

DO CARBON EMISSION DISCLOSURES ENHANCE FIRM VALUE? THE MODERATING ROLES OF EARNINGS MANAGEMENT AND GOOD CORPORATE GOVERNANCE

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ABSTRACT

This study examines the effect of carbon emission disclosures on firm value and investigates the moderating roles of earnings management and good corporate governance. Using a sample of high-profile firms listed on the Indonesian Stock Exchange over the 2020–2024 period, this study employs panel data regression with a Moderated Regression Analysis (MRA) approach. Carbon emission disclosure is measured using a disclosure index, firm value is proxied by Tobin's Q, earnings management is estimated using the conditional revenue model, and corporate governance is proxied by audit committee size. The findings reveal that carbon emission disclosures do not have a significant effect on firm value, indicating that environmental information has not yet become value-relevant in the Indonesian capital market. However, earnings management is found to positively moderate this relationship, suggesting that more stable and strategically managed financial reporting enhances the credibility of sustainability disclosures. In contrast, good corporate governance weakens the relationship, implying that increased transparency may expose environmental risks and compliance costs that lead to more cautious investor responses. This study contributes to the literature by demonstrating that the value relevance of carbon disclosures is conditional upon internal corporate mechanisms, particularly financial reporting behavior and governance structures. The results highlight that sustainability disclosures alone are insufficient to influence firm value without credible financial signals. The findings provide important implications for regulators and practitioners, emphasizing the need for standardized carbon reporting frameworks and better integration between sustainability and financial information to improve decision usefulness in capital markets.

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INTRODUCTION

Climate change has become a critical global challenge driven largely by industrial activities that increase greenhouse gas emissions, particularly carbon dioxide (CO₂) (IPCC, 2021). In response, corporate accountability

has expanded beyond financial reporting to include environmental disclosures, with carbon emission disclosure emerging as a strategic mechanism to communicate environmental performance and sustainability commitment. As investors increasingly incorporate environmental risks into their decision-making, the transparency and quality of such disclosures are expected to influence firm value by reducing information asymmetry and strengthening market confidence.

From a theoretical standpoint, carbon emission disclosure reduces information asymmetry and signals corporate transparency, which can enhance firm value. Prior studies generally document a positive association between environmental disclosure and firm value, as transparent reporting strengthens investor confidence and corporate reputation (Clarkson et al., 2013; Sari & Nugroho, 2020). However, the evidence remains inconclusive, particularly in emerging markets such as Indonesia, where disclosure practices are still evolving and may not fully reflect substantive environmental performance.

Indonesia provides a relevant context due to its commitment to the Paris Agreement and the Net Zero Emission (NZE) 2060 target, alongside regulatory developments such as POJK No. 51/POJK.03/2017 mandating sustainability reporting. Despite these initiatives, the level of carbon disclosure remains inconsistent across firms, raising concerns about whether such disclosures are perceived as credible by investors. This inconsistency highlights the importance of considering the quality of financial reporting as a conditioning factor.

Moreover, prior research has largely overlooked the conditional factors that may influence the effectiveness of carbon emission disclosures. In particular, earnings management and good corporate governance have not been sufficiently integrated into this relationship. Earnings management can alter the credibility of financial information, potentially strengthening or weakening the signal conveyed by environmental disclosures. Similarly, good corporate governance plays a critical role in ensuring the reliability and integrity of disclosed information, thereby affecting how the market interprets sustainability reporting.

Accordingly, this study addresses three key gaps. First, it examines the impact of carbon emission disclosure on firm value within the context of an emerging market characterized by evolving regulatory frameworks. Second, it investigates the moderating role of earnings management, distinguishing whether disclosure effectiveness depends on the quality of financial reporting. Third, it incorporates good corporate governance as a moderating mechanism to assess whether stronger oversight enhances the credibility and value relevance of carbon disclosures. Focusing on high-profile firms listed on the Indonesia Stock Exchange, industries characterized by high environmental impact and public visibility, this study aims to provide a more comprehensive understanding of how carbon emission disclosure, earnings management, and good corporate governance interact in shaping firm value within an emerging market context. By integrating these variables, this research addresses the gap in prior literature that has largely examined these relationships in isolation. Therefore, the study proposes:

H1: Carbon emission disclosures has a positive and significant effect on firm value

H2: Earnings management strengthens the relationship between carbon emission disclosures and firm value

