

The Role of Carbon Emission Disclosure as an Intervening Variable of The Influence of Profitability and Institutional Ownership on Company Value in Mining Companies in the Coal Subsector Listed on the Idx for the 2021-2024 Period

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ABSTRACT

This study examines the role of Carbon Emission Disclosure as an intervening variable in the effect of Profitability and Institutional Ownership on Firm Value in coal mining subsector companies listed on the IDX for the period 2021-2024. A sample of 15 companies was selected through purposive sampling. Multiple linear regression and path analysis were employed using SPSS 26. The findings indicate that Profitability and Institutional Ownership partially exert a negative and insignificant effect on Carbon Emission Disclosure, yet simultaneously exert a significant effect. Both variables partially and simultaneously exert a positive and significant effect on Firm Value. Carbon Emission Disclosure negatively and significantly affects Firm Value but fails to mediate the effect of Profitability and Institutional Ownership on Firm Value. The R^2 of 38.2% explains Firm Value variation, with 61.8% attributed to other factors.

INTRODUCTION

Global climate change has emerged as one of the most pressing and consequential challenges of the twenty-first century, demanding urgent attention from governments, industries, and civil society alike. According to data published by NASA (2024), the global annual average surface air temperature has been on a continuous upward trajectory, producing profound and far-reaching impacts on climate systems around the world. Indonesia, which ranks sixth among the largest carbon-emitting nations globally (Global Carbon Atlas, 2023), faces a particularly serious challenge in striking an effective balance between sustaining its economic growth ambitions and fulfilling its environmental responsibilities on both the national and international stage.

The coal mining subsector represents one of the primary contributors to carbon emissions within Indonesia, underscoring the sector's significant environmental footprint and the urgency of addressing its ecological impact. The export value of coal reached USD 34.7 billion in 2023 (BPS, 2024), reflecting the continued economic significance of this commodity to the national economy and its role as a major source of foreign exchange revenue. This economic reality has simultaneously heightened the pressure on coal mining companies to give greater attention to Carbon Emission Disclosure (CED) as a concrete manifestation of their commitment to environmental transparency and accountability toward their various stakeholder groups. The combination of substantial economic contributions and considerable environmental consequences creates a complex and persistent dilemma for coal mining companies, as they are compelled to navigate the inherent tension between maximizing profitability and fulfilling their broader responsibilities toward environmental sustainability and the long-term well-being of the communities and ecosystems affected by their operations.

Firm value serves as a critical indicator that reflects the market's overall perception of a company's current performance and future growth prospects, making it a central concern for both corporate management and external stakeholders. Among the fundamental factors that have been identified as influential determinants of firm value, Profitability and Institutional Ownership stand out as particularly significant variables worthy of in-depth examination. High profitability is generally regarded as transmitting a positive signal to investors and market participants, conveying that the company is well-managed and capable of generating sustainable returns, which in turn tends to drive upward movements in stock price and overall firm valuation. Institutional Ownership, on the other hand, functions as an effective monitoring mechanism within the corporate governance framework, playing a crucial role in mitigating agency conflicts that arise from the divergence of interests between managers and shareholders, thereby contributing to more disciplined and value-oriented managerial decision-making.

Carbon Emission Disclosure is positioned in this study as an intervening variable that mediates the relationship between Profitability and Institutional Ownership on one hand, and Firm Value on the other. The inconsistency observed across the findings of prior studies suggests the presence of other

variables that may mediate the relationship between these predictors and firm value, warranting further investigation. For instance, Irawan et al. (2022) found that Profitability exerts a positive and significant influence on firm value, while Muhammad et al. (2021) arrived at a contrasting conclusion, reporting a negative relationship between the two variables. Similarly, Simbolon et al. (2023) demonstrated a positive influence of Institutional Ownership on firm value, whereas Mastuti and Prastiwi (2021) found no significant relationship between these variables, further highlighting the need for a mediating variable to reconcile these conflicting empirical results.

This study aims to examine and analyze the role of Carbon Emission Disclosure as an intervening variable that mediates the relationship between Profitability and Institutional Ownership on Firm Value among companies operating within the coal mining subsector that are officially listed on the Indonesia Stock Exchange for the observation period spanning from 2021 to 2024. By incorporating Carbon Emission Disclosure as a mediating variable, this study seeks to provide a more comprehensive and nuanced understanding of the indirect pathways through which Profitability and Institutional Ownership may influence Firm Value, beyond the direct relationships that have been explored in the existing body of literature. The coal mining subsector was specifically selected as the research context given its significant contribution to carbon emissions and the growing relevance of environmental disclosure practices within this industry, making it a particularly appropriate and meaningful setting for investigating the interplay between financial performance, corporate governance mechanisms, environmental transparency, and market valuation.

