CARBON EMISSION DISCLOSURE IN INDONESIAN PLANTATION COMPANIES: EFFECTS OF ENVIRONMENTAL MANAGEMENT SYSTEMS, ENVIRONMENTAL AND FINANCIAL PERFORMANCE

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Abstract

This study aims to evaluate the factors influencing carbon emission disclosure ain plantation companies in Indonesia. The research employs a quantitative method, utilizing secondary data from annual reports, financial statements, and sustainability reports of plantation companies listed on the Indonesia Stock Exchange (IDX) from 2013 to 2022. Data analysis is conducted using purposive sampling, resulting in a sample of 25 companies. The panel data analysis model applied is the Common Effect Model (CEM) after undergoing the Chow test. The results indicate that environmental management systems (EMS) have a significant negative effect, environmental performance has a positive and significant effect, while financial performance does not have a significant effect on carbon emission disclosure. These findings highlight the importance of environmental performance in encouraging transparency, while the implementation of EMS does not necessarily lead to higher disclosure levels. This study contributes to understanding the determinants of carbon emission disclosure in Indonesia's plantation sector and provides insights for policymakers and companies in improving environmental transparency and sustainability practices.

Keywords: Environmental Management System, Environmental Performance, Financial Performance, Carbon Emission Disclosure, Plantation Companies.

Abstrak

Penelitian ini bertujuan untuk mengevaluasi faktor-faktor yang mempengaruhi pengungkapan emisi karbon pada perusahaan perkebunan di Indonesia. Penelitian ini menggunakan metode kuantitatif, memanfaatkan data sekunder dari laporan tahunan, laporan keuangan, dan laporan keberlanjutan perusahaan perkebunan yang terdaftar di Bursa Efek Indonesia (IDX) dari tahun 2013 hingga 2022. Analisis data dilakukan menggunakan purposive sampling, menghasilkan sampel sebanyak 25 perusahaan. Model analisis data panel yang diterapkan adalah Common Effect Model (CEM) setelah melalui uji Chow. Hasil penelitian menunjukkan bahwa sistem manajemen lingkungan (PLT) memiliki pengaruh negatif yang signifikan, kinerja lingkungan memiliki pengaruh positif dan signifikan, sedangkan kinerja keuangan tidak memiliki pengaruh signifikan terhadap pengungkapan emisi karbon. Temuan ini menyoroti pentingnya kinerja lingkungan dalam mendorong transparansi, sementara implementasi PLT tidak selalu mengarah pada tingkat pengungkapan yang lebih tinggi. Penelitian ini berkontribusi pada pemahaman determinan pengungkapan emisi karbon di sektor perkebunan Indonesia dan memberikan wawasan bagi pembuat kebijakan dan perusahaan dalam meningkatkan transparansi lingkungan dan praktik keberlanjutan.

***Kata kunci**: Sistem Manajemen Lingkungan, Kinerja Lingkungan, Kinerja Keuangan, Pengungkapan Emisi Karbon, Perusahaan Perkebunan.*

Introduction

Indonesia plays an important role in the global and national economy (Varkkey *et al.,* 2018). As a country with vast and abundant biodiversity, Indonesia's plantation sector significantly contributes to carbon emissions (Daryono *et al.,* 2023). The plantation sector, including palm oil, rubber, and other crops, has become the economic backbone of many regions across Indonesia. However, this sector also presents environmental challenges, particularly regarding carbon emissions (Gaffar *et al.,* 2024). In terms of regulation, Indonesia's Ministry of Environment and Forestry (KLHK) has issued a policy requiring plantation companies with land areas exceeding 100 hectares to report their carbon emissions. This regulation reflects the government's awareness of the urgency of environmental protection, as evidenced by Leonanda (2019).

Most plantations generate carbon dioxide emissions through activities such as wood burning, land clearing by fire, and the use of fossil fuels (Rahmadania, 2022). Consequently, as part of their social responsibility and to comply with existing regulations, plantation companies must transparently disclose their carbon emissions (Hanifah, 2016). Carbon emission disclosure is essential for building trust and reputation among stakeholders because it provides clear and accurate information, helps assess environmental performance, and demonstrates corporate social responsibility (Santoso *et al.,* 2021).