H3: Good corporate governance strengthens the relationship between carbon emission disclosures and firm

value

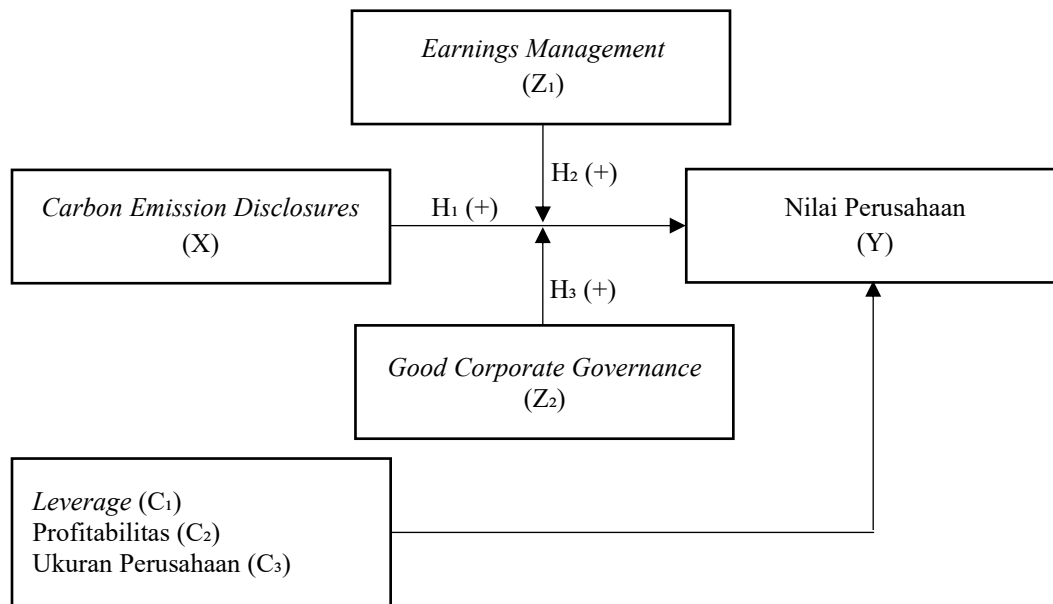


Figure 1. The Research Model
Source: Author, 2025

RESEARCH METHODS

The study employed a quantitative research approach within an explanatory research design framework. The study selected a sample of high-profile firms listed on Indonesia Stock Exchange between 2020 and 2024. The data for carbon emission disclosures is hand collected from stand-alone firm sustainability reports. Alternatively, data for firm value, earnings management, and good corporate governance were collected from annual reports. The initial sample of 95 firm-year observations was obtained from purposive sampling technique. However, after classical assumption testing, revealed the presence of multicollinearity among the independent variables. To address this issue, data treatment procedures were implemented, including variable transformation and the removal of outliers. Therefore, a final sample of 78 firm-year observations was obtained. To test the study's hypotheses, the study used the Multiple Regression Analysis (MRA), as shown in Equation:

$$FV_{it} = \beta_0 + \beta_1 CED_{it} + \beta_2 LEV_{it} + \beta_3 ROA_{it} + \beta_4 SIZE_{it} + \epsilon_{it}$$

$$FV_{it} = \beta_0 + \beta_1 CED_{it} + \beta_2 EM_{it} + \beta_3 GCG_{it} + \beta_4 CED * EM_{it} + \beta_5 CED * GCG_{it} + \beta_6 LEV_{it} + \beta_7 ROA_{it} + \beta_8 SIZE_{it} + \epsilon_{it}$$

Where:

- FV = Firm Value
- CED = Carbon Emission Disclosures
- EM = Earnings Management
- GCG = Good Corporate Governance
- LEV = Leverage
- ROA = Profitability
- SIZE = Firm Size

Firm value (FV) were identified as a dependent variable proxied by the Tobin's Q ratio. According to Sabatini and Sudana (2019), Tobin's Q is measured as the market value of a firm's assets (the market value of outstanding

shares plus the firms debt) divided by the replacement cost of the firm's assets. If the Tobin's Q ratio is less than 1, this means that the company's market value is lower than the replacement value of its assets. The market will view investment in the company as unattractive. Conversely, if the Tobin's Q ratio is greater than 1, the replacement value of the company's assets is lower than its market value, which will encourage new investment (Herawaty, 2008).

