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The Effect of ESG Disclosure, Green Investment, and Carbon Emission Disclosure on the Value of Energy Companies in Indonesia: Analysis for the 2019-2023 Period

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ABSTRACT: This study aims to examine firm value in the energy sector during 2019-2023. Climate change remains one of the world's most urgent and long-term environmental problems. The energy sector contributes significantly to total emissions, with a high dependence on fossil fuels, particularly coal. The average enterprise value of the energy sector fluctuated from 2019 to 2023. Examination of the influence of ESG disclosure, green investment, and carbon emission disclosure on firm value in the energy sector from 2019 to 2023 is appropriately stated in this study. Climate action is now used as one of the investment considerations by investors as part of the response to the Sustainable Development Goals (SDGs). This quantitative study uses descriptive causality approaches. It uses panel data as a secondary source and examines energy firms registered on the Indonesia Stock Exchange between 2019 and 2023. A purposive sampling method is applied to select nine energy sector companies as samples. Researchers used panel data regression. The study findings show that firm value is not affected by ESG disclosure. Furthermore, firm value is positively impacted by green investment and carbon emission disclosure. ESG Disclosure, Green Investment, and Carbon Emission Disclosure simultaneously affected firm value.

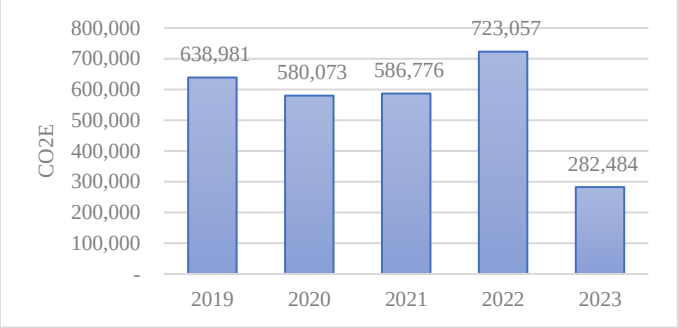
Keywords: ESG Disclosure, Green Investment, Carbon Emission Disclosure, Price to Book Value.

INTRODUCTION

The environment is a factor that is increasingly considered by investors in making investment decisions, indicating that concern for the environment is increasing. Climate change is one of the world's most urgent and long-term environmental problems. This involves many factors that can threaten the existence of human life, such as the environment, institutions, technology, society, and the economy (Putri, 2022). Various pollutants cause the environmental damage caused by climate change, both naturally occurring and due to human actions. One of the main factors contributing to climate change causing environmental degradation is CO2 emissions (Rahelliamelinda & Handoko, 2024).

The combustion of fossil fuels, which emits greenhouse gases like carbon dioxide (CO2) and methane (CH4) into the atmosphere, constitutes a significant human activity that exacerbates global warming, one of the primary drivers of climate change. Air pollution seriously threatens human health and other living things worldwide; according to data from WHO, around 7 million fatalities worldwide are attributed to air pollution each year. Air pollution puts people's health at risk and creates smog and acid rain, which harm forests and agriculture, contaminate the ecosystem, and contribute to climate change (Ministry of Health, 2024). According to the Air Quality Index (AQI), Indonesia has the 14th-worst air quality in the world; in 2019, outdoor air pollution caused about 168,300 deaths in Indonesia from heart disease, stroke, lung cancer, and chronic respiratory illnesses. This is one of the highest G20 (Climate Transparency Organization, 2022).

The issue of global climate change has become increasingly urgent, impacting various aspects of life, including the business sector. Companies worldwide are under growing pressure to minimize their environmental footprint, particularly concerning carbon emissions. According to the Global Carbon Project's findings published in *Earth System Science Data*, global CO2 emissions from fossil fuels reached 36.8 billion metric tons in 2023, marking a 1.1% increase compared to 2022. Regional trends showed significant variation: emissions rose sharply in India (8.2%) and China (4.0%), while they declined in the European Union (-7.4%), the United States (-3.0%), and other countries globally (-0.4%). The energy sector is one of the sectors that works in production and distribution and directly contributes to greenhouse gas emissions. Despite some regional reductions, overall carbon emissions continue to rise, reflecting insufficient global efforts to phase out fossil fuels rapidly enough to mitigate the adverse effects of climate change. These effects include rising global temperatures, extreme weather events, and sea-level rise. The energy sector remains a major contributor to greenhouse gas emissions, underscoring the importance of implementing Environmental, Social, and Governance (ESG) strategies to address these challenges effectively. The energy in question can be petroleum, natural gas, coal, electricity, and others.



Source: Ministry of Environment and Forestry (2024)

Figure 1. Contribution of GHG Emissions from the Energy

As Figure 1 above demonstrates, the contribution of the energy sector to greenhouse gas (GHG) emissions fluctuates. According to a study by the Ministry of National Development Planning (PPN) in 2022, the energy sector experienced an increase in GHG emissions, making it the largest contributor to GHG emissions in Indonesia. The energy sector contributes significantly to total emissions, with a high dependence on fossil fuels, especially coal (Qontrunnada, 2022). Meanwhile, in 2023, the energy sector's contribution to GHG emissions will decrease. This happened because

the government succeeded in suppressing the realization of reducing GHG emissions in the energy sector by more actively utilizing renewable energy (Tasrif, 2024).

Companies strive to achieve sustainability and environmental responsibility as part of their strategy to increase their value. Higher firm values have implications for better welfare of owners and shareholders (Adli, 2023). In this study, researchers utilise price-to-book value (PBV) as a proxy for firm value. PBV provides a clear picture of financial conditions without considering investment risks, making it a relevant indicator for investment decisions (Nafiah & Setiawati, 2023). Comparing the stock's market price to the book value per share will give the price-to-book value ratio (Sutrisno, 2017).