Data collected by the Central Bureau of Statistics (BPS) shows that plantation companies are spread throughout Indonesia, covering 38 provinces with a total of 2,213 plantation companies. In the context of greenhouse gas (GHG) emissions from the plantation sector in Indonesia, the National Greenhouse Gas Inventory compiled by the Ministry of Environment and Forestry (KLHK) provides a summary of GHG emission data from the plantation sector for the years 2013 to 2022.

Figure 1. Trend of GHG Emissions from Plantation Companies

GHG emissions (Mt CO_2)

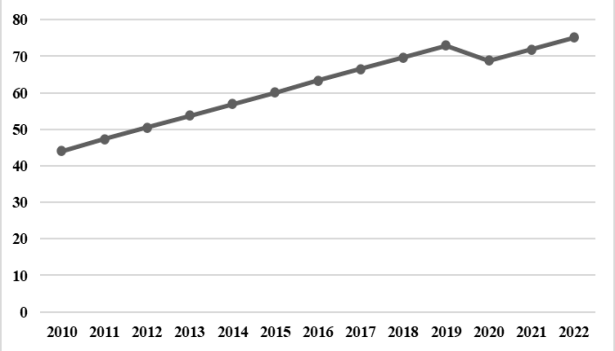


Figure 1 highlights the importance of carbon emission disclosure in addressing the increasing trend of greenhouse gas (GHG) emissions from the plantation industry. Although there was a decline in 2020, the subsequent rise until 2022 indicates the need for continuous efforts to manage carbon emissions in the plantation sector. Therefore, it is crucial for plantation companies not only to understand the factors influencing carbon emissions but also to have an effective environmental management system that helps companies identify, measure, and manage carbon emissions more efficiently (Arif *et al.,* 2023).

The International Organization for Standardization (ISO) is a global body that sets international standards across various sectors, including the environmental field (Ramadan *et al.,* 2019). ISO 14001 is one of the most well-known standards issued by ISO within the framework of environmental management systems (Awantara & Diva, 2014). One theory that explains the relationship between carbon emission disclosure and environmental management systems (EMS) is the legitimacy theory. This theory proposes that the adoption of EMS, such as ISO 14001, is positively related to the level of carbon emission disclosure by companies (Syairozi, 2019). Consistent with the research conducted by Ferdiani & Mulyani (2023), environmental management systems have a positive effect on carbon emission disclosure, as evidenced by findings that ISO 14001 certification can improve the quality of information and provide effectiveness for companies in conducting their business activities. As explained by legitimacy theory, companies' willingness to communicate their social responsibility and environmental concerns to the public reflects the implementation of more reliable and transparent management practices. Consequently, they tend to be more diligent in disclosing environmental information, including carbon emissions (Saraswati & Alam, 2022).

Moreover, a company's environmental performance also plays an important role in carbon emission disclosure (Braam *et al.,* 2016). Environmental performance is an evaluation of the extent to which an organization or entity succeeds in maintaining or

improving environmental sustainability in its operations (Karjono, 2021). According to signaling theory, carbon emission disclosure serves as a signal of how a company treats its environment (Alfayerds *et al.,* 2021). Good environmental performance encourages companies to be more transparent in reporting carbon emissions because they aim to maintain or enhance their reputation as environmentally responsible organizations (Braam *et al.*, 2016).

On the other hand, a company's financial performance can also influence the decision to disclose carbon emissions (Lu *et al.,* 2021). Financial performance measures the extent to which a company is able to generate profit and fulfill its financial responsibilities. This can be assessed through various indicators, such as profitability, which reflects how effectively a company generates profit. Common profitability indicators include net income, gross profit margin, and earnings per share (Crisnadani *et al.,* 2021). Agency theory highlights the distinction between company management and shareholders, indicating the potential for conflict or disagreement regarding priorities and objectives within the context of company operations and policies. Shareholders are interested in carbon emission disclosure because it can affect the company's financial performance and stock value. Therefore, management may respond by increasing carbon emission disclosure to meet shareholder expectations (Golo & Astuti, 2023). Companies experiencing financial pressure tend to limit the disclosure of information that could harm them, including high carbon emissions. Conversely, companies with strong financial performance are better able to invest in environmentally friendly technologies and business practices, as well as expand their carbon emission disclosures (Galyani & Henny, 2022).

