GREEN STRATEGY MODERATE THE EFFECT OF CARBON EMISSION DISCLOSURE AND ENVIRONMENTAL PERFORMANCE ON FIRM VALUE

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Abstract

The purpose of this study is to examine and analyze: (1) The effect of disclosure of carbon emissions and environmental performance on firm value. (2) Effect of green strategy on firm value (3) Green strategy moderates the effect of disclosure of carbon emissions and environmental performance on firm value. Quantitative research uses secondary data taken by purposive sampling from annual reports and sustainable reports of manufacturing companies listed on the Indonesia Stock Exchange in 2015-2019. The data is processed by panel regression. The conclusion of this study (1) Disclosure of carbon emissions has no effect on firm value. (2) Environmental performance and green strategy have a significant positive effect on firm value. (3) The green strategy strengthens the effect of carbon emission disclosure on firm value. (4) The green strategy is not proven to strengthen environmental performance on firm value. Hence, the green strategy only acts as a predictor or independent variable. The contribution of this research are (1) For regulator, in this case the Ministry of Environment and Forestry, it is expected to be able to oblige companies to carry out activities and provide reports related to the company's environmental disclosures such as Disclosure of Carbon Emissions and Green Strategy effectively and efficiently. (2) For companies, to increase CSR activities so that they can increase their reputation and increase shareholder confidence. (3) Future researchers are expected to use different companies and variable variations so that the scope becomes wider.

Keywords: Environmental Performance, Carbon Emission Disclosure, Green Strategy, Firm value

JEL Classification: M210, Q500
INTRODUCTION

The value of the company reflects the trust of the stakeholders in the management of the business which is shown through the achievement of the company's performance results. By maximizing the value of the company as indicated by the increase in share prices from stock transactions on the Stock Exchange. Suppose the stock price is above the company's book value (overvalued). In that case, it shows that the company's performance has met the expectations of stakeholders or is considered to have long-term prospects which are considered good by investors and vice versa if the stock price is below the company's book value (undervalued). This means the company's market value assessed by investors is below the net book value of the company. Therefore, the higher share price increase from the net book value reflects more company's success in managing the company's financial fundamentals and company sustainability by paying attention to the company's environment and social (profit, people, planet).

The high level of competition in the business world is in line with the development of the main environmental pollution problems, namely global warming and carbon emissions. If global warming and carbon emissions continue for a long time, this will result in environmental degradation that is detrimental to the lives of all living things. The decrease in water and air pollution impacts of increasing productivity and efficiency by the company. Although several companies have claimed that their final products have been categorized as environmentally friendly (Anggraeni, 2015). However, some of the company's industrial data has not provided sufficient clear information regarding the efforts made to minimize environmental damage. Thus, the economic activities carried out by companies indirectly have become several factors in global warming. The role of the community and government is urgently needed to realize the importance of environmental conservation and encourage all business sectors to be responsible for the environment in the production process activities. The government can take firm action against companies that damage environmental sustainability by issuing several regulations. As stated by Chen et al. (2017) regulation will be a tight environmental pressure for companies and create new business competition. Green consumers and producers will grow significantly. Although most consumers and producers find it difficult to move to green products. Companies must consider green competition in their business strategy.

In Indonesia, the commitment to reduce carbon dioxide emissions can be seen from Presidential Decree No. 61 of 2011 and Presidential Decree No. 71 of 2011. In Article 4 of Presidential Regulation No. 61 of 2011, it is stated that business actors must participate in efforts to reduce carbon emissions. In addition, Indonesia has ratified the Kyoto Protocol through Law no. 17 of 2004 to implement sustainable development and reduce carbon emissions. However, in Indonesia, participation in reducing carbon emissions is still voluntary.

Companies that disclose carbon emissions and have a green strategy tend to increase public trust in the company and increase intangible assets and firm value. Carbon emission disclosure is important to financial performance, refers to Andrian and Augustine (2019), which said that carbon emission disclosure had a positive significant effect on financial performance. However, this research intends to see the influence of carbon emission disclosure on firm value. This study refers to Anggraeni (2015) who conclude that the disclosure of carbon emissions has a positive effect on firm value.
Previous research has shown the importance of environmental performance documenting companies practicing environmental performance have higher financial performance and profitability (Gabrielle & Toly, 2019); and high firm value (Yadav, Han, & Rho, 2016).

