

THE EFFECT OF CARBON EMISSION DISCLOSURE AND PROFITABILITY ON FIRM VALUE IN ENERGY SECTOR COMPANIES LISTED ON THE INDONESIA STOCK EXCHANGE DURING THE 2022–2024 PERIOD

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ABSTRACT

Climate change and rising carbon emissions are pushing companies, especially those operating in the energy sector, to increase environmental transparency and sustainability practices. Carbon Emission Disclosure (CED) has emerged as an important mechanism to communicate a company's environmental responsibility to stakeholders, while profitability remains a key indicator of financial performance that influences investor decisions. This study aims to examine the effect of carbon emission disclosure and profitability on firm value in energy sector companies listed on the Indonesia Stock Exchange during 2022–2024, with leverage as a control variable. The research uses a quantitative approach, utilizing secondary data collected from annual reports and sustainability reports. Purposive sampling techniques were used to select the sample, resulting in 141 data observations. Carbon emission disclosure is measured using the Carbon Disclosure Project (CDP) index, profitability is represented by Return on Assets (ROA), company value is measured using Tobin's Q, and leverage is measured using the Debt-to-Asset Ratio (DAR). The data is analyzed using statistical software with multiple linear regression. The results show that carbon emission disclosure does not have a significant effect on company value, indicating that environmental disclosure has not yet become a main consideration for investors in assessing the market value of energy companies. On the other hand, profitability has a positive and significant effect on company value, showing that companies with stronger financial performance tend to receive higher market valuations. Leverage doesn't have a significant effect on firm value. This finding highlights the importance of profitability as a determinant of firm value and shows that environmental disclosure mainly serves as a transparency mechanism rather than a direct driver of market value. This study contributes to the literature on sustainability reporting and corporate finance by providing empirical evidence from the energy sector in Indonesia.

Keywords: Carbon Emission Disclosure, Firm value, Profitability, Leverage

1. INTRODUCTION

Climate change has emerged as a critical global challenge, drawing intense scrutiny across various sectors, particularly within the corporate world. This phenomenon is predominantly driven by global warming, which is accelerated by rising concentrations of greenhouse gases (GHGs) most notably carbon dioxide (CO₂) generated through power consumption, fossil fuel combustion, transportation, and industrial manufacturing (Badan Meteorologi Klimatologi dan Geofisika, 2025). The atmospheric release of CO₂ is commonly referred to as carbon emissions. Given its heavy reliance on fossil fuels, the energy sector stands out as one of the primary drivers of these emissions. This is underscored by the Statistical Review of World Energy, which reported that the energy industry accounted for roughly 87% of total global carbon emissions, translating to 35.49 billion tons of CO₂ in 2024 (Energy Institute, 2025). This alarming reality underscores the urgent need for robust emission mitigation and heightened corporate transparency via carbon emission disclosure as a core element of environmental accountability.

In Indonesia, the energy sector also contributes significantly to carbon emissions. Based on the Statistical Review of World Energy, Indonesia ranked sixth among the world's largest energy-sector carbon emitters, contributing 2.10% of total global emissions, or approximately 746.9 million tons of CO₂ in 2024 (Maheswara, 2026). Greenhouse gas inventory data from Statistics Indonesia (BPS) indicate that carbon emissions from the energy sector generally increased during the 2015–2023 period, despite a temporary decline in 2020 due to the COVID-19 pandemic. Following the pandemic, emissions rose again as industrial activities and energy consumption recovered. This phenomenon has encouraged stakeholders, including the Financial Services Authority, to strengthen environmental policies and improve corporate transparency through carbon emission disclosure as part of Environmental, Social, and Governance (ESG) implementation (Sari et al., 2023; Widiyanti, 2025).