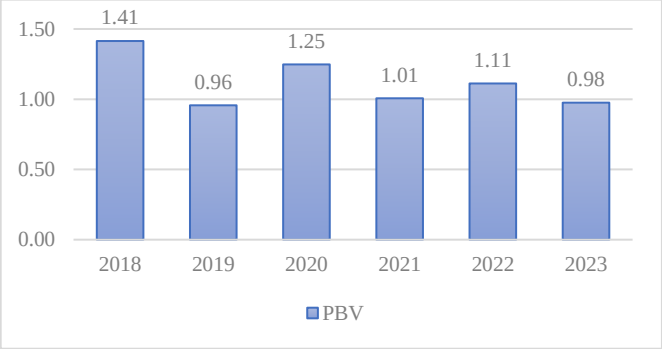


Figure 2. Average PBV in the Energy Sector in 2019-2023

The figure above indicates that the average company value in 2019 and 2023 fluctuates. A decline in the firm's value indicates a decrease in the shareholders' welfare, which can cause investor confidence to decline (Finrely, 2024). This can be seen in the 2019 pbv value in the energy sector decreased by 0.45. This happened because world trade flows experienced a slowdown. The US and China trade war is one of the factors affecting this situation. As a result, the price of commodity products in the world market fluctuates, including crude oil and coal, which experienced price pressure, resulting in a slowdown in investment in the energy sector (Bareksa, 2019). Furthermore, in 2020, PBV in the energy sector increased by 0.29. Even amid the COVID-19 outbreak, the energy sector could increase its firm's value because the energy sector's revenue contribution was greater, and government subsidies for energy increased (Nugroho & Muhyiddin, 2021). However, in 2021, the PBV of the energy sector decreased by 0.24 due to the global energy crisis and the surge in fuel prices after the COVID-19 outbreak (Tumiwa, 2022). After improving in 2022, the development of PBV in 2023 decreased again by 0.13 from the previous year. The impact of the economic downturn in China in 2023 caused global economic uncertainty and a slowdown in international demand. This then affects the global price and demand for energy and oil (Nurdiansyarani, 2024).

The application of corporate responsibility in sustainability can be in the form of environmental conservation; companies must spend money to invest in things that can support environmental conservation to increase their firm's value. Environmental, Social, and Governance (ESG) is now used as one of the investment considerations by investors as part of the Sustainable Development Goals (SDGs) response (Adhi, 2023). Companies that integrate, implement, and disclose business policies to align with ESG ideas must adhere to the Environmental, Social, and Governance (ESG) Disclosure criteria. ESG disclosure reflects a firm's strategy in dealing with climate risks, engaging

stakeholders, and improving ESG performance (Christy & Sofie, 2023). This disclosure can demonstrate the responsibility of the board of directors for sustainability, illustrate efforts to improve these aspects, and strengthen credibility in the eyes of the public (Andy, 2023). In addition to functioning as public transparency, ESG disclosure can be adjusted to Global Reporting Initiative (GRI) standards and show the firm's commitment to sustainability. Companies must prioritize delivering quality and trustworthy information to the capital market when issuing ESG disclosures to encourage better investment decisions (Putu et al., 2024). Several previous studies can support this research, including research conducted by Mauliddin (2023), Adhi (2023), Wu et al. (2022), and Aydogmus & Gülay (2022) which stated that the better the ESG disclosure, the better the firm's disclosure means caring about the environment. This will encourage an improvement in company value as investors get positive signals regarding this. Agni (2024) shows that ESG practices can influence firm's value. However, in his research, Adli (2023) found that a firm's value is not influenced by ESG disclosure.

Investments aimed at environmental preservation are commonly referred to as green investments. These investments help mitigate the negative environmental impacts associated with economic activities linked to the environment without necessarily curtailing the non-energy goods produced and consumed (Murwaningsari & Rachmawati, 2023). Additionally, green investment is an environmentally friendly business strategy that helps firms gain and maintain legitimacy and support from various stakeholders (Zhang & Berhe, 2022). By effectively managing financial resources to achieve economic and environmental benefits, green investment is anticipated to lead the business sector toward reducing energy consumption by exploring new and renewable energy alternatives (Rahmanisa, 2023). Research by Surya et al. (2023), Putri (2022), and Sapulette & Limba (2021) indicates that a higher PROPER score correlates with increased firm value. A strong PROPER rating suggests favourable prospects for a firm, encouraging investors to enhance stock demand and boost firm value. Furthermore, studies by Murwaningsari & Rachmawati (2023) and Paramita & Ali (2023) show that green investment positively correlates to firm value. However, research conducted by Azhari & Hasibuan (2023), Aeni & Murwaningsari (2023), and Triyani & Rusmanto (2022) found that green investment does not significantly impact firm value, as investors often overlook environmental performance and green investment initiatives.

This is consistent with the pledge to conserve the environment, which includes cutting greenhouse gas emissions. Emissions of greenhouse gases (GHGs) are gases in the atmosphere that act like a greenhouse's glass panels, absorbing solar thermal energy and preventing its complete release into space. Hydrofluorocarbons (HFCs), chlorofluorocarbons (CFCs), methane (CH4), nitrous oxide (NOx), and carbon dioxide (CO2) have the most effects (Hardianti, 2023). Responding to environmental issues related to carbon emissions, the Indonesian government issued one of the policies listed in Presidential Regulation (PERPRES) Number 98 of 2021. This policy discusses the firm's contribution to decarbonizing carbon emissions to control greenhouse gases (GHG) in national development. Therefore, Carbon Emission Disclosure needs to be conducted by companies because it will lead to an increase in the firm's value to its stakeholders. By disclosing carbon-related information, companies show good governance and excellence in carbon performance, which is expected to increase the firm's value. According to research conducted by Herawaty (2024), Fitriana & Maharahi (2024), and Ramdani & Nugraha (2024) which stated that

the more information disclosed regarding carbon emissions will increase the tendency of high corporate values. According to Damas (2021), the outcome of his study suggests that transparency regarding a company's carbon emissions can improve its value. However, in her study, Agatha (2024) found that a company's stock price is not affected by their carbon emissions disclosure.