A green strategy facilitates transformational decisions and initiatives that improve the environment. Establishing a clear vision and strategy ultimately enables people to make better decisions that align with the company's priorities for providing goods and services in global markets. In this regard, companies need to implement green innovations to reduce the impact of the production process on the environment. Green innovation refers to innovations that emphasize waste reduction, pollution prevention, and implementation of environmental management systems (Eiadat et al., 2008). Green strategies are applied by companies to achieve competitive advantage, meet market needs and meet stakeholder expectations Song & Yu (2017), which is ultimately expected to positively influence firm value. Research that examines green strategies refers to Soewarno (2019).

Considering that there are still contradictory results between the disclosure of carbon emissions and firm value, there are other variables that have a contingent effect. In this regard, researchers are motivated to add a green strategy variable as a moderating variable. The research results by Soewarno (2019) found a relationship between green strategy and firm value.

Researchers added control variables in the form of company size and company age. The reason is that based on the research of Sandy, A. et al., (2019), the control variables indicate that the size and age of the company have a significant negative effect on firm value. Including control variables in this study is important because previous researchers have studied the control variables. Therefore, the variables that have been studied need to be included as control variables in this study. This is expected to prevent the existence of a missing variable (omitted variable) from overcoming biased research results.

Based on the above background, this study aims to examine and analyze: (1) The effect of disclosure of carbon emissions on firm value. (2) The effect of environmental performance on firm value. (3) The effect of green strategy on firm value (4) Green strategy moderates the effect of carbon emissions disclosure on firm value. (5) Green strategy moderates the influence of environmental performance on firm value.

LITERATURE REVIEW

Legitimacy Theory

Companies must be part of the community to get positive perception results. Indblom (2010) explains that there are four strategies to deal with the threat of legitimacy. First, the company provides relevant information about changes in organizational performance to stakeholders. Second, companies change perceptions of organizational performance. Third, firms change perceptions by interfering with changing external expectations about their performance. These four strategies play an important role in maintaining legitimacy. Positive perceptions and expectations may be built by voluntary social and environmental disclosures (Magness, 2006). Lack of disclosure can be seen as low corporate responsibility.

Legitimacy theory highlights the importance of social approval in promoting
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corporate survival. Legitimacy is a broad perspective in which a company's activities are acceptable and compatible with societal beliefs, values, meanings, and norms (Burrit, 2010). Legitimacy can be assumed that the actions taken by a corporation are actions that are desirable, appropriate or in accordance with a socially developed system of norms, values, beliefs and definitions. Legitimacy is considered important for the company because the community's legitimacy to the company is a factor that affects the company's development in the future. According to Ganda (2018), legitimacy depends on the premise that there is a social contract between the company and the community in which the company operates. The social contract explains many societal expectations about how an organization should conduct its operations. Over time social expectations can change. This requires companies to be responsive to the environment in which they operate. In legitimacy theory, organizations must continually demonstrate that they are operating in behavior that is consistent with social values. This can often be achieved through disclosure in company reports.

The company uses annual reports and sustainability reports as a form of corporate responsibility to the environment. So that there is disclosure of information to the public so that the community can well receive it. Thus, the relationship with the theory of legitimacy of the disclosure of carbon emissions variables and green strategies. So that this will improve the reputation of the company which has an impact on the value of the company because potential investors will be more interested in investing in companies that care about the environment and company sustainability.

Stakeholder Theory

Stakeholder theory explains that companies in carrying out their operations must provide interests to other parties other than their own interests. Other interested parties/stakeholders such as creditors, consumers, government, shareholders, society, etc. This shows that support from stakeholders is very influential for the sustainability of the company. Therefore, stakeholders have the same rights as shareholders to obtain information on the company (Chithambo & Venancio, 2014).

Ganda (2018) defines stakeholders as groups or individuals who can influence or be affected by the realization of company goals. Thus, this theory postulates that the company's ability to operate rests on the strategic inclusion of stakeholder interests in decision making. Today's stakeholder demands have reflected growing global concerns related to changing weather conditions, increasing natural disasters, rising sea and ocean levels, and carbon emissions. Companies are morally obligated to adopt effective carbon performance initiatives to reduce environmental damage and climate change. Thus, the stakeholder theory relates to the disclosure of carbon emissions, green strategies and environmental performance.