Carbon emission disclosure pertains to the reporting of carbon footprint metrics and corporate mitigation targets within sustainability reports (Oktariyani, 2024). This practice is critical as it offers investors transparent insights into a firm's commitment to environmental stewardship. In this study, the extent of transparency is evaluated using the Carbon Disclosure Project (CDP) index. Enhanced disclosure levels can bolster corporate legitimacy and investor confidence, thereby potentially augmenting firm value (Diva & Triyono, 2025). Represented by its stock price, firm value reflects the capital market's collective assessment of a company's financial and non-financial performance (Ningrum, 2021). This study utilizes Tobin's Q as a proxy for firm value because it captures the market valuation of the company's total assets alongside its future value-creation potential. A higher firm value fundamentally signals stronger investor trust and maximized shareholder wealth (Dewi & Budiadnyani, 2024).

In addition to carbon emission disclosure, profitability is another factor that may influence firm value. Profitability reflects a company's ability to generate earnings from its available resources and is an important consideration for investors (Kasmir, 2019). Fina et al. (2024) found that profitability has a significant effect on firm value. In this study, profitability is

proxied by Return on Assets (ROA), which measures the effectiveness of a company in generating profits from its assets. A high level of profitability sends a positive signal to investors and may contribute to an increase in firm value (Darmayanti et al., 2025). Firm value can also be influenced by leverage, which measures the extent to which a company's assets are financed through debt (Kasmir, 2019). This study uses the Debt-to-Assets Ratio (DAR) as a proxy for leverage because it reflects the company's financial risk. High leverage may lead investors to be more cautious in making investment decisions because it indicates a greater reliance on debt financing (Cahyani & Gunawan, 2022). Therefore, leverage is included as a control variable to enable a more accurate analysis of the effects of carbon emission disclosure and profitability on firm value.

This study distinguishes itself from the work of Kurnia et al. (2021), which limited its scope to the impact of carbon emission disclosure on manufacturing firms in Indonesia and Australia. In contrast, the present research incorporates profitability as an independent variable and leverage as a control variable, while shifting the focus specifically toward energy sector companies listed on the Indonesia Stock Exchange for the 2022–2024 period. Furthermore, this study departs from the frameworks utilized by Fina et al. (2024), Damanik et al. (2025), Diva and Triyono (2025), and Dewi and Budiadnyani (2024) by excluding variables such as green accounting, capital structure, and firm size. Instead, it prioritizes the intersection of carbon emission transparency and corporate profitability. The energy sector was intentionally selected as the research focal point, given its status as a primary contributor to global emissions driven by fossil fuel reliance and intensive energy production activities. In addition to facing greater pressure to enhance environmental transparency through carbon emission disclosure, energy companies generally require substantial funding for operations and investments. Consequently, profitability becomes an important factor influencing investor perceptions of corporate performance and future prospects.

This research is very important to conduct in energy sector companies, considering this sector faces the highest environmental transition risk exposure while also requiring massive operational funding. The scientific novelty and originality of this article lie in the research model construction and the selection of more specific and up-to-date objects. Previous studies still show varying results and have some conceptual limitations. Unlike the earlier studies described, this article focuses its analysis deeply on the interaction between environmental transparency (carbon emission disclosure) and actual profit efficiency (profitability) as determinants of firm value (Tobin's Q), while controlling for debt risk (leverage). Besides that, the originality of this research is also supported by the update of the observation time horizon after the pandemic, which is the 2022–2024 period on the Indonesia Stock Exchange (IDX).

2. LITERATURE REVIEW

2.1 Legitimacy Theory

Legitimacy theory explains the existence of an implicit social contract between companies and society. Dowling and Pfeffer (1975) in Ghazali (2020) emphasize that companies always strive to align their operational activities with social norms, values, and expectations to gain

public recognition. Operational misalignment risks threatening the legitimacy and sustainability of the business. In the context of climate sustainability, transparency through carbon emission disclosure becomes a strategic tool to strengthen a company's image and reputation in the eyes of stakeholders. A good reputation indirectly attracts positive perceptions from stakeholders and builds investor trust, which can potentially increase the company's market value.