The independent variable were carbon emission disclosures (CED) constructed via content analysis of carbon disclosure checklist by Choi et al., (2013) reported in stand-alone firm sustainability reports. These carbon disclosure items are 18 further splits into five sub-themes: risks and opportunities of climate change; reporting of greenhouse gas (GHG) emissions; reporting of energy consumption; policies regarding GHG reduction; carbon disclosures accountability. Each item in the carbon emission disclosures was scored using a dichotomous scale: 1 if disclosed and 0 if not disclosed (Astari, 2020).

Earnings management (EM) which is a moderating variable proxied by the estimation of discretionary revenues from the Conditional Revenue Model by Stubben (2010). This model is employed due to its superior ability to detect revenue-based manipulation, which is widely considered one of the most prevalent forms of earnings management in contemporary financial reporting. Empirically, the CRM has been shown to outperform accrual-based models in detecting earnings manipulation, particularly in settings where revenue recognition is subject to managerial discretion (Stubben, 2010). Prior studies argue that accrual models often suffer from substantial measurement error and limited power in distinguishing between normal and opportunistic accruals (Dechow et al., 1995; Kothari et al., 2005). In contrast, the CRM reduces such bias by incorporating firm-specific economic characteristics that influence the revenue-receivable relationship, thereby improving the reliability of earnings management estimation. Furthermore, the use of CRM is particularly relevant in the context of emerging markets, where financial reporting quality may vary and earnings management practices are more likely to occur through operational accounts such as revenue. This approach ensures a more precise measurement of managerial opportunism, which is essential for examining its moderating role in the relationship between carbon emission disclosure and firm value. Therefore, the following Equations used:

$$\Delta AR_{it} = \alpha + \beta_1 \Delta R_{it} + \beta_2 \Delta R_{it} \times SIZE_{it} + \beta_3 \Delta R_{it} \times AGE_{it} + \beta_4 \Delta R_{it} \times AGE_SQ_{it} + \beta_5 \Delta R_{it} \times GRR_P_{it} + \beta_6 \Delta R_{it} \times GRR_N_{it} + \beta_7 \Delta R_{it} \times GRM_{it} + \beta_8 \Delta R_{it} \times GRM_SQ_{it} + \varepsilon_{it}$$

Good corporate governance (GCG) which is a moderating variable proxied by the audit committee, with a specific focus on audit committee size. While GCG is conceptually multidimensional, the audit committee is widely regarded as a core internal governance mechanism that directly influences the integrity of financial reporting. This study operationalizes GCG through audit committee size to capture the monitoring capacity of the audit committee. Audit committee size is measured as the total number of members serving on the audit committee in a given fiscal year. A larger audit committee is generally associated with enhanced monitoring effectiveness due to a broader pool of expertise, experience, and oversight capacity. From the perspective of Agency Theory, increasing the number of audit committee members strengthens the firm's ability to mitigate agency conflicts by improving supervision over managerial reporting behavior. A well-functioning audit committee can ensure that ESG reports are accurate, complete, and aligned with best practices, which in turn enhances investor trust and firm valuation (Prayogo et al., 2024). Empirical evidence supports the role of audit committee size in enhancing financial reporting quality. In this regard, audit committee size serves as a relevant proxy for governance effectiveness, especially in research contexts that examine the credibility of financial disclosures.

Finally, this study included several control variables like financial leverage, firm profitability, and firm size. Leverage is proxied by the debt-to-assets ratio of the firm, profitability is measured through return on assets ratio, and firm size proxied by the natural logarithm of the value of total assets of the firm. As documented by prior literature, these variables significantly influence firm value (Rahmanita, 2020; Kurnia et al., 2020).

RESULTS AND DISCUSSION

Descriptive Statistics

Table 1. Descriptive Statistics

Variable	Obs	Min	Max	Mean	SD
CED	78	0,500	0,944	0,844	0,101
FV	78	0,573	14,415	1,950	2,294
EM	78	-0,698	-0,550	-0,650	0,027
GCG	78	2,000	6,000	3,141	0,639
CED*EM	78	-0,643	-0,328	-0,548	0,068
CED*GCG	78	1,222	5,667	2,660	0,669
LEV	78	0,093	0,866	0,397	0,187
ROA	78	0,001	0,454	0,094	0,086
SIZE	78	30,022	33,790	31,385	0,918

Source: Processing Results with SPSS, 30

Table 1 depicts a summary of the descriptive statistics of the study. The independent variable carbon emission disclosures average value is approximately 84 per cent, which represents a higher level of carbon emission disclosures by Indonesian high-profile firms. The average firm value (FV) value is 1,95, with a standard deviation of 2,294. The average value of 1,95 indicates that, in general, the company has relatively good growth prospects, as evidenced by a Tobin's Q ratio greater than 1, which reflects that the company's market value is higher than its book value.