Institutional Theory

The institutional theory includes the relationship between companies and society in the organizational dimensions of economic governance (Brammer, 2004). This theory assumes that companies are influenced by broader social frameworks such as public laws, private regulations and non-governmental organizations that monitor their business practices. Therefore, this social structure influences business initiatives and procedures. Institutional theory is not based on organizational policies and strategic directions but the broader community's interests in environmental policies (Hahn, 2010).
The company's ability to cope with institutional pressures will depend on its capacity to accommodate incompatible organizational demands by reducing the impact of compliance through bargaining with regulatory bodies and or changing expectations through influencing its key partners. Thus, this theory focuses on the factors that change society along with the organizational frameworks, routines, schemas, norms, values, and rules that influence the behavior of corporate stakeholders. The study of Brammer (2004) and Hahn (2010) used this theory to show how sustainability issues such as disclosure of carbon emissions will affect firm value.

**Conceptual Framework**

**Independent Variable**
- Carbon Emissions Disclosure
- Environmental Performance

**Moderation Variable**
- Green Strategy

**Dependent Variable**
- Firm value

**Control Variable**
- Firm Size
- Firm Age

**Hypothesis Development**

**Effect of Disclosure of Carbon Emissions on Firm value**

Disclosure of carbon gas emissions is a very important benchmark in making an investor's decision. Several studies found that the disclosure of carbon emissions has a positive effect on firm value (Matsumura et al., 2014); and Qiu et al. (2016) environmental responsibility is one way to increase the company's competitive advantage and investor confidence (Okpala & Iredele, 2019). Disclosure of carbon emissions can increase the value of the company because investors focus more on global environmental issues in the future (Luo & Hachiya, 2016). Investors are more interested in companies with a high responsibility for environmental issues since climate change has become an important global problem so that it has a positive impact on firm value (Anggraeni, 2015). The results of Hardiyansah et al. (2020) and Bae Choi et al. (2013) showed that carbon emission disclosure had a positive and significant effect on firm value. Based on the description above, propose the following hypothesis:

**Hypothesis 1: Disclosure of Carbon Emissions has a positive effect on Firm value**

**The Effect of Environmental Performance on Firm value**

Martin & Moser (2016) found that potential investors tend to give a positive response to environmental performance regarding green investment. According to Clarkson, Li, Richardson, & Vasvari (2008), the large number of environmental performance disclosures signals to investors the assurance of high quality of disclosure,
which is difficult for companies with a limited number of items to be disclosed. Iatridis (2013) explains that investors find the disclosure contains relevant information to make decisions, therefore it will increase the value of the company.

The research results by Setiawanta et al. (2021), companies with a high environmental performance level positively affect firm value. This statement is supported by Dewi (2021), which states that environmental performance has a significant effect on the value of the company. The company expects that investors will react positively to the good faith made by the company to the surrounding environment, thereby increasing the value of the company. Based on the explanation above, the following hypothesis is proposed:

**Hypothesis 2: Environmental Performance has a positive effect on Firm value**

**Effect of Green Strategy on Firm value**

A green strategy facilitates transformational decisions and initiatives that improve the environment. Establishing a clear vision and strategy ultimately enables people to make better decisions that align with the company's priorities for providing goods and services in global markets. In this regard, companies need to implement green innovations to reduce the impact of the production process on the environment. Green innovation refers to innovations that emphasize waste reduction, pollution prevention, and implementation of environmental management systems (Eiadat et al., 2008). The fundamental strategy of continuous innovation is very important to cope with external pressures, such as customers, competitors and regulators (Porter & Van der Linde, 1995). Thus, to satisfy these stakeholders, companies need to adopt green innovations. Green strategy is a strategy that companies have undertaken to implement green innovations so that they achieve competitive advantage, meet market needs and meet stakeholder expectations Song & Yu (2017), The research from Agustia et al. (2019) which states that green innovation has a positive influence on firm value. Based on the description above, propose the following hypothesis:

**Hypothesis 3: There is a positive effect of green strategy on Firm value**

**Green Strategy Moderates the effect of Disclosure of Carbon Emissions on Corporate Value**

Disclosure of carbon emissions can increase the value of the company because investors focus more on global environmental issues in the future (Luo & Hachiya, 2016). Investors are more attracted to companies with a high responsibility for environmental issues since climate change has become an important global problem (Anggraeni, 2015). On the other hand, climate change can be bad news for the market so that investors can give a negative response to environmental disclosures (Anggraeni, 2015).

