). Nowadays, management not only profit-oriented to maintain its sustainability but need to fulfill stakeholder's wants as a group that closely related to the firm's sustainability (Irawati et al., 2019; Lubis et al., 2017; Ekawaty, 2019). According to Ernst & Young's (2013) report, 40% of shareholder proposals have social and environmental themes. This phenomenon shows that shareholders put pressure on the firm to have more concern on environmental and sustainability development issues. This resulting reshape of firm's paradigm from a single bottom line, that view a firm's value growth from its economic growth to triple bottom line that reflected through economic, social, and environmental dimension.

The increases in society's awareness of the firm's economic activities impact people, planet, and profit, causing the birth of green accounting. This concept shows the firm's commitment and awareness that development that only focuses on economic growth will halt the sustainability growth itself (Dewi, 20120; Mohasoa & Mokoena, 2019; Galatti et al., 2019). To prevent the immense economic loss, the United Nations Framework Convention on Climate Change (UNFCCC) develop an international amendment known as the Kyoto Protocol. Kyoto Protocol is an international agreement that relates to the United Nations Framework Convention about climate change. If successfully implemented, the Kyoto Protocol will be able to decrease global temperature between 0.020C up to 0.280C in the year 2050. Kyoto Protocol target six greenhouse gas, which are CO2, CH4, N2O, SF6, PFC, and HC to decline (Jannah & Muid, 2014). Kyoto Protocol also regulates three mechanisms to decrease emission, which are Clean Development Mechanism (CDM), Joint Implementation (JI), and Emission Trading (UNFCCC, 1998). Kyoto Protocol ratification gives benefits to Indonesia to reaffirm the shared responsibility to implement sustainability development (Nasih et al., 2019).

As one of the countries that agree and sign the Kyoto Protocol, Indonesia had ratified the Kyoto Protocol on June, 28th 2004, through Law No. 17 Year 2004 in the context of implements sustainability development and also participating in decreasing the global greenhouse gas emission. Indonesia's government also made several regulations and laws to minimize the negative impact on the natural

environment. These laws, as follows first is Law No. 23 Year 1997 about natural environment management, and second is Government Regulation No. 27 Year 1999, which states that the government is compulsory to create an analysis of natural environment impact on each project to minimize carbon emission impacts. These laws are resulting the firms to implement Clean Development Mechanism (CDM) as firm's standard operating procedures to reduce carbon emission that generated from firm's operational (Ratnatunga & Balachandran, 2009) and develops its environmental performance (Suratno et al., 2007; Retno & Priantinah, 2012).

One attempt's effort in sustainable development is to conduct carbon emission disclosure as accounting treatment on environmental issues. This attempt was made by discloses the approach applied to manage the carbon generated from the firm's operational in each annual report. With the disclosure of this information, the firm shows to the public that the firm already implements various strategies and methods to minimize carbon emission. Carbon emission disclosure becomes a vital part of corporate social responsibility reporting (KPMG, 2008; Syafaruddin, 2019). More than 70% of Fortune 500 firms voluntarily disclose their carbon emissions information to help and encourage other firms to implement carbon accounting activities (Barros et al., 2011; Ramadhani, 2015; Bae Choi et al., 2013). By disclose social and environmental performance voluntarily, the firm will receive sustainable economic benefits (Isnalita & Narsa, 2012; Widiyanti et al., 2019). Barus and Maksum (2011) state that CSR information disclosure has a significant and positive relationship to share abnormal returns. Harymawan et al. (2019) also explain that additional information disclosed by the firm will make share price changes.

This study aims to examine the relationship between environmental performance and carbon emission disclosure to share returns. We use 130 firm-year observations, manufacture listed firms in the Indonesia Stock Exchange that included in the PROPER assessment developed by Indonesia's Ministry of Environmental from 2013 to 2016. The motive that we select the firms that included in the PROPER assessment as these firms intensively generate carbon emission from their operational.