LITERATURE REVIEW

Theoretical Foundations

Signaling Theory

Signaling Theory was originally introduced and developed by Spence (1973), who argued that parties possessing superior information, in this context referring to company management, will actively transmit signals to parties with comparatively limited access to information, namely investors and other external stakeholders. This information asymmetry between internal management and outside parties creates a need for credible and verifiable signals that can effectively communicate the true condition and performance of the company to the broader market. Companies that demonstrate strong and consistent performance are motivated to convey positive signals through the proactive disclosure of favorable information, thereby differentiating themselves from underperforming companies and establishing a more favorable perception among investors and market participants. The deliberate transmission of such positive signals is intended to reduce uncertainty, build investor confidence, and ultimately contribute to an improvement in the company's market valuation. In the context of this study, Signaling Theory is employed as a theoretical foundation to explain how high profitability can function as a powerful and credible positive signal to the market, conveying that the company is financially sound, well-managed, and capable of generating sustainable returns.

Furthermore, this theory also provides a basis for understanding how strong profitability can motivate companies to engage in more comprehensive and transparent Carbon Emission Disclosure practices, as such disclosures serve as an additional positive signal of the company's commitment to environmental responsibility and sustainable business conduct, which in turn is expected to enhance the company's overall firm value in the eyes of environmentally conscious investors and stakeholders..

Agency Theory

Agency Theory was originally formulated and developed by Jensen and Meckling (1976), who provided a foundational explanation of the nature of the relationship between the principal, represented by the shareholders as the owners of the company, and the agent, represented by the managers who are entrusted with the responsibility of running the company's operations on behalf of the shareholders. The inherent divergence of interests between these two parties gives rise to what is commonly referred to as agency conflicts, which in turn generate agency costs that can be broadly categorized into three distinct components, namely monitoring costs, which are incurred by principals in their efforts to oversee and evaluate the behavior and decisions of agents; bonding costs, which are borne by agents to demonstrate their commitment to acting in the best interests of the principals; and residual loss, which represents the reduction in welfare experienced by the principal as a result of the inevitable divergence between the agent's decisions and those that would have maximized the principal's utility. These agency costs can significantly undermine the efficiency of corporate decision-making and erode overall firm value if left unaddressed. In the context of this study, Institutional Ownership is positioned as an effective corporate governance mechanism capable of mitigating agency conflicts by providing a more rigorous and consistent form of external monitoring over managerial behavior and decision-making processes. The presence of institutional investors, who typically possess greater financial expertise, resources, and motivation to actively monitor management, is expected to encourage managers to enhance their level of transparency and accountability through more comprehensive Carbon Emission Disclosure practices, thereby demonstrating responsible environmental stewardship and reinforcing stakeholder confidence in the company's long-term commitment to sustainable and ethical business conduct.

Company Value

Firm value represents a critical investment consideration for investors, as it serves as tangible evidence of a company's overall performance and operational achievements that can meaningfully influence investor perceptions and shape their investment decisions (Widati, 2023). A high firm value is generally interpreted as a positive signal that the company is well-managed, financially sound, and capable of delivering sustainable returns to its shareholders over the long term, making it a key benchmark for assessing the attractiveness of a company as an investment destination. Conversely, a declining firm value may raise concerns among investors regarding the company's future prospects and its ability to generate adequate returns on their invested capital. In the context of this study, firm value is measured using the

Tobin's Q ratio as adopted from Pasaribu et al. (2024), which is widely recognized in financial research as a comprehensive and reliable indicator of firm value given its ability to capture the relationship between the market value of a company and the replacement cost of its underlying assets. A Tobin's Q value exceeding one generally indicates that the market assigns a premium valuation to the company above the book value of its assets, reflecting positive investor sentiment and confidence in the company's growth potential, while a value below one may suggest that the market perceives the company as undervalued or facing challenges in generating returns commensurate with its asset base. Firm value in this study is calculated using the following formula:

$$\text{Tobin's } Q = (\text{EMV} + \text{Total Liabilities}) / \text{Total Assets}$$

Profitability

Profitability refers to the capacity of a company to generate earnings from its core business activities and operational endeavors, serving as one of the most fundamental indicators of a company's financial health and managerial effectiveness. Companies that demonstrate high levels of profitability are generally more attractive to investors, as strong earnings performance signals that the company is capable of efficiently utilizing its available resources to create value and deliver satisfactory returns on invested capital. High profitability also enhances a company's ability to reinvest in its operations, expand its business activities, and fulfill its obligations to various stakeholders, all of which contribute to a more positive market perception and a stronger competitive position within the industry. Furthermore, from the perspective of Signaling Theory, consistently high profitability serves as a credible positive signal to the market, conveying that the company is well-managed and financially resilient, which in turn tends to attract greater investor interest and contribute to an appreciation in firm value over time. In the context of this study, Profitability is measured using the Return on Assets (ROA) ratio, which captures the relationship between a company's net income and its total assets, thereby providing a clear and direct measure of how efficiently the company is deploying its asset base to generate profitable returns for its shareholders. The Return on Assets ratio is calculated using the following formula:

$$\text{ROA} = \text{Net Profit} / \text{Total Assets} \times 100\%$$

Institutional Ownership

Institutional Ownership refers to the involvement of external parties, encompassing a broad range of financial entities such as banks, financial institutions, pension funds, insurance companies, and investment firms that channel and allocate their capital into a particular company as part of their investment portfolios (Ogi & Setyarini, 2024). This form of ownership is considered particularly significant within the corporate governance framework because institutional investors, by virtue of their financial expertise, substantial resource base, and professional investment mandates, are generally better equipped and more motivated to conduct rigorous and systematic oversight of managerial behavior and corporate decision-making processes compared to individual retail investors. Institutional Ownership therefore functions as a monitoring agent that carries out optimal and continuous supervision over the