Strategy green facilitates transformational decisions and initiatives that enhance environment. Establishing a clear vision and strategy ultimately enables people to make better decisions that align with the company's priorities for providing goods and services in global markets. In this regard, companies need to implement green innovations to reduce the impact of the production process on the environment. Green innovation refers to innovations that emphasize waste reduction, pollution prevention, and implementation of environmental management systems (Eiadat et al., 2008). The fundamental strategy of continuous innovation is very important to cope with external pressures, such as customers, competitors and regulators (Porter & Van der Linde,
Thus, companies need to adopt green innovations. Green strategy is a strategy that companies have undertaken to implement green innovations to achieve competitive advantage, meet market needs and meet stakeholder expectations (Song & Yu, 2017), which is expected to have a positive influence on firm value. Based on the explanation above, the following hypothesis is proposed:

**Hypothesis 4: Green Strategy strengthens the effect of Disclosure of Carbon Emissions on Firm value.**

**Green Strategy Moderates the influence of Environmental Performance on Firm value**

Companies that disclose environmental policies signify transparency, reduce the risk of uncertainty and competitive advantage. Meanwhile, companies that disclose a small number of items exhibit various risks, such as litigation risk, penalties for pollution, future environmental costs and low future cash flows. Qiu et al., (2016) explains that companies will gain economic benefits from preparing for expanded social and environmental disclosures, in the form of higher stock prices.

A green strategy facilitates transformational decisions and initiatives that improve environment. Establishing a clear vision and strategy ultimately enables people to make better decisions that align with the company's priorities for providing goods and services in global markets. In this regard, companies need to implement green innovations to reduce the impact of the production process on the environment. Green innovation refers to innovations that emphasize waste reduction, pollution prevention, and implementation of environmental management systems (Eiadat et al., 2008). The fundamental strategy of continuous innovation is very important to cope with external pressures, such as customers, competitors and regulators (Porter & Van der Linde, 1995). Thus, to satisfy these stakeholders, companies need to adopt green innovations. Green strategy is a strategy that companies have undertaken to implement green innovations to achieve competitive advantage, meet market needs and meet stakeholder expectations (Song & Yu, 2017), which is expected to have a positive influence on firm value. Based on the explanation above, the following hypothesis is proposed:

**Hypothesis 5: Green Strategy strengthens the influence of Environmental Performance on Firm value.**

**METHOD**

**Research design**

Quantitative research uses secondary data taken from annual reports that have been audited by independent auditors and sustainable reports of manufacturing companies listed on the Indonesia Stock Exchange in 2015-2019. The research sample was taken by purposive sampling, namely sampling using certain considerations and criteria. Secondary data sources are obtained through the IDX website (www.idx.co.id).

**Operational Definition and measurement of variables**

The variables used in this study are as follows:
Independent Variable

Carbon Emissions Disclosure

Disclosure of carbon emissions is a form of environmental disclosure by companies. Environmental disclosure includes the intensity of greenhouse gases and energy use, corporate governance and strategies in relation to climate change, performance against carbon emission reduction targets, risks and opportunities related to climate change.

Disclosure of carbon emissions is measured using the content analysis method. This method uses a carbon emission checklist adopted from research conducted by Rusli et al. (2019). To measure the extent of carbon emission disclosure, the carbon emission disclosure check list used consists of 23 items that need to be identified with 5 categories, namely: (1) Climate change: risks and opportunities, (2) GHG emission calculations, (3) Energy consumption, (4) GHG Cost and Reduction, (5) Carbon Emission Accountability. This check list extent the measurement conducted by Bae Choi et al., (2013) and Sudibyo, (2018).

If the company discloses the item as specified, it will be given a score of 1, while if the specified item is not disclosed it will be given a score of 0. Then the score of 1 is added up as a whole and divided by the maximum number of items that can be disclosed. The following is the carbon emission index disclosure formula.

\[
PEK = \frac{\text{Number of items disclosed by the company} \times 100\%}{\text{Maximum total items}}
\]

Wherein: \( PEK \) = Carbon Emission Disclosure; Maximum total score = 23

Environmental Performance

Environmental Performance is a company's performance in creating a good environment that the Ministry of Environment has developed. This environmental disclosure information can be obtained in the annual report and the company's sustainability report. The proxy used to measure the environmental performance variable is the disclosure score in the annual report. The weight of the score used in this variable is by using the standard Global Reporting Initiative Index (GRI), which includes the environmental category consisting of 34 items.