2.2 Signaling Theory

Signaling theory introduced by Ross (1977) states that companies provide information to external parties to reduce information asymmetry between management and investors. The information disclosed by the company can be interpreted as a positive or negative signal regarding future prospects. Carbon emission disclosure serves as a non-financial signal indicating corporate responsibility and environmental commitment (Dewi and Budiadnyani, 2024). Similarly, profitability functions as a financial signal reflecting managerial effectiveness and future earnings potential (Damanik et al., 2025). Positive signals from environmental transparency and strong profitability can enhance investor confidence, thereby increasing the company's value. Leverage also conveys information regarding financial risk..

2.3 Carbon Emission Disclosure (CED)

Carbon Emission Disclosure (CED) is the disclosure of information regarding the total carbon emissions produced as well as its mitigation targets as a form of accountability for operational impacts on global warming through annual reports or sustainability reports (Darmayanti et al., 2025). This study adopts the Carbon Disclosure Project (CDP) index based on the concept of Choi et al. (2013), which evaluates 5 main categories (18 indicator items): climate change risks and opportunities; greenhouse gas emissions; energy consumption; emission reduction initiatives and costs; and carbon emission accountability. Measurement uses a dichotomous scale (score 0–18), where the index value is calculated through the ratio of the total disclosure score to the total items. The higher the index value, the more comprehensive the company's environmental transparency (Hardianti and Mulyani, 2023). Companies with extensive environmental disclosures are expected to gain greater stakeholder trust and increase their market valuation.

2.4 Profitability

Profitability signifies a firm's capacity to generate earnings through the efficient management of its resources and operations (Kasmir, 2019). It serves as a pivotal indicator for investors when evaluating corporate performance and long-term viability. In this study, Return on Assets (ROA) is utilized as the metric for profitability, as it effectively measures management's proficiency in translating total assets into net income. Superior profitability reflects optimal resource utilization and robust operational prospects, which can enhance investor sentiment and subsequently drive up firm value (Damanik et al., 2025).

2.5 Firm value

Firm value embodies investors' collective appraisal of a company's operational performance and long-term growth trajectories. This valuation is typically manifested in equity market prices and the maximization of shareholder wealth (Fina et al., 2024). To capture this construct, this study employs Tobin's Q as an empirical proxy, as it integrates both market-based sentiments and accounting-based data. According to Ningrum (2021), Tobin's Q effectively encapsulates market perceptions regarding a firm's capability to generate future

economic rents. Consequently, an elevated Tobin's Q ratio signals robust investor confidence and superior corporate performance.

2.6 Leverage

Leverage refers to the extent to which a company finances its assets through debt (Kasmir, 2019). This study uses the Debt-to-Asset Ratio (DAR) to measure leverage. Leverage is included as a control variable because the level of debt can affect investors' perception of financial risk and impact the company's value independently of carbon emissions disclosure and profitability. Controlling for leverage allows this study to more accurately isolate the effects of the main independent variables.

2.7 Hypothesis Development

Based on Legitimacy Theory and Signaling Theory, carbon emission disclosure and profitability are expected to affect a company's value. Disclosing carbon emissions reflects environmental responsibility and boosts the company's legitimacy, while profitability signals financial strength and operational efficiency. Both of these factors can influence investors' perceptions and increase the company's value. Meanwhile, leverage is controlled because financial risk can also affect market valuation.

The Impact of Carbon Emission Disclosure on Firm value

The growing global awareness of the threats posed by climate change is changing the landscape of investor assessment, where non-financial indicators like emission management are now key points of consideration. Referring to legitimacy theory, transparent carbon emission disclosure in sustainability reports builds a positive image and strengthens investor trust, especially for energy sector companies with high emission exposure. This social legitimacy correlates with an increase in the company's market value. Empirical findings from Askiah et al. (2025) as well as Cahyani and Gunawan (2022) confirm a significant impact of CED on firm value, although studies from Fina et al. (2024) and Damanik et al. (2025) show contradictory results. Based on this line of thinking, the first hypothesis is formulated:

H1: Carbon emission disclosure has a significant impact on firm value.