actions and strategies of company management, thereby serving as an effective mechanism for reducing agency conflicts and ensuring that managerial decisions remain aligned with the broader interests of shareholders and other stakeholders. Furthermore, a higher proportion of institutional ownership is generally associated with more efficient utilization of company assets, as institutional investors tend to exert greater pressure on management to optimize operational performance, minimize wasteful expenditures, and pursue strategies that maximize long-term shareholder value. The disciplinary influence of institutional investors can thus contribute meaningfully to improvements in both financial performance and corporate governance quality within the companies in which they hold significant stakes. The formula used to calculate Institutional Ownership in this study, as adopted from Cristofel (2021), is as follows:

$$KI = \text{Number of Shares Owned by the Institution} / \text{Total Outstanding Shares} \times 100\%$$

Carbon Emission Disclosure (CED)

Carbon Emission Disclosure refers to the voluntary reporting practice undertaken by companies within their annual reports to provide transparent and comprehensive information regarding the actions and initiatives they have adopted in their efforts to reduce carbon emissions and mitigate their overall environmental impact (Imansari et al., 2024). As a form of voluntary environmental disclosure, Carbon Emission Disclosure reflects a company's proactive commitment to environmental accountability and its recognition of the growing importance of addressing climate-related risks and responsibilities as an integral component of sustainable business conduct. This type of disclosure has gained increasing prominence among investors, regulators, and other stakeholders who are seeking greater transparency regarding the environmental performance and carbon management strategies of companies operating in carbon-intensive industries. By voluntarily disclosing carbon-related information, companies are able to demonstrate their environmental stewardship, strengthen their credibility among environmentally conscious investors, and contribute to broader national and global efforts to combat climate change. In the context of this study, Carbon Emission Disclosure is measured using a checklist instrument consisting of 18 items developed by Choi et al. (2013), which provides a structured and comprehensive framework for assessing the extent of a company's carbon-related disclosures. This checklist encompasses five primary categories of disclosure, namely climate change, greenhouse gas emissions, energy consumption, emission reduction initiatives, and carbon emission accountability, each of which captures a distinct dimension of the company's efforts to transparently communicate its environmental performance and carbon management practices to its stakeholders.

$$CED = \text{Number of Items Disclosed} / \text{Maximum Number of Items} \times 100\%$$

Frame of Mind

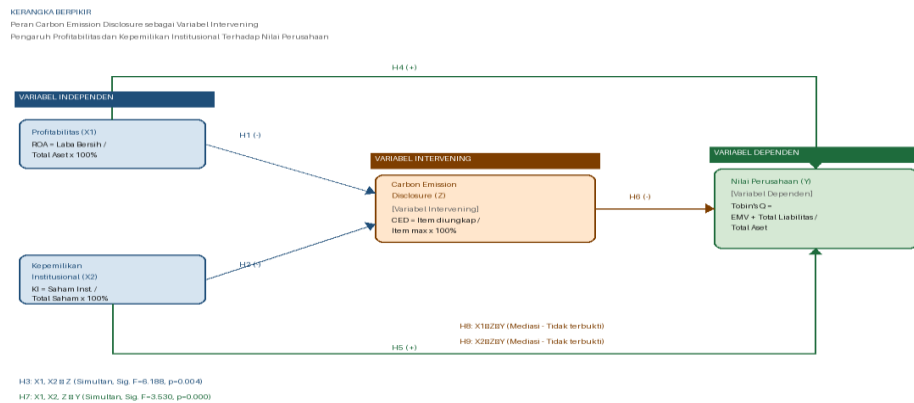


Figure 1. Research Thinking Framework

Research Hypotheses

Based on the above framework, the hypothesis of this study is formulated as follows:

- H₁: Profitability has a positive and significant effect on Carbon Emission Disclosure.
- H₂: Institutional Ownership has a positive and significant effect on Carbon Emission Disclosure.
- H₃: Profitability and Institutional Ownership simultaneously affect Carbon Emission Disclosure.
- H₄: Profitability has a positive and significant effect on the Company's Value.
- H₅: Institutional Ownership has a positive and significant effect on Company Value.
- H₆: Carbon Emission Disclosure has a positive and significant effect on the Company's Value.
- H₇: Profitability, Institutional Ownership, and Carbon Emission Disclosure simultaneously affect the Company's Value.
- H₈: Carbon Emission Disclosure is able to mediate the influence of Profitability on Company Value.
- H₉: Carbon Emission Disclosure is able to mediate the influence of Institutional Ownership on Company Value.

RESEARCH METHODS

This study adopts a quantitative research design with a causal approach, aimed at examining and identifying the cause-and-effect relationships among the variables under investigation. The research object consists of companies operating within the coal mining subsector that are officially listed on the Indonesia Stock Exchange (IDX) for the observation period spanning from 2021 to 2024. All data required for this study were obtained from the official website of the Indonesia Stock Exchange at www.idx.co.id as well as from the annual reports published individually by each of the sampled companies, ensuring that the information collected is accurate, verifiable, and consistent with publicly available corporate disclosures.