A deep understanding of the factors influencing how plantation companies in Indonesia disclose carbon emissions is crucial for guiding sustainable policies and business practices. Previous studies have examined aspects affecting carbon emission disclosure, such as those conducted by Gabrielle & Toly (2019); Setiawan & Iswati (2019); Rokhmawati *et al.* (2015); and Destiyuanita *et al.* (2022). These studies explore the impact of carbon emissions on financial performance, social performance, environmental management, financial performance, and firm value. Participation in the PROPER program, involvement in the manufacturing sector, and listing on the Indonesia Stock Exchange (IDX) have been identified as factors supporting the positive impact of carbon emission disclosure. This contrasts with Rahman *et al.* (2020), who found that environmental management systems do not affect carbon emissions disclosure by Indonesian listed

companies. Additionally, Li *et al.* (2020) found that Chinese manufacturing companies prioritizing profitability and sustainability tend to be less transparent in reporting their carbon emissions. The more these companies prioritize profitability and sustainability, the less likely they are to disclose carbon emission information. This study suggests that this may be because these companies focus more on short-term financial results rather than long-term environmental responsibility.

Although numerous studies have examined carbon emission disclosure, limited research specifically focuses on plantation companies in Indonesia. Furthermore, previous studies show inconsistent results regarding the influence of environmental management systems, environmental performance, and financial performance on carbon emission disclosure.

Based on these gaps, the problem formulation of this study is: (1) Does the Environmental Management System affect carbon emission disclosure? (2) Does Environmental Performance affect carbon emission disclosure? (3) Does Financial Performance affect carbon emission disclosure?Accordingly, this study aims to analyze the effect of Environmental Management Systems, Environmental Performance, and Financial Performance on carbon emission disclosure in Indonesian plantation companies.

The novelty of this research lies in its focus on the plantation sector in Indonesia, which has received limited attention in prior studies, as well as the integration of three key determinants environmental management systems, environmental performance (PROPER), and financial performance within a single empirical model using panel data over a ten-year period (2013–2022).

Theoretically, this research contributes to the development of legitimacy theory, signaling theory, and agency theory in explaining corporate carbon emission disclosure practices. Practically, the findings are expected to provide insights for companies and policymakers, particularly in improving environmental transparency and strengthening the implementation of environmental management policies in the plantation sector.

Literature Review

The Influence of Environmental Management Systems on Carbon Emission Disclosure

An Environmental Management System (EMS) is a system designed to help organizations manage the environmental impacts of their activities (Syam *et al.*, 2021). EMS enables organizations to improve compliance with environmental regulations, enhance

environmental performance, reduce operational costs, and strengthen corporate reputation. The most widely adopted international standard for EMS is ISO 14001 (Hasid *et al.*, 2022), which provides a framework for planning, implementing, monitoring, and continuously improving environmental management practices.

In this study, the Environmental Management System is measured using a dummy variable, where a value of 1 is assigned to companies certified with ISO 14001, and 0 otherwise. This indicator reflects the company's formal commitment to environmental management.Greenhouse Gas (GHG) disclosure refers to the process of conveying information related to a company's carbon emissions and environmental activities through annual or sustainability reports (Safta *et al.*, 2023). Carbon emission disclosure in this study is measured using an index based on 18 disclosure items adapted from Choi et al. (2013), which capture the extent and transparency of carbon-related information reported by companies.

Legitimacy theory explains that organizations seek to gain and maintain legitimacy by aligning their activities with societal expectations (Nonet & Selznick, 2019). Companies implementing EMS are expected to disclose more environmental information to demonstrate accountability and gain stakeholder trust (Said, 2018). Transparent GHG disclosure enhances corporate reputation and signals environmental responsibility (Wong *et al.*, 2021).

Previous studies (Syairozi, 2019; Setiawan & Iswati, 2019; Ferdiani & Mulyani, 2023) generally find that EMS has a positive relationship with carbon emission disclosure. However, some studies also indicate that EMS implementation may not always lead to higher disclosure, as companies may focus more on internal environmental improvements rather than external reporting.

H1: Environmental Management Systems have a positive effect on Carbon Emission Disclosure.