If the company discloses the item as specified, it will be given a score of 1, while if the specified item is not disclosed it will be given a score of 0. Then the score of 1 is added up as a whole and divided by the maximum number of items that can be disclosed. The assessment technique based on the GRI index is made as follows:

\[
KL = \frac{\text{Number of items disclosed by the company} \times 100\%}{\text{Maximum total items}}
\]

Wherein: \( KL \) = Environmental Disclosure; Total maximum number of items disclosed = 34

Dependent Variable

Firm value

The proxy used for the value of the company is Tobin's Q. If Tobin's Q points are more than 1, then the company has a large competitive advantage so that the investment
opportunity in the company is also large. Tobin's Q formula refers to (Manrique & Ballester, 2017; Murwaningsari & Rachmawati, 2017; and Sriwati, 2021):

$$Tobins' Q = \frac{MVE + \text{Total Debt}}{\text{Total Assets}}$$

Note: Tobin's Q = Firm Value; MVE = Market price of shares as of March 31 x number of shares outstanding; DEBT = current debt + long-term debt; TA = book value of total assets.

**Moderating Variables**

**Green Strategy**

Green strategy is a strategy that companies have undertaken to implement green innovations so that they achieve competitive advantage, meet market needs and meet stakeholder expectations Song & Yu (2017). whose measurement uses the Ohlson (2008) index which contains 3 dimensions and 10 indicators:

1. **Dimensions: Role of Leadership (Business Strategy)**
   - Indicators: (1) Product and service, (2) Channels and partners, (3) Market and geography

2. **Dimensions: Role of Policies (Operating, Organizational, Information, Application Strategy)**
   - Indicators: (4) Facilities, (5) Processes, (6) Skills and core competencies, (7) Report and data visibility, (8) System and platforms

3. **Dimensions: Illustrated Action (Supporting Infrastructure)**
   - Indicators: (9) Hardware/Hardware (10) Equipment/Equipment

Measurement using 4 Scales:

1. **Aware** = low green maturity level.
2. **Developing** = moderate green strategy maturity level.
3. **Practicing** = high green strategy maturity level.
4. **Optimizing and leading** = very high green strategy maturity level.

Here is the Green Strategy formula.

$$SH = \frac{\text{Number of items disclosed by the company} \times 100%}{\text{Maximum total items}}$$

Note: SH = Green Strategy; Maximum total items = 4 (Scale) x 10 (Indicator)

**Control Variables**

**Company Size**

Company Size is Ln Total Asset

**Company Age**

This measurement can use the formula from Diana (2019) $UP_\text{= Research Year-nth Year}$
Data Analysis Method
Panel Data Regression Test
The researcher uses panel data (a combination of cross-section data and time series data) in this study. Researchers used Eviews 10 in processing the data of this study. There are 3 possible models used to estimate model parameters with panel data, namely: Common Effect Model (CEM), Fixed Effect Model (FEM-Covariance Model), Random Effect Model (REM).

Choosing the Right Model
From the three possible models that have been estimated, the most appropriate model will be selected for this research by: Chow test, Hausman test, LM (Lagrangian Multiplier) test.

Regression Equation
The equation model used for hypothesis testing in this study is as follows:
\[ NP = a + \beta_1 PEK_{it} + \beta_2 KL_{it} + \beta_3 SH_{it} + \beta_4 CED*SH_{1it} + \beta_5 KL*SH_{2it} + \beta_6 SIZE_{it} + \beta_7 UP_{it} + e \]

Note :
NP = Firm value; PEK = Disclosure of Carbon Emissions; KL= Environmental Performance; SH= Green Strategy; SIZE = Company Size; UP= Company Age; e = Error

ANALYSIS AND DISCUSSION
Descriptive Statistics
The population in this study were manufacturing companies listed on the Indonesia Stock Exchange in 2015 – 2019. The research sample was obtained using the purposive sampling method as follows:

| No | Info                                                                 | Total |
|----|----------------------------------------------------------------------|-------|
| 1  | Manufacturing Companies listed on the Indonesia Stock Exchange in 2015-2019 | 193   |
| 2  | Companies that do not publish complete annual reports during the 2015-2019 period | (35)  |
| 3  | Manufacturing Companies that did not get a PROPER performance rating during the 2015-2019 period | (133) |