The Impact of Profitability on Firm value

From the perspective of signal theory, high profitability announcements act as a positive signal (good news) about the healthy and stable financial performance of an entity. Efficient management in converting assets into profit (high ROA) will increase investment appeal and stimulate stock price appreciation in the capital market, which linearly raises the company's value. Empirical support from Fina et al. (2024) as well as Dewi and Budiadnyani (2024) indicates that profitability has been proven to affect firm value, although there are inconsistencies from the research results of Diva and Triyono (2025). Based on this argument, the second hypothesis is formulated:

H2: Profitability has a significant effect on firm value.

3. METHODS

To investigate the financial and environmental drivers of corporate market value, this study employs a quantitative methodology focusing on energy sector enterprises listed on the Indonesia Stock Exchange (IDX) throughout the 2022–2024 period. This numerical approach

is ideal for verifying the statistical links between variables through robust econometric modeling. Synthesizing Legitimacy Theory and Signaling Theory, the study maps out how green transparency and profitability interact to alter capital market sentiment and asset pricing. The structured model isolates firm value as the primary dependent metric, driven by carbon emission disclosure and profitability as predictors, while incorporating leverage to control for capital structure variations.

Carbon Emission Disclosure

Based on the Carbon Disclosure Project (CDP) index by Choi et al. (2013), carbon emission disclosure is measured through 18 items covering climate change, greenhouse gas emissions, energy consumption, reduction initiatives, and carbon accountability. The mathematical formulation for this measurement is presented below::

$$CDP = \frac{\text{Total disclosure score}}{\text{Total disclosure items}}$$

Profitability

Profitability is represented by Return on Assets (ROA), which is a ratio that shows the company's ability to earn profit or gain from managing all its total assets. The formula for Return on Assets in this study is:

$$\text{Return on Assets} = \frac{\text{Total net profit after tax}}{\text{Total assets}} \times 100$$

Firm value

Firm value is operationalized as the dependent variable, measured via the Tobin's Q ratio. The Tobin's Q ratio is utilized because it effectively captures the market's appraisal of a company's total assets alongside its future growth potential. The mathematical formulation for Tobin's Q is presented below:

$$\text{Tobin's Q} = \frac{EMV + D}{EBV}$$

Where Q is the value of the company; EMV is the market value of the company; D is the total debt of the company; and EBV is the total assets of the company.

Leverage

Leverage is used as a control variable and is measured using the Debt to Asset Ratio (DAR) to reflect the extent to which a company's assets are financed through debt. The formula for the Debt to Assets Ratio (DAR) in this study is:

$$\text{Debt to Assets Ratio} = \frac{\text{Total Debt}}{\text{Total Assets}}$$

The research population encompasses all energy sector companies listed on the Indonesia Stock Exchange (IDX) during the 2022–2024 period. To ensure the sample aligns with the core

research objectives, a purposive sampling technique was applied based on predefined criteria, systematically excluding firms that failed to meet the requirements. This study relies on secondary data obtained through archival documentation techniques, extracted from annual reports, sustainability disclosures, audited financial statements, the official IDX website (www.idx.co.id), and individual corporate portals. These channels provide the comprehensive metrics required to quantify carbon emission disclosure, profitability, leverage, and firm value.

To validate the empirical model, a suite of classical assumption tests specifically normality, multicollinearity, heteroscedasticity, and autocorrelation analyses is conducted to verify that the data satisfies all econometric prerequisites. Upon fulfilling these assumptions, a multiple linear regression estimation is executed to quantify the partial impacts of carbon emission disclosure and profitability on firm value, while controlling for leverage. Hypothesis verification relies on t-statistics to determine the individual significance of each predictor. Concurrently, the coefficient of determination (R^2) is computed to evaluate the proportion of variance in firm value explained collectively by the independent and control variables. All statistical estimations are tested at a 5% significance level ($\alpha = 0.05$), where an independent variable is deemed statistically meaningful if its corresponding p-value falls below the 0.05 threshold.