The study result shows that environmental performance does not have a relationship to share return, while carbon emission disclosure has a positive and significant relationship to share return. These results imply that, in general, the market will respond to information as a signal of a particular event that affects the firm's value, which represented as a firm's share price. Nevertheless, related to environmental performance, the investor does not put serious concern on environmental performance assessment as it does not directly affect the firm's financial performance in the short term. This study provides vital implications for the investor to keep consider non-financial factors such as corporate social responsibility disclosure and environmental performance to select proper investment. Besides that, this study enriches the current literature on the importance of carbon emission to generate an investment return.

The rest of this paper will be organized as follows: section 2 contains an explanation of research hypotheses development; section 3 explains the research variable, sample, and regression model; section 4 discusses the empirical analysis and hypothesis test; and the last section concludes remark, includes a suggestion for future studies.

LITERATURE REVIEW

Mounting studies related to the firm's social and environmental performance disclosure based on stakeholder theory, as the firm, pressured to balancing the fulfillment of various stakeholders want. A firm is not an entity that only operating for its interest, instead provides benefits to its stakeholders (shareholder, creditor, consumer, supplier, government, society, analyst, and other parties). Thus, the existence of the firm depends on the stakeholder's support (Ghozali & Chariri, 2007). Furthermore, the disclosure of corporate social responsibility as an act to gain legitimacy from local communities and maximize their financial performance in the long term (Deegan & Unerman, 2011; Berthelot & Robert, 2011). Environmental performance disclosure that voluntary implemented becomes a signal for the investor that, in the end, to increase the firm's value. This phenomenon is in line with signaling theory, which states that information as a signal that announced by management to the public where the firm has a promising prospect (Miller & Plott, 1985). As a result, more forecast predicts that return will rise and gives a signal about the firm's future both in the short and long term, which used as an analyst to forecast the increase of the long-term earnings.

Prior studies found that there is a positive relationship between greenhouse gas emission disclosure and environmental performance toward a firm's value (Matsumura et al., 2013; Clarkson et al., 2011). Based on this research result, it can be concluded that the market positively responds to the management effort to disclose greenhouse gas emissions. This phenomenon, as investors perceive management can manage the

environmental damage from its business operational (Griffin et al., 2012). Using greenhouse gas emission information (one of environmental analysis component of the firm) in firm's report, related parties that have interest can understand how regulation, value, and motive of the firm to deal greenhouse gas emission and their natural environment issues (Ahmad & Hossain, 2015), resulting they create their value for the firm.

Hsu and Wang (2013) argue that investors do not agree with allowances for dealing with global warming issues by the business entity. This disagreement as investors worried that those allowances have more cost incurred compared to return that will receive, or in another term, the greenhouse gas emission information is costly. Furthermore, the prior study found that the public has more sensitive to information that contains "bad news." As a result, investors do not have any interest in climate change information caused by the firm. These perceptions rise as if the firms disclose that their business operational is causing massive greenhouse gas emission, and that information is spreading to society; the opinion that constructed is the firm has a depraved image. In the end, it will make the downfall of the sales and share price.

Hansen and Mowen (2005) state that environmental performance should not be perceived as philanthropy, instead of as competitiveness. An ideal environmental performance will generate eco-efficiency that supports the firm's sustainability development. Decent sustainability will attract the investors to invest as it has minimized risk and future return that always rises. The test of the social aspect by Al-Tuwaijri et al. (2004) shows that there is a positive relationship between environmental performance to financial performance. Thus, we hypothesized that:

H1. There is relationship between environmental performance toward share return.

Besides that, the firm that discloses its environmental activity appropriately will provide information that reliable for various stakeholders. The high quality of disclosure by the firm is a positive signal that provided by the firm to stakeholders and shareholders. Nurdin and Cahyandito (2006) state that belief from the investor is a vital aspect of the capital market. Hence, an announcement or disclosure will make investors reacted with various responses. If the investor's response is homogeny, then there will be no reaction; therefore, there is no transaction. Based on the above explanation, we hypothesized that:

H2. There is relationship between carbon emission disclosure to share return.