By looking at the energy industry from 2019-2023, this study explores how ESG Disclosure, Green Investment, and Carbon Emissions Disclosure influence energy firm value. Researchers hope this study can be used as a consideration, source, and means for further research to develop and apply the knowledge obtained from this research. It is hoped that companies can add new insights and be considered in implementing ESG, Green Investment, and the Disclosure of Carbon Emissions in creating corporate value. This study is also expected to contribute additional information to assess whether the firm's value is good before making investment decisions for potential investors.

Stakeholders Theory

Stakeholder theory talks about the relationship between a firm and its stakeholders. According to Edward Freeman's argument, businesses must inform the public, workers, shareholders, communities, customers, suppliers, and other parties about their operations to benefit all these groups. ESG disclosures show that the firm has fulfilled the rights of its stakeholders and allows stakeholders to understand ESG implementation. (Mohammad & Wasiuzzaman, 2021; Suttipun & Yordudom, 2022). This can help companies increase public trust and build a positive image, which impacts the firm's value.

Legitimacy Theory

The conditions that describe how an entity or firm conforms to accepted social values in society are described in this legitimacy theory (Dowling & Pfeffer, 1975). In its operations, the firm generates profits and takes responsibility for problems, which is important to meet the community's expectations. The problems in question are environmental, social, health, and employee safety issues (Roestanto, 2022). Companies can affect public assessments by adopting ESG disclosure practices, green investment, and carbon emission disclosure.

Signalling Theory

According to Spence's (1973) Signaling Theory, the initial originator or custodian of the data sends a signal or signals encapsulated in the data that represents the firm and benefits the consumer or investor of the data. Accurate financial and non-financial disclosure reduces information asymmetry and sends a good signal to shareholders (Kurnia et al., 2020). Thus, presenting relevant and appropriate information such as ESG disclosure, green investment, and carbon emission disclosure can help shareholders by increasing the firm's value.

Agency Theory

Introduced by Jensen & Meckling in 1976, the correlation of principals (owners) and representatives (managers) is explained in this theory. This theory emphasises that the relationship between the two parties can cause problems when the agency's interests do not match the principal's. Morally, agents are responsible for optimising the owner's profits and prosperity (Xaviera et al., 2022). The disclosure of governance information in ESG, which includes the firm's treatment of employees, society, and the environment, can reduce information asymmetry, as viewed through the lens of this theory. Additionally, this can boost trust in the firm, increasing its value.

Firm Value

The value of the company that investors feel is related to the company is often related to the stock price. Investors' opinions on the company's prospects for the future are reflected in the firm value (Suhendar & Paramita., 2024). A high corporate value will benefit shareholders (Ningrum, 2022). The measure applied to assess the value of a company is referred to as price-to-book value (PBV). This value helps measure the firm's value because it provides the best information. PBV provides an overview of how the market values a firm compared to the accounting value of its assets (Nasution et al., 2024). A measure that compares a corporation's market value and book value is the PBV ratio. Divide total equity by the number of shares outstanding to get the book value per share (BVPS). subsequently, the number is compared to the existing stock value, which is indicated by the firm's prevailing market price per share. The formula is as follows:

$$\textbf{PBV} = \frac{\textbf{Price Per Share}}{\textbf{Book Value Per Share}}$$

ESG Disclosure

ESG disclosure, which typically involves sustainability reporting, is a novel method of gauging voluntary corporate disclosure. Indonesia prepares sustainability reports following Financial Services Authority (POJK) Regulation No. 51/2017, the GRI Standards, and the Global Reporting Initiative (GRI) disclosure guidelines. To accomplish the Sustainable Development Goals (SDGs), a company's operational operations might positively or negatively influence economic, environmental, and social elements. According to the GRI standard, this is known as sustainability reporting (Christy & Sofie, 2023). The following is the formula for calculating the disclosure of ESG:

$$\textbf{ESG Disclosure} = \frac{\textbf{ESG Disclosure Item Value}}{\boldsymbol{Maximum\ Total\ Disclosure}}$$

From the agency theory perspective, disclosing governance information in ESG regarding the firm's treatment of employees, society, and the environment can reduce information asymmetry and increase trust in the firm, increasing the firm's value (Alfikri, 2024). From the signaling theory perspective, if the firm's ESG disclosure is good, it will create a positive reputation and signal to investors that it can take responsibility for environmental issues. Potential investors will be

attracted to invest in firms with ESG disclosures. By doing this, an increase in firm value will occur. Research conducted by Agni & Anis (2024) states that ESG practices positively affect firm value. This is consistent with research carried out by Adhi (2023), Rahelliamelinda & Handoko (2024), Masditok et al. (2024) and Aydogmus & Gülay (2022).

H1: ESG Disclosure has a positive effect on firm value.

Green Investment

Green investment is a sustainable investment that supports eco-friendly business practices and protects natural surroundings to preserve future lives on Earth (Huan g & Lei, 2021). This investment, moreover, can provide a far-reaching impact, such as a positive image of the company (Azhari & Hasibuan, 2023). PROPER proxies the green investment variable in this study because it can assess the firm's overall environmental performance, including waste management, emissions, water use, and sustainability efforts. PROPER seeks to incentivize Indonesian businesses to enhance sustainable operations and adhere to environmental standards. The evaluation is conducted by assigning a performance-based rating, where gold is awarded a score of 5, green a score of 4, blue a score of 3, red a score of 2, and black a score of 1 (KLKH, 2019).