4. RESULTS AND DISCUSSION

Sampling Process

To establish a robust empirical dataset, the initial population of energy sector firms listed on the Indonesia Stock Exchange was filtered using specific purposive sampling restrictions. The sequential phases of this sample selection process across the 2022–2024 period are outlined below :

Table 1. Sample Process

No	Criteria	Total
1.	Energy sector companies listed on the Indonesia Stock Exchange during the 2022-2024 period	91
2.	Energy sector companies that were newly listed on the IDX during the 2022-2024 period	(20)
3.	Energy sector companies that did not fully publish annual reports and sustainability reports during the 2022-2024 period	(13)
4.	Energy sector companies that did not have positive profits during the 2022-2024 period	(11)
Total Sample 47 x 3 years		141

Source: Processed by the author (2026).

Descriptive Statistics Results

Descriptive statistics were employed to provide an overview of the research variables, specifically Carbon Emission Disclosure (CED), Profitability (ROA), Firm Value (Tobin's Q), and Leverage (DAR). The results indicate that the mean score for CED is 0.6561, demonstrating

that the sampled energy companies disclose approximately 65.61% of the required carbon disclosure items. Profitability, assessed via ROA, yields an average value of 0.1249, which signifies that these companies generate a 12.49% return on their total assets. Furthermore, firm value, proxied by Tobin's Q, presents a mean value of 1.7500, suggesting that investors generally value these firms above their book value. Meanwhile, the average DAR stands at 0.4041, implying that roughly 40.41% of the companies' assets are financed through debt.

Table 2. Descriptive Statistical Analysis

	N	Min	Max	Mean	Std. Deviation
CED	141	0,50	0,78	0,6561	0,07799
ROA	141	0,00	0,62	0,1249	0,13032
DAR	141	0,02	0,92	0,4041	0,19521
Tobin's Q	141	0,27	14,56	1,7500	2,35347
Valid N (listwise)	141				

Source: Data Processed (2026).

Classical Assumptions Test

To guarantee that the estimation model satisfies all statistical prerequisites for multiple linear regression, classical assumption diagnostics were rigorously performed before evaluating the primary hypotheses. The normality test, evaluated via the Kolmogorov–Smirnov method, yielded a significance value of 0.060. Since this value exceeds the 0.05 threshold, it demonstrates that the residuals are normally distributed.

Table 3. Normality Test

		Unstandardize d Residual
N		141
Normal Parameters	Mean	0,0000000
	Std. Deviation	2,23265223
Most Extreme Differences	Absolute	0,321
	Positive	0,321
	Negative	-0,230
Test Statistic		0,321
Asymp. Sig. (2-tailed)		0,060

Source: Data Processed (2026).

Multicollinearity was evaluated by examining the Tolerance and Variance Inflation Factor (VIF) values. The empirical results demonstrate that the Tolerance values for all independent variables exceed 0.10, while the corresponding VIF values remain well below 10. Consequently, it can be concluded that the regression model is free from multicollinearity issues.

Table 4. Multicollinearity Test

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	0,488	1,709	0,286	0,776		
	CED	-0,100	2,474	-0,003	0,968	0,978	1,023
	ROA	5,752	1,508	0,318	0,000	0,943	1,061
	DAR	1,506	1,002	0,125	0,135	0,951	1,052

Source: Data Processed (2026).

Heteroscedasticity was evaluated by analyzing a scatterplot of the standardized predicted values of the dependent variable (ZPRED) against the studentized residuals (SRESID). The resulting plot demonstrates that the data points are randomly dispersed and distributed both above and below the zero line on the Y-axis. This random pattern indicates that the variance of the residuals is homogeneous, thereby confirming that the regression model is free from heteroscedasticity.