The average earnings management (EM) value is -0,65, and the standard deviation is 0,027. The average value of good corporate governance (GCG) is 3,141, with a standard deviation of 0,639. The average leverage value is 0,397, with a standard deviation of 0,187. The average ROA value is 0,094, and the standard deviation is 0,086. The average value of SIZE is 31,385, with a standard deviation of 0,918.

One Sample Kolmogorov-Smirnov Test

Table 2. One Sample Kolmogorov-Smirnov Test

	Model 1	Model 2
Asymp. Sig.	0,067	0,087

Source: Processing Results with SPSS, 30

Table 2 shows that both regression models exhibit a normal distribution. This is evident from the Asymp. Sig. (2-tailed) values of 0.067 and 0.087. These values are greater than 0.05. Therefore, it can be concluded that the data used in this study are normally distributed.

Glejser Test

Table 3. Glejser Test

	Model 1	Model 2
	Sig.	Sig.
CED	0,714	0,570
EM		0,067
GCG		0,308
CED*EM		0,265

CED*GCG		0,141
LEV	0,230	0,332
ROA	0,509	0,099
SIZE	0,270	0,207

Source: Processing Results with SPSS, 30

Table 3 shows that all independent variables have significance values greater than 0.05. This indicates that the regression model does not suffer from heteroscedasticity, making it suitable for further hypothesis testing.

F Test

Table 4. F Test

	Model 1	Model 2
F	5,407	4,542
Sig.	0,001	0,001

Source: Processing Results with SPSS, 30

It is evident that both models are valid and suitable for explaining the effects of carbon emission disclosures, earnings management, good corporate governance, and control variables on firm value. This is indicated by the significance level of both models, which is 0,001. Since this value is less than 0,05, the analysis can proceed to subsequent hypothesis testing.

Hypothesis Testing

Table 5. Moderated Regression Analysis

	Model 1			Model 2			Description
	B	t	Sig.	B	t	Sig.	
CED	-0,110	-0,271	0,787	0,048	0,112	0,911	Not Proven
EM				-2,809	-1,538	0,129	
GCG				0,130	1,599	0,114	
CED*EM				49,835	2,430	0,018**	Proven
CED*GCG				-1,778	-2,439	0,017	Not Proven
LEV	0,314	3,138	0,002**	0,295	3,087	0,003**	
ROA	0,050	1,008	0,317	0,074	1,516	0,134	
SIZE	-5,716	-3,167	0,002	-4,870	-2,706	0,009	
Constant	20,561	3,308	0,001	15,488	2,391	0,020	

Source: Processing Results with SPSS, 30

The Effect of Carbon Emission Disclosures on Firm Value

The empirical results indicate that carbon emission disclosures do not have a significant effect on firm value, leading to the rejection of H1. Although the descriptive statistics show a relatively high level of disclosure (mean = 0.844), this finding suggests that such disclosures have not yet translated into improved market valuation. One plausible explanation lies in the cost perception mechanism, where investors associate environmental initiatives, such as investments in low-carbon technologies and sustainability programs with increased short-term operational costs

rather than immediate economic benefits. Furthermore, the insignificance of the relationship can be attributed to disclosure homogeneity among firms. When most companies disclose carbon-related information at a similar level, the informational value of such disclosures diminishes. As a result, carbon emission disclosures fail to serve as a differentiating signal of firm quality in the capital market. This condition weakens the relevance of disclosure as a value-relevant signal, particularly in markets where environmental information is not yet fully integrated into investment decision-making.

In addition, the findings indicate that carbon emission disclosures are still predominantly symbolic rather than substantive, focusing more on commitments than on measurable environmental performance outcomes. Consequently, investors tend to prioritize financial indicators that are directly linked to profitability and cash flow generation, limiting the impact of environmental disclosures on firm value. These findings are consistent with prior studies by Soetardjo and Nurmawati (2024), Afnilia and Astuti (2023), and Asyifa and Burhany (2022), which also report an insignificant relationship between carbon disclosure and firm value. However, this study contributes by highlighting disclosure homogeneity and symbolic reporting as key explanatory mechanisms, thereby extending previous literature that largely attributes insignificance solely to low investor awareness.