The research population comprises 34 coal mining subsector companies that were listed on the Indonesia Stock Exchange as of December 2024. The sample selection process was carried out using the purposive sampling method, whereby companies were included in the final sample only if they satisfied a set of specific predetermined criteria established by the researcher. These criteria are as follows: first, the company must have been consistently and continuously listed on the Indonesia Stock Exchange throughout the entire observation period from 2021 to 2024 without any interruption; second, the company must have published complete and fully audited annual reports for each year within the observation period; third, the company must possess complete and available data for all research variables included in the study; fourth, the company must have disclosed carbon emission-related information within its annual reports; and fifth, the company must have recorded positive earnings throughout the observation period. Based on the application of these five criteria to the overall population, a total of 15 companies were identified as meeting all of the required conditions and were therefore selected as the final research sample, resulting in a total of 60 observations derived from the combination of 15 companies observed across 4 consecutive years of the study period.

Variable Operational Definitions

Table 1. Variable Operational Definition

Variabel	Operational Definition	Measurement	Scale
Company Value (Y)	Investor perception of a company's success as it relates to stock price	Tobin's Q = (EMV + Total Liabilities) / Total Assets	Ratio
Profitability (X ₁)	The company's ability to generate profits on its assets	ROA = Net Profit / Total Assets x 100%	Ratio
Institutional Ownership (X ₂)	The proportion of shareholding by institutions to total outstanding shares	KI = Institutional Shares / Total Outstanding Shares x 100%	Ratio
Carbon Emission Disclosure (Z)	Voluntary disclosure of companies related to carbon emission reduction measures in annual report	CED = Item Revealed / Maximum Item x 100%	Ratio

Source: Data processed (2026)

Data Analysis Techniques

The data analysis techniques employed in this study encompass five sequential and complementary stages of statistical analysis. First, descriptive statistics are conducted to provide a preliminary overview of the central tendency, dispersion, and distributional characteristics of each variable included in the study, offering a foundational understanding of the dataset prior to inferential analysis. Second, a series of Classical Assumption Tests are performed to verify that the data satisfies the prerequisites required for valid multiple linear regression analysis, including the normality test to assess whether the residuals follow a normal distribution, the multicollinearity test to detect the presence of

high correlations among independent variables, the autocorrelation test to identify any correlation among residuals across consecutive observations, and the heteroscedasticity test to determine whether the variance of the residuals remains constant across all levels of the independent variables. Third, Multiple Linear Regression Analysis is conducted to examine the direction and magnitude of the influence exerted by each independent variable on the dependent variables within the research model. Fourth, Hypothesis Testing is carried out through three complementary procedures, namely the partial t-test to assess the individual significance of each independent variable, the simultaneous F-test to evaluate the collective significance of all independent variables, and the Coefficient of Determination test (R^2) to measure the proportion of variation in the dependent variable that is collectively explained by the independent variables included in the model. Fifth, Path Analysis is employed in conjunction with the Sobel Test to examine and verify the mediating role of Carbon Emission Disclosure in the relationship between the independent variables and Firm Value, thereby providing empirical evidence regarding the significance of the indirect pathways within the proposed research framework. All of the aforementioned analytical procedures were carried out using SPSS version 26 statistical software.

RESULTS AND DISCUSSION

Statistics Descriptive

Variabel	N	Min	Max	Mean	
Company Value (Tobin's Q)	60	0,36	3,11	1,2877	0,58694
Profitability (ROA)	60	0,01	0,62	0,2156	0,17553
Institutional Ownership	60	0,14	0,98	0,6088	0,20471
Carbon Emission Disclosure	60	11,11	66,67	38,2407	14,61265

Source: SPSS output, data processed (2026)

Classical Assumption Test

Normality Test

The normality test was conducted using the One-Sample Kolmogorov-Smirnov Test, which is one of the most widely applied statistical procedures for assessing whether the residuals of a regression model conform to a normal distribution. The results of this test yielded an Asymptotic Significance (2-tailed) value of 0.200, which substantially exceeds the predetermined significance threshold of 0.05. Based on this finding, it can be conclusively determined that the residual data generated by the regression model follows a normal distribution, thereby confirming that the normality assumption, which constitutes one of the fundamental prerequisites for the valid application of multiple linear regression analysis, has been satisfactorily fulfilled. The

fulfillment of this assumption provides assurance that the parameter estimates produced by the regression model are unbiased and reliable, and that the subsequent hypothesis testing procedures conducted in this study will yield statistically valid and interpretable results. This outcome therefore supports the continuation of the analytical process to the subsequent stages of classical assumption testing and inferential statistical analysis within the research framework employed in this study.