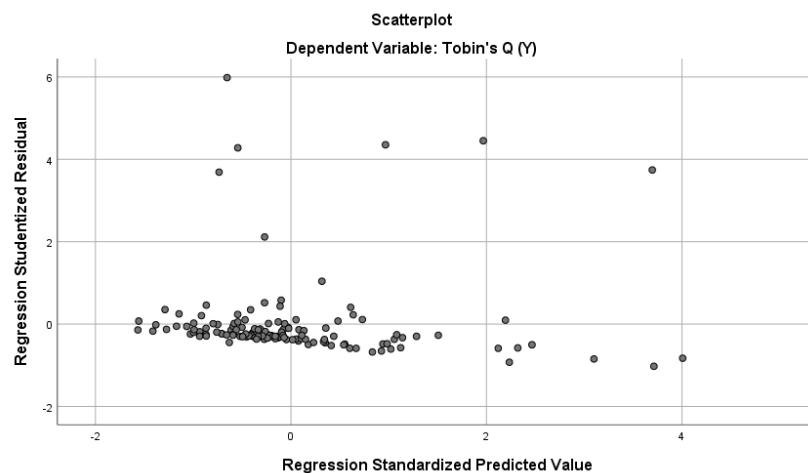


Figure 1. Heteroskedasticity Test

Source: Data Processed (2026).

Autocorrelation test was evaluated using the Runs Test value, which resulted in 0.554, exceeding the 0.05 significance level. This Runs Test value indicates that the residuals occur randomly and do not follow any specific pattern. So, it can be concluded that there is no autocorrelation.

Table 5. Autocorrelation Test

	Unstandardize d Residual
Test Value	-0,55245
Cases < Test Value	70
Cases >= Test Value	71
Total Cases	141
Number of Runs	75
Z	0,592
Asymp. Sig. (2-tailed)	0,554

Source: Data Processed (2026).

Regression Analysis and Hypothesis Testing

Multiple linear regression analysis is used to study the effect of Carbon Emissions Disclosure (CED) and Profitability (ROA) on Firm value (Tobin's Q), while controlling for Leverage (DAR). The regression model produces an R-square value of 0.100 and an Adjusted R-square of 0.080, which indicates that 8.0% of the variation in firm value can be explained by carbon emissions disclosure, profitability, and leverage, while the remaining 92.0% is explained by other variables not included in the model.

Table 6. Linear Regression Analysis

R	R Square	Adjusted R Square	Std. Error of the Estimate
0,316	0,100	0,080	2.25696

Source: Data Processed (2026).

The results of the partial hypothesis testing (t-test) indicate that Carbon Emission Disclosure yields a coefficient of \$-0.100\$ with a p-value of \$0.968\$, demonstrating that it exerts no significant effect on firm value. Conversely, Profitability (ROA) exhibits a positive coefficient of 5.752 and a significance value of 0.000, establishing a highly significant positive impact on firm value. Meanwhile, the leverage control variable (DAR) produces a coefficient of 1.506 with a p-value of 0.135, confirming that it does not significantly influence market valuation..

Table 7. Partial Test

Variable	B	t	Sig.	Decision
CED	-0,100	-0,040	0,968	Rejected
ROA	5,752	3,815	0,000	Accepted
DAR	1,506	1,503	0,135	Not Significant

Source: Data Processed (2026).

The regression equation can be stated as follows:

$$\text{Tobin's } Q = 0.488 - 0.100CED + 5.752ROA + 1.506DAR + \varepsilon$$

Discussion

The results of this study indicate that Carbon Emission Disclosure (CED) does not have a significant effect on firm value. This finding implies that the extent of carbon emission information disclosed by energy sector companies is not yet considered a primary factor by investors when evaluating the market value of a company. Although carbon emission disclosure reflects a company's commitment to environmental sustainability and transparency, investors may still place greater emphasis on financial indicators, such as profitability, revenue growth, and future cash flow potential, when making investment decisions. As a result, improvements in environmental disclosure alone may not immediately translate into higher market valuation.

From the perspective of Legitimacy Theory, companies disclose environmental information to gain social acceptance and maintain legitimacy from stakeholders. Carbon emission disclosure is expected to enhance corporate reputation by demonstrating accountability for environmental impacts and commitment to sustainable business practices. However, the insignificant relationship found in this study suggests that legitimacy obtained through environmental disclosure may not necessarily be converted into economic benefits reflected in firm value. One possible explanation is that environmental disclosure practices among energy companies in Indonesia are still largely voluntary and may not yet be perceived by investors as a reliable indicator of future financial performance. Consequently, although companies attempt to strengthen their legitimacy through carbon disclosure, the market may not respond positively because investors prioritize information that has a more direct impact on profitability and shareholder returns.