RESEARCH METHODOLOGY

Sample and Data Sources

In this study, we used manufacture listed firms and included in the PROPER assessment developed by Indonesia's Ministry of Environmental from 2013 to 2016. We use manufacture firms as they have more amount of industry compared to other sectors. The data sources of this study are the annual report and financial report of the firm that obtained from the Indonesia Stock Exchange (IDX) official website. As for PROPER assessment rank obtained from the Ministry of Environmental's official website. This study implements purposive sampling methods to select the research sample. The selection criteria that this study employed is as follows:

Table 1: *Research Sample*

No	Criteria	Year				Total
		2013	2014	2015	2016	
1	Manufacture firms that listed in IDX	136	141	143	144	564
2	Manufacture firms that not participating in PROPER	(99)	(104)	(106)	(107)	(416)
3	Participants of PROPER that the data is not complete and invalid	(3)	(5)	(8)	(2)	(18)
	Total firm-year observations	34	32	29	35	130

Variable Operationalization

Share Return

The dependent variable of this study is the share return or also known as share earnings and measured by the changes of share price between period t and t-1 (Halim, 2005). As the share price changes, it will generate higher share return. Tandellin (2010) explains that share return is one factor that motivates investors to

invest and also as compensation for the risk borne by investors as they decided to invest. In this study, the share return formula is as follows:

$$Ret_t = \frac{P_t - P_{t-1}}{P_{t-1}}$$

Where, Ret_t is share return on period t, and P_t is share price on observation period, while P_{t-1} is share price of previous period

Environmental Performance

To test our first hypothesis, we use environmental performance as our independent variable. The environmental performance measured by ranks given by Indonesia's Ministry of Environmental that regulated by PROPER, which is the Ministry of Environmental Law No. 5 Year 2011 about the assessment criteria and PROPER rank. The detailed environment performance assessment rank is provided in table 2.

Table 2: *Proper Assessment Rank*

PROPER Rank	Score/Point
Gold	5
Green	4
Blue	3
Red	2
Black	1

Carbon Emission Disclosure

Independent variable that used for test the second hypothesis is carbon emission disclosure. This variable regarded as disclosing activity done by the firm to know the seriousness of the firm in the context of their responsibility of carbon emission activities (Andrew & Cortese, 2011). Carbon emission disclosure using five main indicators developed by Carbon Development Program (CDP). This assessment of carbon emission disclosure explained the detail of five indicators through 18 items. Table 3 provides the checklists of carbon emission disclosure.

Table 3: *Checklist Carbon Emission Disclosure Information*

Category	Item
1. Climate Change (CC): Risk and Oppurtunity	CC1: Valuation / Description of risk (regulation, both of specific and general) that relates to climate change and action already or will be done as risk management effort.
	CC2: Valuation / Description of financial, business, and opportunity implication on climate change both in present and future.
2. Greenhouse Gasses (GHG):	GHG1: Describing method that applied to calculate greenhouse gas emission (GHG)
	GHG2: External verification on sustainability of greenhouse gas emission quantity (GHG)
	GHG3: Total greenhouse gas emission - metric ton CO2 – that generated
	GHG4: Disclosure of point 1, 2, and 3 directly on greenhouse gas emission.
	GHG5: Disclosure of greenhouse gas emission that generated from power sources (such as electricity, coal, and others).
	GHG6: Disclosure of greenhouse gas emission that generated from facility or segment level.
	GHG7: Comparison of current year greenhouse gas emission with previous years.
3. Energy Consumption (EC)	EC1: total energy consumed (such as terra joule, peta joule)
	EC2: Quantity of energy used that generated from renewable resources
	EC3: Disclosure based on its type, facility or segment
4. Reduction Cost (RC)	RC1: Explain the planning or strategy to minimize greenhouse gas emission
	RC2: Specification of minimization level of greenhouse gas emission and its

	target for each year
	RC3: Total cost of minimizing the greenhouse gas emission or the total allowances
	RC4: Future cost of emission that included in capital planning
5. Accountability Carbon Cost (ACC)	ACC1: Indication where particular committees (or executives) has responsibility to activity that relates to climate change
	ACC2: Describe the mechanism that created by boards (or other executives) by reviewing the sustainability of the firm in process of climate change.