Normality Test Results (Kolmogorov-Smirnov)

Remarks	Unstandardized Residual
N	60
Normal Parameters - Mean	0,0000000
Normal Parameters - Std. Deviation	0,46155485
Test Statistic	0,101
Asymp. Sig. (2-tailed)	0,200 (Normal)

Source: SPSS output, data processed (2026)

Multicollinearity Test

The multicollinearity test was conducted using the Tolerance value and Variance Inflation Factor (VIF) as the primary diagnostic indicators for detecting the presence of harmful correlations among the independent variables included in the regression model. Multicollinearity is considered a potential problem in multiple regression analysis when two or more independent variables are highly correlated with one another, as this condition can distort the estimated regression coefficients and undermine the reliability and interpretability of the model's results. The findings of the multicollinearity test reveal that all independent variables incorporated in the regression model possess Tolerance values that exceed the minimum acceptable threshold of 0.10, while simultaneously demonstrating VIF values that fall below the maximum permissible threshold of 10. Since all variables satisfy both of these diagnostic criteria, it can be conclusively determined that no multicollinearity problem exists among the independent variables within the regression model constructed in this study. This outcome confirms that each independent variable contributes unique and non-redundant information to the model, ensuring that the estimated regression coefficients accurately and reliably reflect the individual influence of each predictor variable on the dependent variable without being distorted by overlapping or collinear relationships among the independent variables. The fulfillment of the multicollinearity assumption therefore provides further validation of the integrity and reliability of the regression model employed in this study.

Multicollinearity Test Results

Variabel	Tolerance	LIVE
Profitability	0,960	1,042
Institutional Ownership	0,796	1,257
Carbon Emission Disclosure	0,822	1,217

Source: SPSS output, data processed (2026)

Autocorrelation Test

The autocorrelation test was conducted using the Durbin-Watson statistic, which is a widely recognized diagnostic tool for detecting the presence of serial correlation among the residuals of a regression model across consecutive observations. The existence of autocorrelation in a regression model can compromise the efficiency of the estimated coefficients and invalidate the results of hypothesis testing, making it essential to verify that this assumption is adequately satisfied prior to drawing conclusions from the regression analysis. The results of the autocorrelation test indicate that Model 1 produced a Durbin-Watson statistic of 1.674, while Model 2 yielded a Durbin-Watson statistic of 2.089. Both of these values fall within the acceptable range defined by the upper bound of the Durbin-Watson table (d_U) and the value of 4 minus d_U ($4-d_U$), which represents the region in which the null hypothesis of no autocorrelation cannot be rejected. Since the Durbin-Watson statistics for both models reside within this acceptable range, it can be conclusively determined that no autocorrelation problem exists in either of the regression models constructed in this study. This finding confirms that the residuals are independent of one another across consecutive observations, thereby satisfying one of the fundamental classical assumptions required for the valid application of multiple linear regression analysis and further reinforcing the overall integrity and reliability of the regression models employed in this research.

Autocorrelation Test Results (Durbin-Watson)

Model	Durbin-Watson	Conclusion
Model 1 ($X \rightarrow \text{CED}$)	1,674	No Autocorrelation
Model 2 ($X, Z \rightarrow \text{NP}$)	2,089	No Autocorrelation

Source: SPSS output, data processed (2026)

Heteroscedasticity Test

The heteroscedasticity test was performed using a Scatterplot graph. The results show that the data points are randomly spread above and below the number 0 on the Y axis, so there is no heteroscedasticity problem.

Analysis of the Regresi Linier Berganda

Model 1 Regression Results (Dependent Variable: Carbon Emission Disclosure)

Variabel	Koef. B	Beta	Remarks
(Constant)	55,893	-	
Profitability (X_1)	-0,656	-0,008	Insignificant
Institutional Ownership (X_2)	-28,543	-0,421	signifikan

Model 1 regression equation: $\text{CED} = 56,665 - 0.656 \text{ LONG} - 30,033 \text{ KI} + \varepsilon$

Model 2 Regression Results (Dependent Variable: Company Value)

Variabel	Koef. B	Beta	Remarks
(Constant)	0,638	-	

Variabel	Koef. B	Beta	Remarks
Profitability (X_1)	1,292	0,386	signifikan
Institutional Ownership (X_2)	0,960	0,335	signifikan
Carbon Emission Disclosure (Z)	-0,006	-0,139	signifikan

Model 2 regression equation: $NP = 0.638 + 1.292 \text{ LONG} + 0.960 \text{ KI} - 0.006 \text{ CED} + \varepsilon$
Partial Test (t-test)

Model 1 Partial Test Results (Dependent Variable: CED)

Variabel	t-count	Say.	Remarks
(Constant)	10,498	0,000	
Profitability (X_1)	-0,064	0,949	Insignificant
Institutional Ownership (X_2)	-3,434	0,001	signifikan

Source: SPSS output, data processed (2026)

Partial Test Results of Model 2 (Dependent Variable: Company Value)

Variabel	t-count	Say.	Remarks
(Constant)	1,936	0,058	
Profitability (X_1)	3,602	0,001	signifikan
Institutional Ownership (X_2)	2,843	0,006	signifikan
Carbon Emission Disclosure (Z)	-1,199	0,036	signifikan

Source: SPSS output, data processed (2026)

Simultaneous Test (F Test)

Table 8. Simultaneous Test Results (ANOVA)

Model	F-count	Say.	Conclusion
Model 1: $X_1, X_2 \rightarrow \text{CED}$	6,188	0,004	Signifikan
Model 2: $X_1, X_2, Z \rightarrow \text{NP}$	3,530	0,000	Signifikan

Source: SPSS output, data processed (2026)

Determination Coefficient Test (R^2)

Table 9. Determination Coefficient Test Results

Model	R	R Square	Interpretasi
Model 1 (CED)	0,422	0,178 (17,8%)	17.8% of CED variations are explained X_1 and X_2 ; the remaining 82.2% of other factors
Model 2 (Company Value)	0,399	0,382 (38,2%)	38.2% variation in Company Value is explained by X_1 , X_2 , and Z; the remaining 61.8% of other factors

Source: SPSS output, data processed (2026)

Path Analysis and Sobel Test

The path analysis was conducted to test the role of Carbon Emission Disclosure as an intervening variable between Profitability and Institutional Ownership on Company Value.