The environmentally conscious investment elicits a favorable reaction from the public, increasing investor evaluation (Yusnia, 2024). This idea consists of funding and investment to mitigate adverse environmental effects and bolster endeavours to accomplish the Sustainable Development Goals (SDGs). Green investment is an endeavor by corporations to build credibility by demonstrating its dedication to environmental preservation and sustainability. A company's attempt to establish credibility by showcasing its dedication to environmental preservation and sustainability is called green investment (Alfikri, 2024). According to research conducted by Indriastuti (2021), green investment positively impacts firm value. This research is the same as the research findings of Murwaningsari & Rachmawati (2023) who found that between green investment and firm value a positive influence is found. The public will respond positively to this green investment enabling investors to evaluate the company properly (Fauziyyah, 2019).

H2: Green Investment has a positive effect on firm value.

Carbon Emission Disclosure

Carbon Emission Disclosure is one of the ways companies disclose their environmental practices, where companies provide information related to carbon emissions resulting from their operational activities (Trimuliani, 2023). The Carbon Disclosure Project (CDP) divides carbon disclosure into five categories of disclosure indicators, namely: Greenhouse Gas Emission Accounting (GHC), Climate Change Opportunity and Risk Index (CC/Climate Change), Carbon Emission Accountability (ACCCarbon Emission Accountability), and Energy Consumption Accounting (EC/Energy Consumption), RC- (Greenhouse Gas Reduction and Cost) (Dila & Aryati, 2023). Carbon Emission Disclosure can be calculated by:

$$\text{CED} = \frac{\text{Carbon Emission Disclosure Item Value}}{\text{Maximum Total Disclosure}}$$

The more transparent the firm is in disclosing its carbon emissions, the more the assessment of stakeholders will increase (Fitriana & Maharani, 2024). As a result, investors will be more interested in the firm, so they want to invest their capital by buying its shares, which can affect its value. Carbon emission disclosure evaluates how well a firm discloses information about the carbon emissions generated by its operations. This is also explained in the research of Kurnia et al. (2021), Meyliana & Sudibyo (2022), Hardianti (2023), Trimuliani (2023), and Damas (2021), stating that firm value is positively influenced by carbon emission disclosure. This finding indicates that environmentally responsible companies will more likely attract investors in the Indonesian market. Therefore, the hypothesis states that:

H3: Carbon Emission Disclosure has a positive effect on firm value.

METHOD

This investigation utilized a quantitative methodology and adopted a descriptive causality approach. Secondary sources include 2019-2023 financial and sustainability reports of all energy businesses traded on the Indonesia Stock Exchange. The researcher examined the data using panel data regression. The researcher determined that 83 energy companies were registered on the Indonesia Stock Exchange from 2019 to 2023. The researcher used non-probability sampling and purposive sampling. The researcher has sorted the following sample according to specific criteria.

Table 1. Sample Criteria

No.	Sample Criteria	Violating the Criteria	Sum
1	Energy sector companies listed on Indonesia Stock Exchange for the 2019-2023 period	-	83
2	A company that publishes financial statements in full 2019-2023 period	(20)	67
3	Companies that publish sustainability full report for the 2019-2023 period	(48)	19
4	Listed companies and received ratings PROPER during the 2019-2023 period	(10)	9
5	Companies that disclose emissions Carboniferous products were produced during the 2019–2023 period	-	9
Research Sample			9
Unit of analysis (9 x 5 years)			45

E-Views 12 was the statistical analysis tool employed for this research.

RESULT AND DISCUSSION

Descriptive Statistical Analysis

Table 1. Results of Descriptive Statistical Analysis

	X1_ESG	X2_GI	X3_CED	Y_PBV
Mean	0.677120	4.339956	0.718524	1.047944
Median	0.692300	4.019000	0.722200	0.951500
Maximum	0.991500	5.192000	0.888900	1.792300
Minimum	0.196600	3.000000	0.277800	0.508800
Std. Dev.	0.199589	0.887317	0.132632	0.342291
Observations	45	45	45	45

Source: Data processing results with Eviews 12, 2024

Based on the results of the descriptive statistical analysis in table 1, it shows that:

1. According to the descriptive analysis, 45 data points were collected from each variable studied. The enterprise value (PBV) variable has a mean of 1.047944 and a median of 0.95150. There is a standard deviation of 0.342291 and a range of values for variable Y of 0.508800 to 1.79230.
2. The median value for variable X1 (ESG) is 0.692300, and the mean value is 0.677120. There is a standard deviation of 0.199589, with the largest value of 0.991500 and the minimum value of 0.196600.
3. The median value for variable X2 (GI) is 4.019000, and the mean is 4.339956. The standard deviation is 0.887317, with the highest reported figure being 5.192000 and the lowest being 3.000000.
4. The median value for the X3 variable (CED) is 0.722200, while the mean value is 0.718524. With a standard deviation of 0.132632, the observed values range from 0.888900 at the greatest to 0.277800 at the lowest.

Panel Data Regression Model Selection Test

Chow Test

Table 2. Chow Test Result

Effects Test	**Statistic**	**d.f.**	**Prob.**
Cross-section F	2.342386	(8,33)	0.0409
Cross-section Chi-square	20.236767	8	**0.0095**

Source: Data processing results with Eviews 12, 2024

The table above shows that the Cross-section Chi-square probability value is 0.0095, below the significance level of 0.05. This finding indicates that the alternative hypothesis (Ha) must be accepted and the null hypothesis (H0) rejected. Hence, the Chow test will use the Fixed Effect Model (FEM). Therefore, Hausman test is required to proceed with the analysis.