In this study, greenhouse gas emission proxied by the carbon emission disclosure index (Bae Choi et al., 2013). The valuation base of that disclosure index is regulation developed by Carbon Disclosure Project (CDP), an organization from the United Kingdom that focused on the firm's emission disclosure that triggering global warming. The formula of this disclosure index is as follows:

$$\text{CED} = \frac{\text{Total score of entity i for period t}}{\text{Total maximum score}} \text{x}100\%$$

METHODS

This study uses ordinary least square regression analysis by SPSS 22 to test the relationship between environmental performance and carbon emission disclosure to share return. We test the hypotheses after the research data fulfill all the classic assumption requirement. The classic assumptions test is needed so that the result can be interpreted appropriately. The regression equation of this study as it follows:

$$Ret_{it} = \alpha + \beta_1 Epi_{t-1} + \beta_2 CEDi_{t-1} + e_{it-1} \quad (1)$$

Where, Ret_{it} is share return current period, Epi_{t-1} is environmental performance of previous period and $CEDi_{t-1}$ is carbon emission disclosure of previous period.

RESULT AND DISCUSSION

Descriptive Statistic

Table 4 provides a descriptive statistic result of this study. This study uses 130 firm-year observations as its sample. The result shows that share return in this study has an average value 0.008838 with standard deviation, which represents the share return variable variety is 0.3447852. Next, the average carbon emission disclosure in this study is 40.82%, with a standard deviation 23.71%. Besides that, the least carbon emission disclosure of the firm is 11.11% or approximately only discloses two items of carbon emission disclosure for each year, and the utmost amount is 88.89%. This result means that a firm discloses 16 items of carbon emission for each year based on the Carbon Development Program.

Table 4: *Descriptive Statistic Test Result*

	N	Minimum	Maximum	Mean	Std. Deviation
CED	130	0.1111	0.8889	0.408120	0.2371909
Ret	130	-0.7870	1.2913	0.008838	0.3447852

Table 5 provides a descriptive statistic for the only environmental performance variable. The result shows that total observations, which are 130 firm-year observation categorized into the firm who categorized gold rank according to PROPER, are five observations or only 3.8%. The rest is categorized as green rank is 16 observations or 12.3%, then blue rank is 95 observations or 73.1%, and the last is categorized as red rank with amount 14 observations or 10.8%.

Table 5: *Descriptive Statistic – Environmental Performance*

		Frequency	Percentage (%)
	Red	14	10.8
	Blue	95	73.1
	Green	16	12.3
	Gold	5	3.8

	Total	130	100.0

Classic Assumption Test

Before conduct the main analysis, we must ensure that the regression model is appropriate to analyze the environmental performance and carbon emission disclosure to share return. These classic assumption tests consist of four types of tests, which are the normality test, multicollinearity test, heteroskedasticity test, and autocorrelation test.

Normality Test

The normality test is a non-parametric test conducted by the Kolmogorov-Smirnov test. The significance (2-tailed) level of normally distributed data is more than 5%. Table 6 provides the Kolmogorov-Smirnov test result where obtained Kolmogorov-Smirnov value is 1.048, with a significance level is 0.222. The significance level is more than 0.05. This result concludes that the research data is normally distributed.

Table 6: *Kolmogorov-Smirnov Test Result*

	Unstandardized Residual
N	130
Kolmogorov-Smirnov Z	1.048
Asymp. Sig. (2-tailed)	0.222

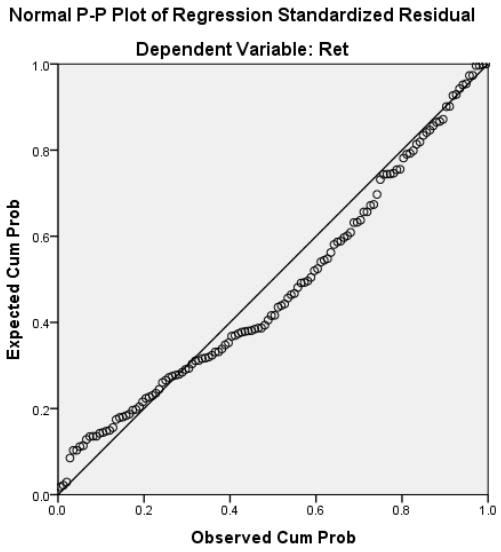

Figure 1: *Normal P-Plot Chart*

As seen in figure one, the data spread is around and following the diagonal line. Therefore, based on the Normal P-Plot result, the research data is normally distributed, which is in line with the Kolmogorov-Smirnov test result.