Total Samples studied 25
Number of years of research 5
Total of all samples used 125
The results of the descriptive statistical test can be seen in table 2 as follows:

| Variable | N  | MINIMUM  | MAXIMUM  | MEAN   | STD DEVIATION |
|----------|----|----------|----------|--------|---------------|
| NP       | 125| 0.0237   | 426.5170 | 74.4167| 92.7074       |
| PEK      | 125| 0.0000   | 0.7391   | 0.3126 | 0.1967        |
| KL       | 125| 2.0000   | 4.0000   | 3.0960 | 0.4292        |
| SIZE     | 125| 3.83E+11 | 9.65E+13 | 1.61E+13| 2.40E+13      |
| UP       | 125| 2.0000   | 37.0000  | 21.5600| 8.5055        |

Note: NP = Firm value; PEK = Disclosure of Carbon Emissions; KL = Environmental Performance; SIZE = Company Size; UP = Company Age

In table 2 above, it is known that the variables of disclosure of carbon emissions, environmental performance, and company age, have an average value greater than the standard deviation value, meaning that the data for these variables are homogeneous, while the firm value and company size are smaller than the standard deviation is heterogeneous.

Model Selection
Model Selection Test (Chow Test, Hausman Test, LM Test)

| Model       | Chi-square | Decision    | Note                           |
|-------------|------------|-------------|--------------------------------|
| Chow Test   | 0.0000     | Ho rejected | Individual effect (Fixed Effect Model) |
| Hausman Test| 0.0266     | Ho rejected | Fixed effect model             |

Source: data processed (Eviews 10.0)

By testing using the Chow Test where the null hypothesis (H0) is a common effect model, the probability value of Chi square is 0.0000 < 0.05. Thus, the null hypothesis (H0) is rejected, so the better model to use is the estimation with the Individual Effect represented by the Fixed Effect Model, then the next test is to compare the fixed effect with the random effect where the test uses the Hausman test.

Furthermore, testing using the Hausman Test where the null hypothesis (H0) is a Random effect model, the probability value from Chi square is 15.843935 and the probability value from Chi square is 0.0266. Thus, the model has a probability value of Chi square <0.05, so the null hypothesis (H0) is rejected, so the better model used is the estimation with Fixed effect.
Classic Assumption Test

According to Basuki & Prawoto (2016), although the results of the model test show a fix effect, it still needs to be tested for heteroscedasticity and multicollinearity, as follows:

### Table 4. Heteroscedasticity Test Results

| Obs*Rsquare | Prob Chi Square |
|--------------|----------------|
| 0.792175     | 0.3734         |

*Source: data processed Eviews 10.0*

### Table 5. Multicollinearity Test Results

| Variable | VIF |
|----------|-----|
| PEK      | 13.32836 |
| KL       | 9.642907 |
| SH       | 55.97804 |
| PEK*SH   | 25.07327 |
| KL*SH    | 83.96997 |
| SIZE     | 1.125871 |
| UP       | 1.254686 |

*Note: NP = Firm value; PEK = Disclosure of Carbon Emissions; KL = Environmental Performance; SIZE = Company Size; UP = Company Age*

### Goodness of Fit Test

### Table 6. Results of the Coefficient of Determination

| R Square | Adjusted R Square |
|----------|-------------------|
| 0.958139 | 0.944186          |

*Source: Data processed Eviews 10.0*

### Table 7. Global Test Results

| F-statistics | Sig F-stat |
|--------------|------------|
| 68.66657     | 0.000000   |

*Source: Data processed Eviews 10.0*

### Individual Test

In this study, a test is carried out to see the green strategy in moderating the effect of disclosure of carbon emissions and environmental performance on firm value. The test results are as follows:
Table 8.
Individual Test Results

| Variable  | Coefficient | Std. Error | t-Statistic | Prob. (1 Tail) | Conclusion |
|-----------|-------------|------------|-------------|----------------|------------|
| C         | -13.91121   | 73.11179   | -           | 0.8495         |            |
| PEK       | -31.76148   | 15.17922   | -           | 0.0391         | Rejected   |
| KL        | 15.83402    | 5.959405   | 2.656979    | 0.0093         | Accepted   |
| SH        | 113.6947    | 37.75463   | 3.011412    | 0.0033         | Accepted   |
| PEK*SH    | 49.21218    | 25.67517   | 1.916723    | 0.0583         | Accepted   |
| KL*SH     | -44.72435   | 14.52458   | -           | 0.0027         | Rejected   |
| SIZE      | 0.762348    | 2.878090   | 0.264880    | 0.7917         |            |
| UP        | 1.480601    | 0.427174   | 3.466034    | 0.0008         |            |
| R2 Adjust |             |            |             | 0.9441         |            |
| F Stat    |             |            |             | 0.0000         |            |
| ARCH test/ Chi Square |          |            |             | 0.3734         |            |
| Heteroscedasticity |            |            |             | *              |            |