Another possible explanation is related to the characteristics of the Indonesian capital market. The market may still be dominated by short-term investment behavior, where investors focus primarily on financial outcomes rather than long-term sustainability initiatives. In such circumstances, carbon emission disclosure may be viewed as supplementary information rather than a critical determinant of investment decisions. Furthermore, differences in the quality, completeness, and consistency of carbon disclosure across companies may reduce its ability to serve as a meaningful signal to investors. Therefore, even though companies disclose information regarding carbon emissions, investors may find it difficult to compare environmental performance among firms and incorporate such information into their valuation decisions.

This outcome reinforces the empirical evidence established by Fina et al. (2024), Damanik et al. (2025), and Budiman et al. (2024), which collectively demonstrates that carbon emission disclosure does not critically alter corporate value. These synchronized findings imply that environmental transparency has failed to gain traction as a core determinant in the valuation processes of Indonesian enterprises. Furthermore, the cross-sectoral uniformity of these results highlights a prevailing market apathy toward green reporting, revealing that investors remain deeply anchored in traditional financial indicators rather than sustainability metrics.

In contrast, profitability was found to exert a positive and significant influence on firm value. This finding suggests that higher profitability levels are associated with increased market valuations. Profitability serves as a reflection of management efficiency in deploying corporate resources to generate earnings and create shareholder value. Consequently, firms that demonstrate consistent profit growth are typically perceived as possessing robust financial performance and superior future prospects, thereby bolstering investor confidence and driving demand for the company's shares.

This finding strongly supports Signaling Theory, which argues that profitability serves as a positive signal regarding a company's operational efficiency, financial stability, and growth potential. When companies report higher profitability, investors interpret this information as evidence that management is capable of generating satisfactory returns from available resources. As a result, investors become more willing to invest in such companies, leading to increased stock prices and higher firm value. In addition, profitability provides tangible evidence of a company's ability to generate future cash flows, making it one of the most important considerations in investment decision-making.

This significant positive result suggests that market participants in the energy industry remain fundamentally profit-oriented, placing substantial weight on financial viability when assessing corporate growth and asset pricing. Unlike environmental disclosure, which may provide indirect benefits over a longer period, profitability offers immediate and measurable information regarding the company's success in generating returns. Consequently, profitability emerges as the dominant determinant in shaping investor sentiment and driving corporate market valuations.

Furthermore, the energy sector is characterized by high capital intensity and substantial operational costs. In such an environment, profitability becomes a crucial indicator of managerial effectiveness and business sustainability. Companies that can maintain strong profitability despite fluctuating energy prices, regulatory changes, and environmental pressures are likely to be perceived as more resilient and capable of generating long-term value. Therefore, the positive relationship between profitability and firm value found in this study is both theoretically and practically justified.

This result is consistent with the findings of Dewi and Budiadnyani (2024), Fina et al. (2024), and Damanik et al. (2025), who also found that profitability positively and significantly affects firm value. These studies emphasize that profitability remains one of the most important determinants of market valuation because it directly reflects the company's ability to generate economic benefits for shareholders. The consistency of findings across studies further strengthens the argument that financial performance remains a dominant factor in investor decision-making.

Concerning the control variable, the analysis reveals that leverage exerts no significant influence on firm value. This finding suggests that the degree of debt financing employed by energy firms is not a primary determinant in the market's valuation process, indicating that

investors may view debt levels as a secondary factor compared to operational performance. Although leverage theoretically reflects financial risk, investors may not consider debt levels as a critical determinant of firm value as long as the company can effectively manage its obligations and maintain stable financial performance.

From the perspective of Signaling Theory, leverage can provide either positive or negative signals. High leverage may be interpreted as a sign of increased financial risk due to the company's dependence on debt financing. Conversely, leverage can also signal management confidence in future growth opportunities if debt is utilized productively to finance investments and expansion. The insignificant result found in this study indicates that these opposing interpretations may offset one another, resulting in no clear influence on firm value.