Table 10. Path Analysis Results - Direct and Indirect Impacts

Variable Paths	Direct Influence	Indirect Influence	Sobel value (z)	Ket.
$X_1 \rightarrow NP$ (H_4)	0,386	-	-	Live
$X_2 \rightarrow NP$ (H_5)	0,335	-	-	Live
With $\rightarrow NP$ (H_6)	-0,139	-	-	Live
$X_1 \rightarrow Z \rightarrow NP$ (H_8)	0,386	$(-0.008) \times (-0.139) = 0.001112$	0,000784	No Mediation
$X_2 \rightarrow Z \rightarrow NP$ (H_9)	0,335	$(-0.421) \times (-0.139) = 0.058519$	0,04814	No Mediation

Source: SPSS output, data processed (2026)

Based on the results of the Sobel test, the indirect influence of Profitability through CED on Company Value resulted in a value of $z = 0.000784 < 1.96$, and the indirect influence of Institutional Ownership through CED resulted in a value of $z = 0.04814 < 1.96$. The two values are not significant, so Carbon Emission Disclosure is not proven to be a mediating variable.

DISCUSSION OF RESEARCH RESULTS

Effect of Profitability on CED

The research findings indicate that Profitability exerts a negative and statistically insignificant influence on Carbon Emission Disclosure, as evidenced by a t-value of -0.064 and a significance value of 0.949, which substantially exceeds the predetermined threshold of 0.05. Based on these results, the first hypothesis (H_1) is rejected, as the empirical evidence obtained in this study does not support the theoretical expectation that higher profitability would be associated with greater levels of carbon emission disclosure. This finding suggests that companies demonstrating high profitability do not necessarily possess a stronger commitment or motivation to engage in more comprehensive carbon emission disclosure practices compared to their less profitable counterparts. The negative direction of the coefficient, while statistically insignificant, implies that in certain cases, highly profitable companies may even be less inclined to disclose carbon-related information, possibly due to concerns that such disclosures could attract greater regulatory scrutiny or expose the company to reputational risks associated with its carbon footprint. This outcome indicates that the decision to disclose carbon emission information is more strongly driven and shaped by factors other than profitability alone, including but not limited to regulatory requirements and compliance obligations, external pressure exerted by various stakeholder groups such as investors, environmental advocacy organizations, and government agencies, as well as the company's broader corporate reputation management strategy and its long-term

commitment to positioning itself as an environmentally responsible entity in the eyes of the public and the capital market.

Influence of Institutional Ownership on CED

The research findings reveal that Institutional Ownership exerts a negative and statistically significant influence on Carbon Emission Disclosure, as demonstrated by a t-value of -3.434 and a significance value of 0.001, which falls well below the predetermined threshold of 0.05. Despite the statistical significance of this relationship, the second hypothesis (H_2) is rejected given that the direction of the influence is negative rather than the positive relationship that was theoretically anticipated. This finding indicates that a higher proportion of institutional ownership is paradoxically associated with a decline in the level of carbon emission disclosure, rather than an improvement, which runs contrary to the conventional expectation that institutional investors would leverage their monitoring capacity to encourage greater environmental transparency among the companies in which they hold significant stakes. This unexpected outcome suggests that institutional investors operating within the coal mining subsector may be primarily oriented toward maximizing short-term financial performance and returns on their investment portfolios, rather than prioritizing environmental transparency and long-term sustainability considerations. In this context, institutional investors may perceive comprehensive carbon emission disclosure as a potential liability that could expose the company to heightened regulatory scrutiny, increased compliance costs, or negative public attention regarding its environmental footprint, all of which could adversely affect short-term profitability and share price performance. This finding therefore implies that the monitoring role of institutional investors in the coal mining subsector is predominantly financially driven, with environmental accountability and carbon disclosure transparency taking a secondary position relative to the pursuit of near-term financial returns and operational efficiency.