Hausman Test

Table 3. Hausman Test Result

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	7.986247	3	**0.0463**

Source: Data processing results with Eviews 12, 2024

The probability value of the cross-section random is 0.0463, which is below the threshold of 0.05, as indicated in Table 3 above. This discovery substantiates the dismissal of the null hypothesis (H0) and the endorsement of the alternative hypothesis (Ha). Therefore, to conduct the Hausman test, the researcher used the fixed-effects model (FEM). Given that the FEM is the model chosen for the Chow and Hausman tests, it is considered the most appropriate approach for this study.

Classical Assumption Test

Multicollinearity Test

Table 4. Multicollinearity Test Result

	X1_ESG	X2_GI	X3_CED
X1_ESG	1.000000	**0.037891**	**0.165511**
X2_GI	0.037891	1.000000	**0.144282**
X3_CED	0.165511	0.144282	1.000000

Source: Data processing results with Eviews 12, 2024

In the table above, the association coefficient for X1_ESG and X2_GI is 0.037891, which is below 0.9, while the association between X1_ESG and X3_CED is 0.165511, also lower than 0.9. In addition, the correlation between X2_GI and X3_CED is shown at 0.144282, again lower than 0.9. Thus, a conclusion reveals that the relationship between the independent variables is free from multicollinearity, indicating that the variables pass the multicollinearity test.

Heteroscedasticity Test

Table 5. Heteroscedasticity Test Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.892870	0.581839	-1.534566	0.1344
X1_ESG	0.401290	0.318742	1.258980	**0.2169**
X2_GI	0.239777	0.131043	1.829728	**0.0763**
X3_CED	0.874688	0.444012	1.969965	**0.0573**

Source: Data processing results with Eviews 12, 2024

The table above indicates that the probability values for X1_ESG are 0.2169, X2_GI is 0.0763, and X3_CED is 0.0573, all greater than 0.05. Consequently, the research variables do not exhibit heteroscedasticity. These values imply that the research variables do not indicate heteroscedasticity.

Panel Data Regression

Table 6. Panel Data Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.139124	0.806679	-2.651767	0.0122
X1_ESG	0.225811	0.151541	1.490092	**0.1457**
X2_GI	1.081598	0.512543	2.110258	**0.0425**
X3_CED	0.936531	0.382124	2.516717	**0.0169**

Source: Data processing results with Eviews 12, 2024

The following is the acquisition of the panel data regression equation:

$$Y\_PBV = -2.139124 + 0.225811*X1\_ESG + 1.081598*X2\_GI + 0.936531*X3\_CED + \varepsilon it$$

Considering the outcomes of the referred-to equation, it can be explained that if ESG increases by 1%, the possibility of PBV increasing by 0.225811 or 22.58%, assuming other variables remain the same. If the GI rises by 1%, the probability of the PBV rising by 1.081598 or 108% assumes the other variables remain the same. If the CED rises by 1%, the probability of PBV rises by 0.936531 or 93.65%, assuming the other variables remain the same.

Hypothesis Testing

Partial Test (T-Test)

The partial test or t-test is used to determine the extent of the effect of each independent variable on the dependent variable separately. The T-test aims to determine whether each independent variable effects its dependent variable (Ghozali & Ratmono, 2020; Aminin, 2023).

Table 7. Test Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.139124	0.806679	-2.651767	0.0122
X1_ESG	0.225811	0.151541	1.490092	**0.1457**
X2_GI	1.081598	0.512543	2.110258	**0.0425**

X3_CED	0.936531	0.382124	2.516717	**0.0169**

Source: Data processing results with Eviews 12, 2024

Based on table 7, the results show the following:

1. The Effect of ESG Disclosure on Firm Value
   The probability value is 0.1457 > 0.05, l consequently H0 is accepted and H1 is rejected. Companies listed on the Indonesia Stock Exchange in the energy industry from 2019 to 2023 do not appear to be impacted by the disclosure of ESG on Firm Value.
2. The Effect of Green Investment on Firm Value
   The probability value is 0.0425 < 0.05, resulting in the rejection of H0 and the acceptance of H2. This suggests that from 2019 to 2023, the Company Value of energy sector companies registered on the Indonesia Stock Exchange is positively influenced by Green Investment.
3. The Effect of Carbon Emission Disclosure on Firm Value
   The probability value is 0.0169 < 0.05. Consequently, H0 is rejected, and H3 is accepted. This indicates that from 2019 to 2023, the Company Value of energy sector companies registered on the Indonesia Stock Exchange is positively impacted by Green Investment.

Simultaneous Test (Test f)

Table 8. Test Result

F-statistic	**3.133564**
Prob(F-statistic)	**0.005500**

Source: Data processing results with Eviews 12, 2024

As indicated in Table 8, the probability (F-statistic) value is 0.005500, less than 0.05, and the F-statistic value is 3.133564. Given the rejection of H0 and acceptance of H6, it can be inferred that there is a statistically significant possibility that ESG, GI, and CED all impact the Firm's Value simultaneously.

Coefficient of Determination

Table 9. Determination Coefficient Test Results

Adjusted R-squared	**0.547851**

Source: Data processing results with Eviews 12, 2024

Table 9 reveals that the Adjusted R-squared value is 0.547851. This number means that around 54.78% of the company value can be described by independent variables, including ESG Disclosure, Green Investment, and Carbon Emissions Disclosure.