The Influence of Environmental Performance on Carbon Emission Disclosure

Environmental performance refers to a company's ability to manage and minimize the environmental impact of its activities (Solovida & Latan, 2017). In Indonesia, environmental performance is assessed through the PROPER program developed by the Ministry of Environment and Forestry (KLHK), which ranks companies using five categories: black, red, blue, green, and gold (Anggara *et al.*, 2021). In this study, Environmental Performance is measured using PROPER ratings, which are converted into a numerical scale ranging from 1

(worst) to 5 (best). This indicator reflects the level of compliance and environmental responsibility of the company.

Signaling theory (Spence, 1973) suggests that companies provide signals to external stakeholders to indicate their quality and credibility (Akhanolu *et al.*, 2023). Companies with strong environmental performance are more likely to disclose carbon emission information to signal their commitment to sustainability.Empirical studies (Gabrielle & Toly, 2019; Setiawan & Iswati, 2019; Deswanto & Siregar, 2018) consistently show a positive relationship between environmental performance and carbon emission disclosure.

H2: Environmental Performance has a positive effect on Carbon Emission Disclosure.

The Influence of Financial Performance on Carbon Emission Disclosure

Financial performance reflects a company's ability to generate profit and achieve its financial objectives (Matar & Eneizan, 2018). It is commonly measured using profitability indicators such as net income, gross profit margin, and earnings per share (Yuniastuti & Nasyaroeka, 2017). Companies that proactively manage and disclose their greenhouse gas (GHG) emissions often gain better access to capital and investment, as they appeal to sustainability-oriented investors (Wibowo, 2022).

In this study, Financial Performance is measured using profitability ratios, specifically Return on Assets (ROA), which indicates how efficiently a company utilizes its assets to generate profit.Agency theory (Ross, 1973) explains the relationship between shareholders (principals) and management (agents). Shareholders may demand greater transparency, including carbon emission disclosure, as it can influence firm value and investment decisions (Golo & Astuti, 2023).

Companies with strong financial performance are generally more capable of investing in environmental initiatives and disclosure practice**s** (Wibowo, 2022). However, empirical findings are mixed. Li *et al.* (2017) found a negative relationship between environmental disclosure and financial performance, while Deswanto & Siregar (2018) found no significant relationship.

H3: Financial Performance has a positive effect on Carbon Emission Disclosure.

Research Methodology

To examine carbon emission disclosure in plantation companies listed on the Indonesia Stock Exchange (IDX), this study employs a quantitative research approach using

secondary data derived from annual reports, financial statements, and sustainability reports. The data collection technique used in this study is documentation, where data are obtained from official company reports published on the Indonesia Stock Exchange (IDX) website and the respective companies' websites.

The sample consists of 25 companies selected using purposive sampling based on the following criteria:

1. Plantation companies listed on the IDX between 2013 and 2022.
2. Plantation companies that have consistently published complete financial reports during the observation period (2013–2022).

A number of plantation companies met these criteria and were included in the sample. The following table presents the list of sample companies.

Table 1. Plantation Companies Listed on the IDX (2013–2022)

No	Plantation Company	Code
1	Astra Agro Lestari Tbk	AALI
2	Austindo Nusantara Jaya Tbk	ANJT
3	BISI International Tbk	BISI
4	Bumi Teknokultura Unggul Tbk	BTEK
5	Eagle High Plantations Tbk	BWPT
6	Jaya Agra Wattie Tbk	JAWA
7	Bakrie Sumatera Plantations Tbk	UNSP

Source: Processed by the author (2024)