Simultaneous Effects of X_1 and X_2 on CED

The results of the simultaneous hypothesis testing reveal that Profitability and Institutional Ownership jointly and collectively exert a statistically significant influence on Carbon Emission Disclosure, as evidenced by an F-value of 6.188 and a corresponding significance value of 0.004, which falls well below the predetermined threshold of 0.05. Based on these findings, the third hypothesis (H_3) is accepted, confirming that the combined effect of these two independent variables on Carbon Emission Disclosure reaches a level of statistical significance that meets the required threshold for acceptance. This outcome demonstrates that while Profitability and Institutional Ownership may individually yield insignificant or unexpected results in their partial relationships with Carbon Emission Disclosure, their simultaneous interaction as a unified set of predictors produces a meaningful and statistically reliable collective influence on the company's carbon emission disclosure decisions. The combination of these two factors together provides a more comprehensive and holistic explanation of the dynamics that shape corporate carbon disclosure behavior within the coal mining subsector, suggesting that the interplay between a company's financial performance and the composition of its ownership structure jointly contributes to determining the extent and comprehensiveness of

its environmental reporting practices. This finding underscores the importance of examining the simultaneous rather than solely the individual effects of these variables when seeking to understand the complex and multifaceted factors that drive carbon emission disclosure decisions among companies operating in carbon-intensive industries such as coal mining.

The Effect of Profitability on Company Value

The research findings demonstrate that Profitability exerts a positive and statistically significant influence on Firm Value, as evidenced by a t-value of 3.602 and a significance value of 0.001, which falls well below the predetermined threshold of 0.05. Based on these results, the fourth hypothesis (H_4) is accepted, confirming that Profitability serves as a meaningful and reliable determinant of Firm Value within the context of the coal mining subsector during the observation period. This finding is well aligned with the theoretical propositions of Signaling Theory, which posits that high profitability functions as a credible and powerful positive signal transmitted by company management to the market and external stakeholders, conveying that the company possesses the financial capability and operational resilience to consistently generate sustainable earnings over the long term. When investors and market participants receive and interpret this positive signal, their confidence in the company's future performance and growth prospects is strengthened, which in turn drives greater demand for the company's shares in the capital market and contributes to an upward movement in its overall firm value. This dynamic reflects the fundamental principle that financially strong and consistently profitable companies are generally rewarded with higher market valuations, as the market perceives them as lower-risk investments with greater potential to deliver satisfactory returns to their shareholders. The acceptance of this hypothesis therefore reinforces the central role of profitability as a key driver of firm value creation within the coal mining industry.

The Influence of Institutional Ownership on Company Value

The research findings reveal that Institutional Ownership exerts a positive and statistically significant influence on Firm Value, as demonstrated by a t-value of 2.843 and a significance value of 0.006, which falls well below the predetermined threshold of 0.05. Based on these results, the fifth hypothesis (H_5) is accepted, confirming that Institutional Ownership constitutes a meaningful and statistically reliable determinant of Firm Value among coal mining subsector companies listed on the Indonesia Stock Exchange during the observation period. This finding is consistent with and theoretically grounded in the propositions of Agency Theory, which identifies Institutional Ownership as an effective and consequential corporate governance mechanism capable of meaningfully reducing the agency conflicts that arise from the divergence of interests between managers and shareholders. By exercising rigorous and continuous oversight over managerial behavior and strategic decision-making, institutional investors play a pivotal role in curtailing agency costs, which include monitoring costs, bonding costs, and residual losses, that would otherwise erode the overall value of the firm. The presence of institutional investors with significant shareholding stakes creates stronger incentives for management to pursue strategies and make

decisions that are genuinely aligned with the broader interests of shareholders, rather than prioritizing personal or managerial objectives that may conflict with value maximization goals. This disciplinary effect of institutional ownership ultimately contributes to more efficient resource allocation, improved operational performance, and enhanced corporate governance quality, all of which are positively perceived by the market and reflected in a higher overall firm value. The acceptance of this hypothesis therefore affirms the critical governance role that institutional investors play in driving firm value creation within the coal mining industry.

The Influence of CED on Company Value

The research findings indicate that Carbon Emission Disclosure exerts a negative and statistically significant influence on Firm Value, as reflected by a *t*-value of -1.199 and a significance value of 0.036, which falls below the predetermined threshold of 0.05. Despite the statistical significance of this relationship, the sixth hypothesis (H_6) is rejected given that the direction of the influence is negative rather than the positive relationship that was theoretically anticipated. This finding reveals that higher levels of Carbon Emission Disclosure are paradoxically associated with a reduction in firm value as perceived by investors, rather than contributing to an enhancement of market valuation as would be expected based on the theoretical propositions of Signaling Theory. This counterintuitive outcome suggests that within the context of the coal mining subsector, investors may interpret extensive carbon emission disclosures not as a positive signal of environmental responsibility and corporate transparency, but rather as an indication of greater environmental liabilities, higher compliance costs, and elevated regulatory risks that could potentially constrain the company's future profitability and operational flexibility. In an industry that is inherently carbon-intensive, comprehensive disclosure of emission-related information may inadvertently draw attention to the magnitude of the company's environmental footprint, raising concerns among investors about the potential financial implications of increasingly stringent environmental regulations, carbon taxation policies, and the long-term viability of coal as an energy source in the context of the global transition toward cleaner and more sustainable forms of energy. The rejection of this hypothesis therefore highlights the complex and context-dependent nature of the relationship between environmental disclosure and firm value within the coal mining industry.