The Effect of ESG Disclosure on Firm Value

The t-test found that the disclosure of ESG does not impact firm value. This conclusion contradicts the first hypothesis, which posits that ESG Disclosure does not influence the Firm Value (PBV) of energy sector companies from 2019 to 2023, causing the rejection of this hypothesis. This study is inconsistent with stakeholder theory, which asserts that a firm should provide benefits to all stakeholders, not just shareholders (Qodary & Tambun, 2021). The lack of impact from ESG on firm value can be attributed to the fact that many companies in Indonesia have yet to effectively implement sustainability practices or communicate this information to the public. The adoption of ESG principles in Indonesia is still in its developmental phase and has not been fully integrated across all companies.

There is no correlation between the ESG performance of companies and the valuation of stocks traded on the Indonesia Stock Exchange between 2017 and 2021, as Kartika et al. (2023) reported in their research. This finding is also confirmed by Romley & Abdurohime (2024) and Adli (2023) in their study, which found that firm value is not affected by ESG disclosure. But not in line with research Aydogmus & Gülay (2022) and Mauliddin (2023), Adhi (2023), and Wu et al. (2022) find that ESG does affect firm value.

The Effect of Green Investment on Firm Value

The t-test indicates that green investment positively impacts a firm's value. This conclusion is derived from the second hypothesis, which asserts that company value (PBV) is positively influenced by green investment, and this hypothesis is thus accepted. The study's findings are consistent with legitimacy theory, suggesting that as a company harmonises its operations with society's values and norms, it earns public acknowledgement, increasing its value.

The result is consistent with a previous study conducted by Paramita & Ali (2023), which claimed that green investment positively affects the value of companies in the Sri-Kehati index. Furthermore, this finding is also stated by Wijayanti & Budi (2024) in their study, which found that green investment positively affects firm value. But not in line with the research of Azhari & Hasibuan (2023), Aeni & Murwaningsari (2023), and Triyani & Rusmanto (2022) found that the results of green investment do not affect firm value.

The Effect of Carbon Emission Disclosure on Firm Value

Carbon emissions disclosure appears to have a positive impact on firm value, according to the t-test results. This evidence supports the third hypothesis that carbon emissions disclosure increases firm value (PBV). Hence, this conclusion is a result of this hypothesis. The study's conclusions are reinforced by stakeholder theory, which suggests that stakeholders' perceptions improve with a company's transparency regarding its carbon emissions (Fitriana & Maharani, 2024). Consequently, this increased transparency makes the firm more attractive to investors, encouraging them to invest by purchasing shares, thereby impacting its value.

This result is similar to previous findings by Bahriansyah & Ginting (2022), which also demonstrated that a firm's value is positively affected by its carbon emissions disclosure. Additionally, research by Aeni & Murwaningsari (2023) further supports earlier studies highlighting the positive impact of carbon emission disclosure on company value. However, in contrast to research by Agatha (2024), carbon emission disclosure does not affect the firm's value.

The Effect of ESG Disclosure, Green Investment, and Carbon Emission Disclosure on Firm Value

ESG Disclosure, Green Investment, and Carbon Emissions Disclosure contribute 54.78% to firm value, with the remaining variables not considered in this research, as obtained from the Adjusted R-squared value test results of 0.547851. With an F-statistic value of 3.133564 and a Prob (F-statistic) value of 0.005400 <0.05, as indicated by the test results in Table 8, H4 is accepted, which indicates that firm value is impacted simultaneously by ESG Disclosure, Green Investment, and Carbon Emissions Disclosure.

CONCLUSION

Energy sector companies registered on the Indonesia Stock Exchange between 2019 and 2023 do not observe any impact on their firm value from ESG disclosure, following the results and discussion of the impact of green investment and carbon emissions disclosure on firm value. Conversely, green investing positively influences firm value over the same period. Furthermore, carbon emission disclosures positively impact the valuation of companies listed on the Indonesia Stock Exchange. Additionally, companies registered on the Indonesia Stock Exchange experienced increased firm value after disclosing their carbon emissions. Lastly, although ESG Disclosure does not have a significant individual impact, the firm value of energy sector companies for 2019-2023 is simultanly influenced by all three factors: ESG Disclosure, Green Investment, and the Disclosure of Carbon Emissions.

There are several constraints on this study. First, a small sample was taken because only a few energy sector corporations disclose their sustainability reports. Second, data elimination was done by removing outlier data because some had extreme values due to the small amount of data. Recommendations for future research suggest that rather than focusing solely on specific industries, other researchers should examine companies listed on the Indonesia Stock Exchange using a more extensive and less restricted approach. This strategy would generate valuable insights that could serve as a framework for subsequent studies in a wider context. Companies must combine their environmentally friendly investments with strong, clear reporting of their carbon emissions to build trust with investors and be more transparent. This means focusing on technologies that produce fewer emissions and sticking to all the current and upcoming rules. At the same time, companies should concentrate on enhancing their Green Investment and Carbon Emission Disclosure to preserve the firm's value. Energy companies should combine green

investments with strong carbon reporting. This means investing in technologies that produce fewer emissions and following new and upcoming regulatory standards.

REFERENCES

R. E. Adhi, and N. Cahyonowati, (2023). Pengaruh Environmental, Social, and Governance Disclosure Terhadap Nilai Perusahaan Dengan Ukuran Perusahaan Sebagai Variabel Moderasi (Studi Empiris Perusahaan Non-Keuangan di Bursa Efek Indonesia Tahun 2019-2021). *Diponegoro Journal of Accounting*. https://ejournal3.undip.ac.id/index.php/accounting/article/view/40165

Adli, N. (2023). Pengaruh Pengungkapan Kinerja Environmental, Social, Governance (ESG), dan Carbon Emission Disclosure (CED) terhadap Nilai Perusahaan Dimoderasi oleh Kinerja Lingkungan. *Doctoral dissertation, Universitas Gajah Mada*.