Table 2. Operational Definition of Variables

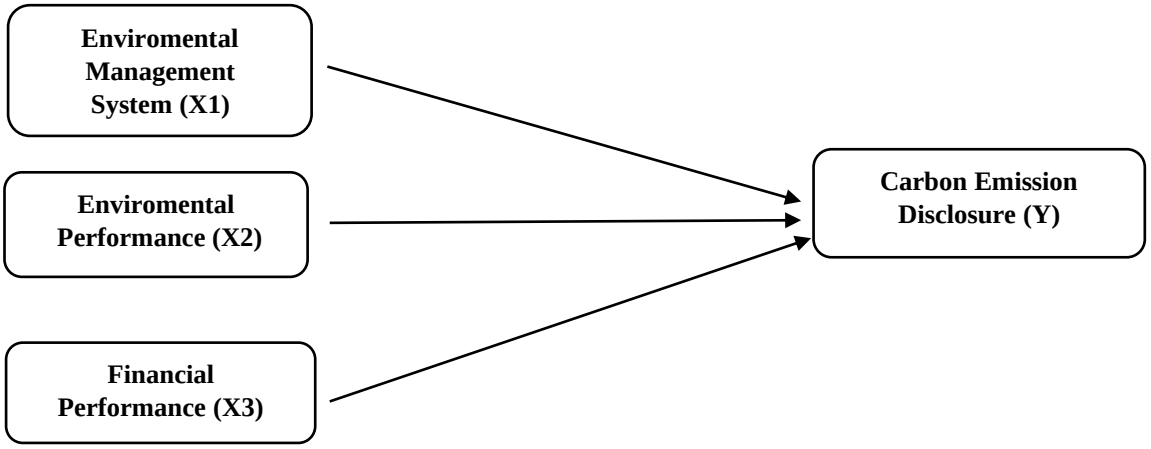
Variable	Definition	Measurement Indicator
Carbon Emission Disclosure (CED)	Disclosure of company carbon emission information	Disclosure index based on 18 items (Choi et al., 2013)
Environmental Management System (EMS)	Structured environmental management implementation	Dummy variable: 1 = ISO 14001 certified; 0 = otherwise
Environmental Performance (EP)	Company capability in managing environmental impact	PROPER rating (1–5)
Financial Performance (FP)	Company profitability performance	ROA = Net Income / Total Assets

Source: Processed by the author (2024)

Data Analysis Methods

This study employs panel data regression analysis, including descriptive statistics, classical assumption tests (multicollinearity and heteroskedasticity), and hypothesis testing using t-tests, F-tests, and the coefficient of determination (R^2).

Figure 2. Research Framework



Source: Processed by the author (2024)

Carbon Emission Disclosure

Carbon emission disclosure is the process by which an organization or entity openly reports the amount of greenhouse gases (GHGs) produced as a result of its operational activities. The aim is to provide transparency regarding the environmental impact of the organization's activities (Choi et al., 2021). The carbon emission disclosure score is measured using the following formula:

$$CED = \frac{\sum d}{M}$$

Explanation:

CED = Carbon Emission Disclosure

∑d = Total number of disclosed items

M = Total number of items that can be disclosed (18) (Choi et al., 2013)

Environmental Management System

The implementation of an Environmental Management System (EMS) certified under ISO 14001 is intended to help organizations control and improve their environmental performance while reducing the excessive impact of their operations on the surrounding environment (Setiawan & Iswati, 2019). The measurement of the Environmental Management System is as follows:

If the company has an EMS certified by ISO 14001, it is assigned a score of 1 (certified).

If the company does not have an EMS, it is assigned a score of 0 (not certified).

Environmental Performance

In Indonesia, the Ministry of Environment has established the Corporate Performance Rating Program in Environmental Management (PROPER) to evaluate companies' environmental performance (Gabrielle & Toly, 2019). PROPER uses a five-level rating system ranging from 1 (worst) to 5 (best), represented by the following colors: black, red, blue, green, and gold.

Financial Performance

Financial ratios are useful tools for evaluating key aspects of a company's financial performance, such as profitability. These ratios indicate how well a business is growing and whether it is effectively managing its operations while complying with financial regulations (Safutri et al., 2023). Financial performance in this study is measured using a profitability indicator, as follows:

$$ROA = \frac{Net\ Income}{Total\ Assets}$$

Results and Discussion

Results

Descriptive Statistics

Table 2 presents the descriptive statistics for the variables under study. Descriptive statistics is a method used to summarize and describe the basic characteristics of a dataset. This method provides insights into key features of the data, including the mean, median, standard deviation, data distribution, and so forth (Prihatiningsih, 2022).