The Moderating Role of Earnings Management

The results show that earnings management positively and significantly moderates the relationship between carbon emission disclosures and firm value, supporting H2. This indicates that earnings management strengthens the influence of carbon disclosures on market valuation. From an agency perspective, managers may engage in earnings management to present stable and favorable financial performance, thereby enhancing investor confidence when environmental disclosures are made. This finding suggests that earnings management, within certain limits, may function not purely as opportunistic behavior but as a strategic reporting mechanism. By maintaining earnings stability, firms are able to align environmental disclosures with perceived financial strength, reducing investor skepticism regarding the economic implications of sustainability initiatives. As a result, carbon emission disclosures become more credible and positively interpreted by the market.

From a legitimacy perspective, companies utilize both financial reporting and environmental disclosures to maintain social acceptance. Earnings management, in this context, supports the effectiveness of carbon disclosures as a reputational tool, reinforcing the firm's image as both environmentally responsible and financially sound. These findings are in line with Abbas et al. (2023), who argue that firms with higher earnings management tend to use carbon disclosure as a legitimization strategy. However, this study offers a more nuanced contribution by demonstrating that earnings management not only coexists with disclosure practices but also enhances their value relevance, indicating a complementary rather than merely symbolic relationship.

The Moderating Role of Good Corporate Governance

The findings reveal that good corporate governance negatively moderates the relationship between carbon emission disclosures and firm value, leading to the rejection of H3. This suggests that stronger governance mechanisms do not necessarily amplify the positive impact of environmental disclosures; instead, they may weaken it under certain conditions. A key explanation lies in the role of governance in promoting greater transparency. While transparency is normatively desirable, it may also expose detailed information regarding environmental risks, compliance costs, and operational challenges associated with carbon management. Consequently, the market may respond more cautiously, particularly in the short term, as increased transparency reduces information asymmetry but simultaneously reveals potential financial burdens.

This indicates that governance mechanisms, such as the audit committee enhance disclosure credibility but also increase the visibility of environmental liabilities, which may negatively influence investor perception. In this sense, governance acts as a double-edged sword: it strengthens accountability while simultaneously amplifying the market's awareness of risk. These findings are consistent with Blesia et al. (2023), Atmadya (2019), Prayogo et al., (2024), Luo et al., (2012), and Clarkson et al., (2011), which highlight that carbon disclosure transparency can reveal economic consequences of environmental commitments. However, this study contributes by demonstrating that

governance not only promotes transparency but also alters the market interpretation of disclosure, thereby weakening its impact on firm value in the short run.

CONCLUSIONS

This study provides three main findings. First, carbon emission disclosures are not value-relevant in the Indonesian capital market, indicating that environmental information has not yet been fully incorporated into investor decision-making. Second, earnings management strengthens the relationship between carbon emission disclosures and firm value, suggesting that financial reporting plays a complementary role in enhancing the credibility of sustainability information. Third, good corporate governance weakens this relationship, implying that increased transparency may expose environmental risks and costs that lead to more cautious market responses. This study contributes to the literature in several ways. It extends prior research by demonstrating that the value relevance of carbon disclosure is contingent upon internal corporate mechanisms, particularly financial reporting behavior and governance structures. Unlike prior studies that treat disclosure effects as direct, this study highlights the conditional nature of disclosure effectiveness, thereby offering a more nuanced understanding of how sustainability information interacts with firm-level characteristics.

From a practical perspective, the findings imply that companies should not rely solely on the extent of disclosure but also ensure the credibility and integration of sustainability information with financial performance. For regulators, the results underline the importance of developing standardized and decision-useful carbon reporting frameworks to enhance comparability and relevance in capital markets. Despite its contributions, this study has several limitations. First, the measurement of good corporate governance relies on a single proxy (audit committee size), which may not fully capture the multidimensional nature of governance mechanisms. Second, the sample is limited to high-profile firms within a specific period, potentially restricting generalizability. Third, the study focuses on disclosure quantity rather than the qualitative depth of carbon information, which may influence investor perception differently. Future research is encouraged to incorporate composite governance indices, explore qualitative dimensions of carbon disclosure, and examine cross-country settings to assess institutional differences. Additionally, further studies may investigate the role of external assurance, ESG ratings, or investor sophistication in strengthening the value relevance of sustainability disclosures.

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