Simultaneous Influence of X_1 , X_2 , and Z on Company Value

The research findings demonstrate that Profitability, Institutional Ownership, and Carbon Emission Disclosure jointly and simultaneously exert a statistically significant influence on Firm Value, as evidenced by an *F*-value of 3.530 and a corresponding significance value of 0.000, which falls well below the predetermined threshold of 0.05. Based on these results, the seventh hypothesis (H_7) is accepted, confirming that the collective contribution of these three variables as a unified set of predictors produces a meaningful and statistically reliable simultaneous influence on the Firm Value of coal mining subsector companies listed on the Indonesia Stock Exchange during the observation period. This outcome validates the overall regression model constructed in this study and affirms that the combination of financial performance indicators, corporate

governance mechanisms, and environmental disclosure practices collectively provides a more comprehensive and holistic explanation of the variation observed in firm value compared to any single variable examined in isolation. The three variables together are capable of collectively explaining approximately 38.2% of the total variation in Firm Value observed across the sampled companies throughout the study period, indicating that the model captures a meaningful and substantial portion of the factors driving market valuation within the coal mining subsector. While the remaining 61.8% of the variation in Firm Value is attributable to other factors that lie outside the scope of the current research model, the explanatory power demonstrated by the simultaneous inclusion of Profitability, Institutional Ownership, and Carbon Emission Disclosure underscores the importance of considering these variables together when seeking to understand the complex and multifaceted determinants of firm value in this industry.

The Role of CED Mediation (H_8 and H_9)

The results of the Sobel Test indicate that Carbon Emission Disclosure is unable to mediate the influence of Profitability on Firm Value, as evidenced by a Sobel z-value of 0.000784, which falls substantially below the minimum threshold of 1.96 required to establish statistically significant mediation, leading to the rejection of the eighth hypothesis (H_8). Similarly, Carbon Emission Disclosure is also unable to mediate the influence of Institutional Ownership on Firm Value, as demonstrated by a Sobel z-value of 0.04814, which likewise falls well below the threshold of 1.96, resulting in the rejection of the ninth hypothesis (H_9). These findings collectively confirm that Carbon Emission Disclosure does not function as a statistically significant intervening variable in either of the indirect pathways examined in this study. The direct influences exerted by both Profitability and Institutional Ownership on Firm Value are considerably more dominant and pronounced compared to the indirect influences transmitted through Carbon Emission Disclosure as a mediating variable, suggesting that the pathway through which these two independent variables affect firm value operates primarily through direct mechanisms rather than through the intermediary role of environmental disclosure practices. This outcome implies that investors and market participants in the coal mining subsector respond more directly and immediately to signals of financial performance and governance quality when forming their assessments of firm value, rather than incorporating carbon emission disclosure information as a meaningful intermediate channel that amplifies or transmits the effects of profitability and institutional ownership on market valuation. Carbon Emission Disclosure is therefore not proven to serve as an intervening variable within the research framework of this study, and its mediating role in the relationships between the independent variables and Firm Value is not supported by the empirical evidence obtained.

Summary of Hypothesis Testing Results**Table 11. Summary of Hypothesis Testing Results**

H	Hipotesis	t/F	Say.	Results
H ₁	Profitability → CED (positive & significant)	-0,064	0,949	Rejected
H ₂	Institutional Ownership → CED (positive & significant)	-3,434	0,001	Rejected
H ₃	X ₁ , X ₂ → CED (simultan)	6,188	0,004	Accepted
H ₄	Profitability → Company Value (positive & significant)	3,602	0,001	Accepted
H ₅	Institutional Ownership → Corporate Value (positive & significant)	2,843	0,006	Accepted
H ₆	CED → Company Value (positive & significant)	-1,199	0,036	Rejected
H ₇	X ₁ , X ₂ , Z → Company Value (simultaneous)	3,530	0,000	Accepted
H ₈	X ₁ → CED → Company Value (mediation)	0,000784	< 1.96	Rejected
H ₉	X ₂ → CED → Company Value (mediation)	0,04814	< 1.96	Rejected

Source: Data processed (2026)

CONCLUSIONS AND SUGGESTIONS**Conclusion**

Based on the results of the research and discussion, it can be concluded that: (1) Profitability has a negative and insignificant effect on Carbon Emission Disclosure; (2) Institutional Ownership has a negative and significant effect on Carbon Emission Disclosure; (3) Profitability and Institutional Ownership simultaneously have a significant effect on Carbon Emission Disclosure; (4) Profitability has a positive and significant effect on Company Value; (5) Institutional Ownership has a positive and significant effect on Company Value; (6) Carbon Emission Disclosure has a negative and significant effect on the Company's Value; (7) Profitability, Institutional Ownership, and Carbon Emission Disclosure simultaneously affect the Company's Value; (8) Carbon Emission Disclosure has not been proven to mediate the effect of Profitability on Company Value; and (9) Carbon Emission Disclosure has not been proven to mediate the influence of Institutional Ownership on Company Value.

Suggestions

For coal mining companies, it is recommended to: (1) improve the quality and quantity of Carbon Emission Disclosure as a form of commitment to environmental sustainability; (2) maintain consistent profitability to increase the value of the company; and (3) optimizing the role of institutional ownership in encouraging environmental disclosure practices. For subsequent researchers, it is recommended to add other relevant moderation or mediation variables and expand the period and scope of the study.

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