Table 2. Descriptive Statistics Results

	EMS (X1)	EP (X2)	FP (X3)	CED (Y)
Mean	0.657143	2.142857	3.830000	0.369857
Median	1.000000	3.000000	3.300000	0.390000
Maximum	1.000000	4.000000	7.200000	0.670000
Minimum	0.000000	0.000000	1.600000	0.110000
Std. Dev.	0.478091	1.835920	1.503653	0.163508
Skewness	-0.662122	-0.226168	0.569709	0.043250
Kurtosis	1.438406	1.190982	2.194859	1.852264
Jarque-Bera	12.22725	10.14170	5.677365	3.863945
Probability	0.002213	0.006277	0.058503	0.144862
Sum	46.00000	150.0000	268.1000	25.89000
Sum Sq. Dev.	15.77143	232.5714	156.0070	1.844699
Observations	70	70	70	70

Source: Processed data, Eviews-10, 2024

The statistical testing presented in Table 2 indicates that not all variables are normally distributed, as several variables have probability values below 0.05. Specifically, the Environmental Management System (0.002213) and Environmental Performance (0.006277) variables do not meet the normality assumption. However, due to the use of panel data regression and the relatively sufficient sample size, the analysis can still proceed as the estimation method is considered robust. With a sample of 7 plantation companies listed on the Indonesia Stock Exchange (IDX) over a 10-year period (2013–2022), the data meet the requirements for further statistical analysis.

The Environmental Management System variable has a mean value of 0.657143, a median of 1.000000, a maximum value of 1.000000, a minimum of 0.000000, a standard deviation of 0.478091, and a probability value of 0.002213. This indicates that most of the variation in the Environmental Management System data is statistically significant. Next, the Environmental Performance variable has a mean of 2.142857, a median of 3.000000, a maximum value of 4.000000, a minimum of 0.000000, a standard deviation of 1.835920, and a probability value of 0.006277. This suggests that most differences in the Environmental Performance data across plantation companies listed on the IDX are significant.

The Financial Performance variable shows a mean of 3.830000, a median of 3.300000, a maximum of 7.200000, a minimum of 1.600000, a standard deviation of 1.503653, and a probability value of 0.0585503. This indicates that most of the variation in Financial Performance is not statistically significant. Lastly, the Carbon Emission Disclosure variable has a mean of 0.369857, a median of 0.390000, a maximum of 0.670000, a minimum of 0.110000, a standard deviation of 0.163508, and a probability value of 0.144862. This

suggests that most of the differences in Carbon Emission Disclosure data are also not statistically significant.

Model Selection Test

Chow Test

Table 3. Chow Test Results

Effects Test	Statistic	d.f.	Prob.
Cross-section F	1.319069	(6,60)	0.2628
Cross-section Chi-square	8.673260	6	0.1928

Source: Processed data, Eviews-10, 2024

Based on the Chow Test, this study selected the Common Effect Model (CEM) as the most appropriate model for panel data analysis. The probability value of 0.1928, which is greater than 0.05, indicates that the CEM is more suitable for this study compared to the Fixed Effect Model (FEM).

Classical Assumption Testing

Since the chosen model is the Common Effect Model (CEM), it is necessary to perform classical assumption tests, including multicollinearity and heteroskedasticity tests (Napitupulu et al., 2021).

Multicollinearity Test

Table 4. Results of the Multicollinearity Test

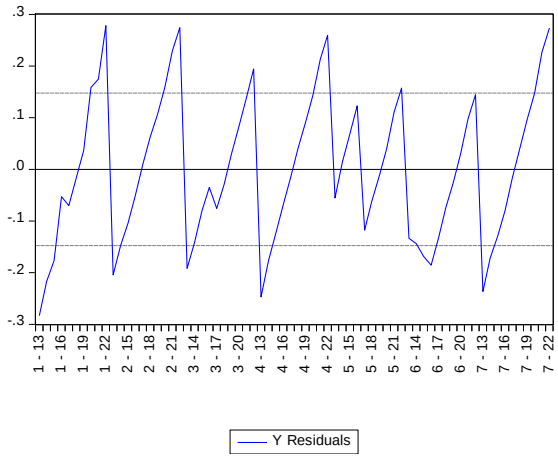
	X1	X2	X3
X1	1.000000	0.849162	0.121364
X2	0.849162	1.000000	0.136497
X3	0.121364	0.136497	1.000000

Source: Processed data, Eviews-10, 2024

Multicollinearity occurs when there is a high degree of correlation among the independent variables in a regression model. The correlation coefficient between X1 and X2 is 0.849162, between X1 and X3 is 0.121364, and between X2 and X3 is 0.136497. All values fall below 0.85. This may indicate that multicollinearity is not present or that it is only mildly estimated by the model (Napitupulu et al., 2021).