Aeni, & Murwaningsari. (2023). Pengaruh Pengungkapan Emisi Karbon dan Investasi Hijau Terhadap Nilai Perusahaan. Jurnal Ekonomi Trisakti, 3(2), 3135–3148. https://doi.org/10.25105/jet.v3i2.17890

Agatha, H. T. (2024). Pengaruh Pengungkapan Emisi Karbon, Green Investment dan Tata Kelola Perusahaan Terhadap Nilai Perusahaan. Journal of Social Science Research. https://doi.org/10.31004/innovative.v4i4.13950

Agni, M. T., & Anis, I. (2024). Pengaruh Praktik Environmental, Social, and Governance terhadap Nilai Perusahaan dengan Pengungkapan Emisi Karbon sebagai Variabel Mediasi. Jurnal Penelitian Ilmu-Ilmu Sosial, 1(7). https://doi.org/10.5281/zenodo.10627978

Alfikri, M. R. (2024). Pengaruh Green Finance, Ukuran Perusahaan, Leverage Terhadap Nilai Perusahaan Yang Dimoderasi Oleh Profitabilitas Pada Perusahaan Sektor Industri Dasar Dan Kimia Pada Tahun 2018-2022. Journal of Economic, Bussines and Accounting. https://doi.org/10.31539/costing.v7i5.11756

Aydoğmuş, M., & Gülay, G. (2022). Impact of ESG Performance on Firm Value and Profitability. Bursa Istanbul Review. http://dx.doi.org/10.1016/j.bir.2022.11.006

Ayu Wijayanti, & Yoseph Agus Bagus Budi N. (2024). Dampak Green Governance, Green Investment, dan Green Innovatiom Terhadap Nilai Perusahaan. *Jurnal Ekonomi Trisakti*, *4*(1), 535–544. https://doi.org/10.25105/jet.v4i1.19373

Bahriansyah, R. I., & Lestari Ginting, Y. (2022). Pengungkapan Emisi Karbon Terhadap Nilai Perusahan dengan Media Exposure Sebagai Variabel Moderasi. Jurnal Riset Akuntansi & Perpajakan (JRAP), 9(02), 249–260. https://doi.org/10.35838/jrap.2022.009.02.21

Christy, E., & Sofie. (2023). Pengaruh Pengungkapan Environmental, Social, dan Governance Terhadap Nilai Perusahaan. *Jurnal Ekonomi Trisakti*. http://dx.doi.org/10.25105/jet.v3i2.18233

Damas, D. (2021). Pengaruh eco-efficiency, green innovation dan carbon emission disclosure terhadap nilai perusahaan dengan kinerja lingkungan sebagai moderasi. Jurnal Magister Akuntansi Trisakti. https://doi.org/10.33395/owner.v7i2.1301

Dila, R., & Titik Aryati. (2023). Analisis Intellectual Capital, Carbon Emission Disclosure dan Managerial Ownership Terhadap Nilai Perusahaan. Jurnal Ekonomi Trisakti, 3(1), 1309–1318. https://doi.org/10.25105/jet.v3i1.16040

Dowling, J., & Pfeffer, J. (1975). *Organizational legitimacy: Social values and organizational behavior.* Standford: Pacific sociological review.

Gunawan, S. N., Sembiring, F., & Paramita, S. (2024). The Effect of Green Investment, Corporate Social Responsibility, and Good Corporate Governance on Green Company Value Mediated by Return on Investment. JASa (Jurnal Akuntansi, Audit Dan Sistem Informasi Akuntansi), 8(3), 673–687. https://doi.org/10.36555/jasa.v8i3.2705

Ghozali, & Ratmono. (2020). Analisis Multivariate dan Ekonometrika: Teori Konsep dan Aplikasi dengan Eviews10. Badan Penerbit Universitas Diponegoro.

Hardianti, T. (2023). Pengaruh Carbon Emission Disclosure Dan Ukuran Perusahaan Terhadap Nilai Perusahaan Dengan Kinerja Lingkungan Sebagai Variabel Moderasi. *Jurnal Ilmiah Wahana Pendidikan*. https://doi.org/10.5281/zenodo.7951766

Herawaty, V. (2024). Pengaruh Pengungkapan Emisi Karbon, Eco Efficiency dan Pertumbuhan Penjualan terhadap Nilai Perusahaan dengan Profitabilitas sebagai Variabel Moderasi. 5, 3670. https://doi.org/10.47467/elmal.v5i8.3646

Kartika, F., Dermawan, A., & Hudaya, F. (2023). Pengungkapan environmental, social, governance (ESG) dalam meningkatkan nilai perusahaan publik di Bursa Efek Indonesia. *SOSIOHUMANIORA: Jurnal Ilmiah Ilmu Sosial Dan Humaniora*, *9*(1), 29–39. https://doi.org/10.30738/sosio.v9i1.14014

Kemenkes. (2024). *Bahaya Polusi Udara bagi Kesehatan: Dampak, Penyebab dan Pencegahannya*. Retrieved from kemenkes: https://ayosehat.kemkes.go.id/

KLHK. (2019). *Sejarah Proper*. Retrieved from PROPER - Kementerian Lingkungan Hidup dan Kehutanan: https://proper.menlhk.go.id/

Mandiri. (2022). ESG atau Environmental, Social, and Governance (Lingkungan, Sosial, dan Tata Kelola). Retrieved from Mandiri: https://www.bankmandiri.co.id/

Masditok, T., Gunarsih, T., Geraldina, I., & Wihadanto, A. (2024). The Effect of Environmental, Social, Governance (ESG) on Price to Book Value (PBV), with Industry Classification as Moderation in ASEAN Companies 2013-2023. Journal Khazanah Sosial, Vol. 6 No. 2: 371-382. https://doi.org/10.15575/ks.v6i2.38456