Source: data processed Eviews 10.0

Based on the test results using the VIF analysis tool to test whether there is a multicollinearity violation, for some variables having a VIF value > 10, it is concluded that there is multicollinearity including PEK, SH, PEK*SH, and KL*SH, this can be ignored because in this study using moderating variable. Furthermore, the ARCH test results obtained the prob. value of Chi Square of 0.3734 which is greater than 0.05 (alpha 5%) then it is concluded in the equation free from Heteroscedasticity disease.

Goodness of fit model shown by Adj. R-squared produces a coefficient of 0.9441 which means that the behavior or variations of the independent variables are able to explain the behavior or variations of the dependent variable by 94.4186% and the rest is behavior or variations from other independent variables that affect the dependent variable, but not included in the model. The high value above 90% is because the selected model is a fixed effect where to distinguish behavior between individuals or between time using a dummy variable as an independent variable, so that the more independent variables are used, the higher the R2 value. In addition, if we look at the results of the fixed effect, many variables are statistically significant but are rejected because the direction is not in accordance with the proposed hypothesis. While the F test, shows a sig value of 0.0000 < 0.05, this indicates that it is statistically proven that there is at least one independent variable that has an influence on the dependent variable.

H1: Disclosure of Carbon Emissions has a positive effect on Firm value
Based on the results of statistical testing, it is known that the coefficient of Carbon Emission Disclosure is -31.76148, meaning that if Carbon Emission Disclosure increases by one unit, then the Firm value will decrease by 31,76148 units. The resulting coefficient value is not in accordance with the hypothesis proposed in this study where Carbon Emission Disclosure has a positive effect on Firm Value. Therefore, the hypothesis testing was not repeated and accepted the null hypothesis. It is concluded that statistically there is no effect of Disclosure of Carbon Emissions on Firm value.

**H2: Environmental Performance has a positive effect on Firm value**

Based on the results of statistical testing, it is known that the coefficient of Environmental Performance is 15.83402, meaning that if Environmental Performance increases by one unit, the Firm value will increase by 15.83402 units. The resulting coefficient value is in accordance with the hypothesis proposed in this study where environmental performance positively influences firm value. Based on the test results, it is known that the sig value is 0.0093 <0.05 (alpha 5%) then Ho is rejected. It is concluded that statistically there is a positive influence of Environmental Performance on Firm value.

**H3: Green Strategy has a positive effect on Firm value**

Based on the results of statistical testing, it is known that the coefficient of the Green Strategy is 113.6947, meaning that if the Green Strategy increases by one unit, the Firm value will increase by 113.6947 units. The resulting coefficient value is in accordance with the hypothesis proposed in this study where the Green Strategy positively influences Firm Value. Based on the test results, it is known that the sig value is 0.0033 <0.05 (alpha 5%) then Ho is rejected. It is concluded that statistically there is a positive effect of the Green Strategy on Firm value.

**H4: The Green Strategy strengthens the effect of Disclosure of Carbon Emissions on Firm value**

Based on the results of statistical testing, it is known that the coefficient of the Green Strategy* Carbon Emission Disclosure is 49.21218, meaning that if the Carbon Emission Disclosure increases by one unit, the Firm value will increase by 49,21218 units, moderated by the Green Strategy. The processing results show a sig value of 0.0583 < 0.10 (alpha 10%) then Ho is rejected. It is concluded statistically that the Green Strategy can strengthen the effect of Disclosure of Carbon Emissions on Firm value.

**H5: Green Strategy strengthens the influence of Environmental Performance on Firm value**

Based on the results of statistical testing, it is known that the coefficient of the Green Strategy* Environmental Performance is -44.72435, meaning that if the Environmental Performance increases by one unit, the Firm value will decrease by 44,72435 units moderated by the Green Strategy, so the hypothesis testing is not carried out again. It is concluded statistically that the Green Strategy is not able to strengthen the influence of Environmental Performance on Firm value.
Discussion of Research Results

Effect of carbon emission disclosure on firm value

The results of the hypothetical disclosure of carbon emissions have no effect on firm value. The results of this study do not support Rusli et al. (2019) and Hardiyansah et al. (2020) which state that Disclosure of Carbon Emissions has significant positive results on firm value. This shows that companies that have environmentally friendly behavior and disclose carbon emissions have not been able to create competitive advantages and attract the attention of customers and other stakeholders. The impact of this phenomenon can reduce the company's revenue and firm value. It is possible that the disclosure of carbon emissions has no effect on the value of the company due to the lack of awareness among stakeholders about environmentally friendly conditions or lack of socialization.