Another explanation is that energy sector companies generally require substantial capital to finance exploration, production, infrastructure development, and operational activities. Consequently, the use of debt is often considered a normal and necessary business practice within the industry. Investors may therefore perceive leverage as an inherent characteristic of the energy sector rather than as a factor that directly affects firm value. Instead of focusing on debt levels alone, investors may place greater emphasis on how effectively companies generate profits and manage their operational performance.

This finding aligns with prior research by Diva and Triyono (2025) and Cahyani and Gunawan (2022), which similarly documented that leverage exerts no significant influence on firm value. These collective studies imply that debt levels alone are insufficient to account for variations in market valuation. Instead, investors appear to appraise corporate worth through a more comprehensive matrix of financial and non-financial metrics.

Overall, the empirical findings demonstrate that profitability serves as the primary driver of firm value among energy sector companies listed on the Indonesia Stock Exchange, whereas carbon emission disclosure and leverage exert no significant influence on market valuation. These insights imply that investors persistently prioritize bottom-line financial performance over environmental transparency and capital structure configurations. Although carbon emission disclosure remains vital for corporate accountability and long-term sustainability goals, its immediate economic returns have yet to be fully validated by the market. Consequently, companies striving to enhance their market value should focus on optimizing profitability while concurrently elevating the quality and credibility of their environmental disclosures to foster long-term stakeholder trust.

Research Implications

The findings of this study provide both theoretical and practical implications. From a theoretical perspective, the results support Signaling Theory by demonstrating that profitability serves as a positive signal that significantly influences firm value. However, the findings provide limited support for Legitimacy Theory because carbon emission disclosure does not significantly affect market valuation. From a practical perspective, energy sector companies should focus on improving financial performance while continuing to enhance the quality and

credibility of environmental disclosures. For investors, profitability remains a key consideration in assessing firm value, whereas carbon emission disclosure may serve as complementary information regarding long-term sustainability and environmental responsibility.

5. CONCLUSION AND LIMITATION

This study examined the effect of Carbon Emission Disclosure (CED) and profitability on firm value in energy sector companies listed on the Indonesia Stock Exchange during the 2022–2024 period, with leverage included as a control variable. The findings reveal that carbon emission disclosure does not significantly affect firm value, indicating that environmental disclosure has not yet become a major consideration in investors' valuation decisions within the Indonesian energy sector. In contrast, profitability has a positive and significant effect on firm value, suggesting that investors place greater emphasis on a company's ability to generate earnings and create economic value. Meanwhile, leverage does not significantly influence firm value, implying that debt levels are not the primary factor considered by investors when assessing the market value of energy companies. These findings support Signaling Theory, which emphasizes the importance of financial performance as a positive signal to investors, while providing limited support for Legitimacy Theory, as environmental disclosure does not appear to be fully reflected in market valuation. Therefore, profitability remains the most influential factor in enhancing firm value, whereas carbon emission disclosure functions primarily as a mechanism of transparency and accountability rather than a determinant of market performance.

Several inherent limitations should be considered when interpreting the empirical outcomes of this study. First, the analytical scope is confined strictly to energy sector enterprises listed on the Indonesia Stock Exchange, which may restrict the generalizability of these insights to industries with contrasting operational models and ecological footprints. Second, the evaluation of carbon emission transparency depends entirely on self-reported data within annual and sustainability disclosures; this reliance may not fully capture genuine environmental performance due to disparities in reporting quality and frameworks across firms. Third, the model's coefficient of determination (R^2) indicates that a substantial proportion of variance in firm value remains driven by unobserved external determinants. Consequently, future scholars are encouraged to expand this research by conducting multi-sectoral analyses, extending the longitudinal timeframe, and incorporating omitted variables such as corporate governance mechanisms, actual environmental performance scores, institutional ownership, green innovation, broader ESG ratings, and capital structure dynamics. Furthermore, adopting panel data econometrics or cross-country comparative frameworks could yield a more robust and nuanced understanding of the nexus between sustainability transparency, financial indicators, and capital market valuations.

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