Mauliddin, J. A. (2023). Pengaruh Leverage, Profitabilitas, Environmental Social dan Governance (ESG) Terhadap Nilai Perusahaan yang Mengungkapkan ESG pada Tahun 2022. Jurnal Ilmu dan Riset Akuntansimu

Murwaningsari, E., & Rachmawati, S. (2023). The Effect of Green Banking and Green Investment on Firm Value with Eco-Efficiency as Moderation. In International Journal of Social and Management Studies (IJOSMAS) (Vol. 4, Issue 2). https://doi.org/10.5555/ijosmas.v4i2.300

Nasution, M. I. S., Yulia, I. A., & Fitrianti, D. (2024). Pengaruh Pengungkapan Enviromental, Social dan Governance (ESG) Terhadap Nilai Perusahaan (Studi Kasus Pada Perusahaan Perbankan Yang Terdaftar di BEI Tahun 2023). Jurnal EMT KITA, 8(4), 1255–1264. https://doi.org/10.35870/emt.v8i4.2939

Ningrum, E. P. (2022). Nilai Perusahaan: Konsep dan Aplikasi. Indramayu: Penerbit Adab.

Paramita, V. S., & Ali, A. (2023). Can Profitability Moderate the Impact of Green Investment, Corporate Social Responsibility, and Good Corporate Governance on Company Value on the SRI-KEHATI Index? *International Journal of Finance Research*, *4*(4), 320–338. https://doi.org/10.47747/ijfr.v4i4.1604

Putri, Y. F. (2022). Analisis Pengaruh Kinerja Lingkungan Dan Biaya Lingkungan Terhadap Nilai Perusahaan Dengan Kinerja Keuangan Sebagai Variabel Intervening. *INNOVATIVE: Journal Of Social Science Research*. https://doi.org/10.31004/innovative.v4i1.8300

Qontrunnada, R. (2022). *Emisi Karbon: Penyebab, Dampak, dan Cara Mengurangi*. Retrieved from Lindungihutan: https://lindungihutan.com/

Roestanto, A. (2022). Pengaruh Ukuran Perusahaan, Umur Perusahaan, Jenis Industri, dan Struktur Kepemilikan Terhadan Environmental, Social, and Governace (ESG) Disclosure (Studi Empiris Perusahaan di Indonesia yang Terdaftar di IDX 2017-2020). *Journal STIEM*. http://dx.doi.org/10.35906/jurakun.v8i1.958

Rahelliamelinda, L., & Handoko, J. (2024). Profitabilitas Sebagai Moderating Pengaruh Kinerja ESG, Green Innovation, Eco-Efficiency Terhadao Nilai Perusahaan. Jurnal Informasi, Perpajakan, Akuntansi, dan Keuangan Publik, 19(1),145– 170. https://doi.org/10.25105/jipak.v19i1.19191

Ramdani, K. E., & Nugraha, A. A. (2024). Pengaruh Pengungkapan Emisi Karbon dan Kinerja Lingkungan terhadap Nilai Perusahaan (Studi pada Perusahaan Sektor Energi yang Terdaftar di BEI Periode 2020-2022). Indonesian Accounting Literacy Journal. https://doi.org/10.35313/ialj.v4i3.5872.

Romli, & Abdurohim. (2024). Pengaruh Pengungkapan ESG Terhadap Nilai Perusahaan. https://doi.org/10.31539/costing.v7i6.12171

Sapulette, S. G., & Limba, F. B. (2021). Pengaruh Penerapan Green Accounting dan Kinerja Lingkungan terhadap Nilai Perusahaan Manufaktur yang terdaftar di BEI tahun 2018-2020. Kupna Jurnal. https://doi.org/10.30598/kupna.v2.i1.p31-43

Spence, M. (1973). Job Market Signaling. Source: The Quarterly Journal Of Economics, 87(3), 355–374.

Sugiyono, P. D. (2019). Metode Penelitian Kuantitatif, Kualitatif, dan R&D. Bandung: Penerbit Alfabeta.

Suhendar, R. P., & Paramita, V. S. (2024). Pengaruh Keputusan Investasi, Ukuran Perusahaan, Keputusan Pendanaan dan Kebijakan Dividen Terhadap Nilai Perusahaan Pada Perusahaan Sub Sektor Perbankan Yang Terdaftar Di BEI Periode 2018-2022. *Equibrium, 13*. https://doi.org/10.35906/equili.v13i1.1883

Sutrisno. (2017). *Manajemen Keuangan: Teori Konsep dan Aplikasi.* Yogyakarta: EKONISIA.

Tasrif, A. (2024). *Pemerintah Berhasil Tekan 127.67 Juta Ton Emisi GRK Sektor Energi*. Retrieved from Kementerian Energi dan Sumber Daya Mineral: https://www.esdm.go.id/

Tumiwa, F. (2022). Climate Transperency Report: Comparing G20 Climate Action. *Institute for Essential Services Reform*.

Xaviera, A., Rahman, A., Program (2022), Akuntansi, S., Ekonomi, F., Bisnis, D., & Artikel, P. (n.d.). Pengaruh Kinerja ESG Terhadap Nilai Perusahaan dengan Siklus Hidup Perusahaan Sebagai Moderasi. Jurnal Akuntansi Bisnis, 16(2), 226–247. https://doi.org/10.30813/jab.v16

Zhang, Y., & Berhe, H. M. (2022). The Impact of Green Investment and Green Marketing on Business Performance: The Mediation Role of Corporate Social Responsibility in Ethiopia's Chinese Textile Companies. Sustainability (Switzerland), 14(7). https://doi.org/10.3390/su14073883