Multicollinearity Test

A multicollinearity test is needed to test the regression model if there is any quite strong correlation between each independent variable. To determine that the regression model has a multicollinearity symptom is based on tolerance value and Variance Influence Factor (VIF). The regression model that unfettered from the multicollinearity issue is the regression model that has tolerance value ≥ 0.10 or if the Variance Influence Factor (VIF) value is ≤ 10. Based on table 7, it is shown that all independent variables, which are environmental performance (EP) and carbon emission disclosure (CED), have tolerance value > 0.1 and VIF < 10. This result settles that all independent variables in this study do not have any multicollinearity symptoms.

Table 7: *Multicollinearity Test Result*

Variable	Collinieearity Statistic		Description
	Tolerance	VIF	
EP	0.719	1.391	No multicollinearity issue
CED	0.719	1.391	No multicollinearity issue

Heteroskedasticity Test

Heteroskedasticity test conducted to figure out the relationship between other variables to independent variables. If there is homoscedasticity symptom, then there is no relationship between other variables to independent variables; therefore, the dependent variable only explained by independent variables. Heteroskedasticity symptom test is using a scatter plot test. If the dots are spread widely and do not shape a particular pattern, then the regression test does not have a heteroskedasticity assumption.

Based on figure 2, the scatter plot diagram shows that the dots have spread widely, not huddled each other, and not shape a particular pattern. This result settles that there is homoscedasticity symptom, or there is no relationship between other variables to independent variables, which dependent variable only explained by independent variables. This test result shows that the regression model is free from heteroskedasticity symptom.

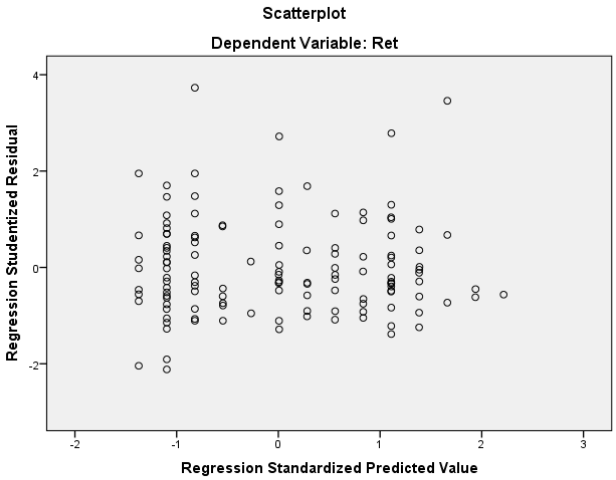

Figure 2: *Scatterplot Diagram*

Autocorrelation Test

The autocorrelation test objective is to test if there is a relationship between error in the variable for period t with error in the same variable for period t-1 (previously). To ensure the autocorrelation issue, we use a Durbin-Watson test. As shown in table 8, the regression model of this study has Durbin-Watson value 1.615 which still positioned in free from autocorrelation area as the limit is -2 to +2.

Table 8: *Durbin – Watson Test*

Model	Durbin – Watson
1	1,615

Main Analysis

Table 9: *Regression Result*

Variable	Regression Model		
	Coefficient	t	Sig
(constant)	0.116	0.745	0.457
EP	-0.086	-1.497	0.137
CED	0.384	2.592	0.011*
R square	0,050		
F statistic	3.369		
F Sig.	0.038		

*significant at level of 5%

Table 9 provide the ordinary least square regression analysis test result that test the relationship between independent variables which are environmental performance and carbon emission disclosure toward dependent variable which is share return. Based on the regression result provided in table 9, the constant coefficient is 0.116, which means if all independent variables included in the regression model has zero value, then the value of share return is 0.116. The environmental performance variable has a regression coefficient -0.086, where if environmental performance's value increases one point, then the share return variable will decrease by 0.086 and vice versa, cateris paribus. As for carbon emission, disclosure has a regression coefficient of 0.384. This value means that if carbon emission disclosure's value increase one point, then the share return will increase by 0.384, cateris paribus.