Effect of environmental performance on firm value

While the effect of environmental performance on firm value has a positive and significant effect on firm value. These results support the research of Dewi (2021) companies that have a high level of environmental performance have a positive effect on firm value. So that investors will respond positively to companies with good environmental and social performance. This shows that stakeholders feel the need for all companies to have good environmental performance.

Effect of green strategy on firm value

On the other hand, the effect of green strategy on firm value has a positive and significant effect on firm value. These results support the research of Soewarno (2019) which state that green innovation has significant positive results on firm value. This shows that many companies feel the need to implement a green strategy, even though more costs must be incurred to carry out reforestation activities according to the company's vision. The green strategy has a positive impact on the environment, this is because the green strategy has the goal of increasing productivity with environmentally friendly technologies and resources effectively and efficiently. So, it can reduce the bad impact on the environment and can lower costs to increase profits and good prospects and firm value.

Green strategy moderates the effect of carbon emission disclosure on firm value

The results of the hypothetical disclosure of carbon emissions have no effect on firm value. This shows that companies that have environmentally friendly behavior and disclose carbon emissions have not been able to create competitive advantages and attract the attention of customers and other stakeholders. The impact of this phenomenon can reduce the company's revenue and firm value.

Therefore, according to Baron & Kenny (1986) precisely when X is not significant to Y, it is necessary to have a moderating variable. Variable X cannot be a single predictor, if there is no moderating variable. Variable X will affect Y if there is a moderating variable. From the results of this study, when referring to Sharma et al. (1981), the moderating variable (Green Strategy) has significant results while the interaction variable (SH*PEK) has significant results, the moderating variable is included in the pseudo-moderation category (quasi moderator). Quasi moderation is a variable that moderates the relationship between the independent variable and the dependent variable which is also the independent variable.
Green strategy moderates the effect of environmental performance on firm value

The effect of environmental performance on firm value has a positive and significant effect on firm value. This shows that stakeholders feel the need for all companies to have good environmental performance and firm value. The green strategy has a significant effect on firm value while the interaction variable (SH*KL) does not have a significant result.

Therefore, according to Sharma et al. (1981) the moderating variable is included in the category of moderating predictors. This means that this moderating variable only acts as a predictor variable (independent) in the relationship model that is formed.

CONCLUSION

Based on the description above, it can be concluded as follows: (1) Disclosure of carbon emissions has no effect on firm value. (2) Environmental performance has a significant positive effect on firm value. (3) The green strategy has a significant positive effect on firm value. (4) The green strategy strengthens the effect of carbon emission disclosure on firm value. Then the moderating variable (green strategy) is included in the pseudo-moderation category. Quasi moderation is a variable that moderates the relationship between the independent variable and the dependent variable which is also the independent variable. (5) Green strategy is not proven to strengthen environmental performance on corporate value. Then the moderating variable is included in the category of moderating predictors. This means that this moderating variable only acts as a predictor variable (independent) in the relationship model that is formed.

Based on the conclusions above, there are the following limitations: (1) Determination of the indicator score for the carbon emission disclosure index and green strategy is subjective, so that each researcher can have a different perspective, and this may miss certain items that are actually disclosed by the company. (2) There is no direct verification to the company which makes this data research biased, because there is a possibility that the company does not disclose the activities listed in the carbon emission disclosure index and green strategy indicators but has done so in the sustainability report.

Based on the conclusions from the research results that have been described, the implications and suggestions that can be given are as follows: (1) The regulator, in this case the Ministry of Environment and Forestry, is expected to be able to oblige companies to carry out activities and provide reports related to the company's Environmental Disclosures such as Disclosure of Carbon Emissions and Green Strategy effectively and efficiently. (2) For companies to increase CSR activities so that they can increase their reputation and increase shareholder confidence. (3) Future researchers are expected to use different companies and variable variations so that the scope becomes wider.

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