Heteroskedasticity Test

Table 5. Results of the Heteroskedasticity Test



Source: Processed data, Eviews-10, 2024

The residual plot shows that the values do not exceed the boundaries of 500 and -500, indicating that the residual variance is consistent. Therefore, there is no indication of heteroskedasticity, meaning that this model passes the heteroskedasticity test (Napitupulu et al., 2021).

Panel Data Regression Equation

Y=0.401229942441-0.191631328925X1+0.0734543524145X2-.0164088314155*X3.

Based on the estimated regression equation, the direction of relationships among variables can be explained systematically through the sign of each independent variable's coefficient. The Environmental Management System variable (X1) has a coefficient of −0.191631328925, indicating a negative relationship with Carbon Emission Disclosure (Y). This means that an increase in the implementation of environmental management systems is associated with a decrease in the level of carbon emission disclosure, assuming other variables remain constant.

In contrast, the Environmental Performance variable (X2) has a positive coefficient of 0.0734543524145, which indicates a positive relationship. This implies that an improvement in environmental performance leads to an increase in carbon emission disclosure. Meanwhile, the Financial Performance variable (X3) shows a negative coefficient of −0.0164088314155, indicating a negative relationship with carbon emission disclosure. Thus, higher financial performance tends to be associated with a slight decrease in the level of carbon emission disclosure.

Overall, only environmental performance (X2) demonstrates a positive relationship, while the environmental management system (X1) and financial performance (X3) variables exhibit negative relationships with carbon emission disclosure. This finding indicates that not all theoretically expected relationships are supported empirically, highlighting the importance of empirical testing in validating research hypotheses.

Hypothesis Testing

T- Test

Table 6. Results of the T-Test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.401230	0.052320	7.668726	0.0000
X1	-0.191631	0.070462	-2.719640	0.0083
X2	0.073454	0.018385	3.995245	0.0002
X3	-0.016409	0.011944	-1.373830	0.1741

Source: Processed data, Eviews-10, 2024

The results of the t-test analysis indicate the individual influence of each independent variable on the dependent variable. For the Environmental Management System (X1) variable, the calculated t-value is -2.719640, which is lower than the critical t-table value of 1.995, and the significance value is 0.0083, which is below 0.05. This indicates that X1 has a statistically significant effect on Carbon Emission Disclosure in plantation companies in Indonesia. For the Environmental Performance (X2) variable, the calculated t-value is 3.995245, which is higher than the t-table value of 1.995, with a significance value of 0.0002, also below 0.05. This demonstrates that X2 significantly influences Carbon Emission Disclosure in Indonesian plantation companies. The Financial Performance (X3) variable has a t-value of -1.373830 and a significance value of 0.1741, indicating that this variable does not have a statistically significant effect on Carbon Emission Disclosure in plantation companies in Indonesia.

F-Test

Table 7. Results of the F-Test

F-statistic	6.156946
Prob(F-statistic)	0.000936

Source: Processed data, Eviews-10, 2024

Statistical analysis using the F-test shows that the calculated F-value is 6.156946, which is greater than the F-table value of 3.128, with a significance value of 0.000936, which is less than 0.05. This indicates that carbon emission disclosure in plantation companies in Indonesia is significantly influenced by factors such as financial performance, environmental performance, and environmental management systems.

Coefficient of Determination (R^2) Test

Table 8. Results of the R^2 Coefficient of Determination Test

R-squared	0.218665
Adjusted R-squared	0.183150

Source: Processed data, Eviews-10, 2024

The adjusted R-squared value is 0.183150, equivalent to 18.3150%. This coefficient of determination indicates that the independent variables Environmental Management System, Environmental Performance, and Financial Performance collectively explain 18.3150% of the variation in Carbon Emission Disclosure among plantation companies in Indonesia. Meanwhile, the remaining 81.6850% is explained by other factors not included in this research model.