The determinant coefficient (R2) indicates how much the percentage of all independent variables explain the dependent variable. The regression result provided in table 9 shows that R2 is 0.05 or 5%. This result implies that both environmental performance and carbon emission disclosure can explain the variation of share return by 5% and for the rest (95%) is explained by other variables that not included in this study.

Relationship between Environmental Performance to Share Return

The regression result in table 9 shows that the t value for the environmental performance (EP) variable is -1.497, with a significance level 0.137. As the significance level is higher than the requirement, which is 0.05, then it concluded that environmental performance does not have a relationship to share return. The coefficient value has a negative value, which means that if a firm has a better quality of environmental performance, the firm's share return will be more unfavorable. This result confirms that the first hypothesis (H1) is not accepted.

Based on the analysis result on the regression test, the environmental performance does not have a relationship to share return. This result is consistent with Naratama and Majidah (2014) research, which document that environmental performance does not have a statistically significant relationship toward share return. In line with research conducted by Anggraeni (2015), which found empirical evidence that environmental performance does not have a relationship with the firm's value except for firms that have a gold rank. In this context, the share return is one indicator of the firm's value.

Therefore, as the environmental performance does not have any relationship with a firm's share return, it becomes an indication that investor is not considered paid attention to the assessment of the firm's environmental performance. This investor's reaction as the assessment result does not directly link a firm's short-term financial performance. Besides that, the Indonesian listed firm's environmental management implementation only following the minimum requirement of related regulations and laws. These habits resulting in investors have their perception that there is no value-added both for the firm and the investors themselves.

Relationship between Carbon Emission Disclosure to Share Return

The t value for carbon emission disclosure (CED) is 2.592, with significance level 0.011, as provided in table 9. The significance level is lower than 0.05; then, it can conclude that the amount of carbon emission disclosure has a positive and significant relationship share return. This result confirms the second hypothesis of this study. As the item amount that describes the carbon emission is increased, it is resulting in a higher firm's share return. This result is in line with legitimacy theory, which states that the firm that voluntarily provides environmental disclosure in its operational location has made a "social contract" with surrounding society.

This action serves as one of the bases for the firm to obtain its legitimacy as the society has regarded the firm already implements its activity according to local norms and constraints.

The study result is in line with Matsumura et al. (2014) as they found a positive relationship between management decisions related to carbon emission disclosure to the firm's value. Barus and Maksum (2011) also argue that CSR information disclosure has relationship to share return. These prior studies confirm that investors consider the firm's social aspect in the context of investment decisions.

Therefore, it can be said that the market, in general, responds information as a signal for a particular event that affects the firm's value, which represented by the firm's share price. According to Signaling Theory, the firm activities that provide information to investors about share return prospect is substantial. Information considered as "signal" if that information provided by management to society conveys the firm has a promising future. As a result, more forecast predicts that return will rise and gives a signal about the firm's future both in the short and long term, which used as an analyst to forecast the increase of the long-term earnings.

CONCLUSION

This study aims to examine the relationship between environmental performance and carbon emission disclosure to share returns. This study using manufacture listed firms in the Indonesia Stock Exchange (IDX) and included in PROPER assessment by the Ministry of Environmental for the period 2013 to 2016. Based on the analysis result, the environmental performance does not have a relationship to share return. This result indicates that investor is not considered paid attention to the assessment of the firm's environmental performance as these assessment result is not directly link the firm's short-term financial performance. As for second hypothesis, this study found that carbon emission disclosure has positive and significant relationship to share return. Therefore, it can be said that the market, in general, responds information as a signal for a particular event that affects the firm's value, which represented by the firm's share price.

This study has a limitation that is related to the data source to calculate the share return that used as a dependent variable in this study. The share return data that the user is only based on end-year share price, thus it not considers its volatility or changes. Consequently, this limitation provides an opportunity for future studies to extend the information related to the firm's share return data on a monthly or daily basis. This study provides vital implications for the investor to keep consider non-financial factors such as corporate social responsibility disclosure and environmental performance to select proper investment. Besides that, this study provides consideration for Indonesia's firm related to the global warming issue by intensifying the carbon emission disclosure in an annual report or sustainable report. These actions can provide a decent image and support the transparency of the firm to the society or investors.

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