Discussion

The Influence of Environmental Management Systems on Carbon Emission Disclosure

Hypothesis testing indicates that the Environmental Management System (EMS) has a significant effect on Carbon Emission Disclosure in Indonesian plantation companies. This is evidenced by the calculated t-value of -2.719640, which is less than the critical t-value of -1.995, and a significance value of 0.0083, which is below 0.05.

This result indicates that the Environmental Management System has a significant negative effect on carbon emission disclosure. This suggests that companies implementing EMS tend to disclose less carbon emission information.These findings do not support the first hypothesis, which states that the implementation of an Environmental Management System has a significant positive effect on carbon emission disclosure.

This result implies that the implementation of EMS, such as ISO 14001, may be focused more on internal environmental management practices rather than external transparency through disclosure. Companies may prioritize operational efficiency, regulatory compliance, and internal environmental improvements rather than voluntarily disclosing carbon emission information.

This finding is inconsistent with several previous studies (Syairozi, 2019; Destiyuanita & Muid, 2022; Puteri & Inawati, 2023; and Ferdiani & Mulyani, 2023) that found a positive relationship between EMS and carbon emission disclosure.From the perspective of legitimacy theory, companies are expected to disclose environmental information to gain public trust and legitimacy. However, this study suggests that EMS implementation alone does not necessarily lead to greater disclosure, indicating that companies may achieve legitimacy through internal compliance rather than external reporting.This inconsistency highlights that the relationship between EMS and carbon emission disclosure may depend on company strategy, regulatory pressure, and the extent of voluntary disclosure practices.

The Influence of Financial Performance on Carbon Emission Disclosure

Based on the hypothesis test results, it can be concluded that Financial Performance cannot be used to predict Carbon Emission Disclosure in Indonesian plantation companies. This is evidenced by the calculated t-value of -1.373830, which is less than the critical t-value of 1.995, and a significance value of 0.1741, which is greater than 0.05. This indicates that other factors, besides Financial Performance, may be more important in determining the level of carbon emission disclosure in plantation companies.

This study shows that the company's Financial Performance does not have an impact on carbon emission disclosure. This result is inconsistent with agency theory, as carbon emission disclosure is not the only mechanism used by companies to fulfill the needs of agents, and financial performance is not a factor that increases carbon emission disclosure (Septriyawati & Anisah, 2019).

Plantation companies with good financial performance may be more inclined to maximize production and profits rather than disclose their carbon emissions, which could be perceived as operational obstacles or additional costs (Angelsen, 2010). Disclosing carbon emissions can incur significant costs for plantation companies, especially those with large and complex operations. These costs include carbon emission data collection, emission audits, emission reporting, and the development of emission reduction strategies. Plantation companies with strong financial performance may be reluctant to bear these costs if they are uncertain about the benefits (Septriyawati & Anisah, 2019).

Conclusion

This study examines the influence of Environmental Management Systems (EMS), environmental performance, and financial performance on carbon emission disclosure in plantation companies listed on the Indonesia Stock Exchange (IDX). The results indicate that Environmental Management Systems have a significant negative effect, environmental performance has a significant positive effect, while financial performance does not have a significant effect on carbon emission disclosure.

Theoretically, these findings contribute to the development of legitimacy theory and signaling theory by confirming that companies tend to disclose carbon emission information as a form of legitimacy and as a positive signal to stakeholders when they demonstrate strong environmental management and performance. However, the insignificant effect of financial performance suggests that agency theory may not fully explain carbon disclosure practices in this context, indicating that non-financial factors play a more dominant role in driving transparency.

Practically, this study provides important implications for companies and policymakers. For companies, the results highlight the importance of implementing environmental management systems (such as ISO 14001) and improving environmental performance (PROPER) to enhance transparency and credibility in carbon emission disclosure. For policymakers, particularly regulators, the findings suggest the need to strengthen environmental regulations and monitoring systems to encourage more comprehensive disclosure practices in the plantation sector.

This study is limited to plantation companies listed on the IDX during the period 2013–2022 and may not fully represent unlisted or newly established companies. In addition, financial performance is only measured using profitability indicators, which may not capture the overall financial condition of firms.

Further research is recommended to include a broader sample, longer observation periods, and additional financial indicators such as liquidity and solvency. Future studies should also consider external factors, including regulatory pressure and stakeholder demands, that may influence carbon emission disclosure.

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