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THE IMPACT OF CORPORATE GOVERNANCE AND SUSTAINABILITY PERFORMANCE ON FIRM VALUE: EVIDENCE FROM ENERGY SECTOR COMPANIES LISTED ON THE INDONESIA STOCK EXCHANGE

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Abstract: This study investigates the impact of corporate governance mechanisms and sustainability performance on firm value in energy sector companies listed on the Indonesia Stock Exchange during the 2020–2024 period. Using balanced panel data and employing a Fixed Effects Model, the analysis examines the roles of board independence, board size, audit committee, institutional ownership, sustainability performance, and firm size in explaining firm value. The results show that independent commissioners have a positive and significant effect on firm value, indicating that effective board independence enhances monitoring quality and investor confidence. Other governance attributes and sustainability performance do not exhibit significant effects, suggesting that formal governance structures and sustainability initiatives are not immediately reflected in market valuation. The overall model is statistically significant and explains a moderate proportion of the variation in firm value. These findings imply that investors in the energy sector prioritize governance quality over structural compliance and short-term sustainability disclosures. The study provides empirical evidence on the relevance of corporate governance in shaping firm value within a capital-intensive and environmentally sensitive industry context.

Keywords: Corporate Governance; Sustainability Performance; Firm Value; Energy Sector

1. INTRODUCTION

Firm value represents a central indicator of corporate success as it reflects not only shareholders' wealth maximization but also the market's assessment of a firm's credibility, risk profile, and long-term growth prospects. In capital markets, firm value is commonly proxied by market-based indicators such as Price to Book Value (PBV) and Tobin's Q, which capture investors' expectations regarding firms' financial performance, governance quality, and sustainability orientation. In resource-based and capital-intensive industries such as the energy sector, the formation of firm value is inherently more complex because it is shaped by a combination of financial fundamentals, governance effectiveness, exposure to regulatory and environmental risks, and the firm's strategic response to sustainability challenges (Firdauzi et al., 2024; Halim & Sihono, 2025).

The energy sector occupies a strategic position in Indonesia's economy, serving as a backbone for household consumption, industrial production, and national infrastructure development. At the same time, energy companies operate under increasing structural pressures arising from commodity price volatility, global energy demand fluctuations, and the accelerating transition toward low-carbon and renewable energy sources. These dynamics have significant implications for firms' operational performance and capital market valuation. Empirical evidence indicates that the valuation of energy sector firms in Indonesia exhibits substantial volatility in line with commodity price cycles, particularly coal and mineral prices, making firm value highly sensitive to changes in macroeconomic conditions and investor sentiment (Firdauzi et al., 2024). Consequently, market appreciation of energy companies often fluctuates sharply even when firms' internal strategies and operational structures remain relatively stable.

This phenomenon is further illustrated by fluctuations in market-based valuation indicators among listed energy firms. For instance, Halim and Sihono (2025) document pronounced changes in PBV across energy companies during 2021–2023, reflecting heterogeneous market perceptions of firms' asset quality and future prospects. Such variations suggest that firm value in the energy sector is not driven solely by accounting performance, but also by how investors interpret firms' risk management, governance practices, and strategic positioning in response to sustainability-related challenges. This condition underscores the importance of examining non-financial determinants of firm value, particularly corporate governance and sustainability performance, which increasingly shape investor confidence in resource-intensive industries.

Corporate governance has long been recognized as a fundamental mechanism for aligning managerial decisions with shareholders' interests and mitigating agency problems. From the agency theory perspective, governance structures, such as board oversight, ownership structure, and audit mechanisms, serve to reduce information asymmetry and managerial opportunism, thereby enhancing decision quality and firm performance (Widigdo, 2013; Mukhtaruddin et al., 2019). In emerging markets such as Indonesia, where ownership concentration and institutional governance frameworks vary significantly across firms, the effectiveness of corporate governance mechanisms becomes particularly salient. Empirical studies in the Indonesian context demonstrate that certain governance attributes, including institutional ownership and board characteristics, are associated with higher firm value, suggesting that stronger monitoring and control mechanisms enhance investor trust (Nuraisah & Laily, 2022; Pradina, 2025).

However, prior empirical findings on the governance–firm value nexus remain inconclusive. Several studies report that not all governance components exert a uniform or significant effect on firm value. For example, while ownership structure may positively influence market valuation, audit committee characteristics and board independence do not always show a consistent impact across sectors and periods (Mukhtaruddin et al., 2019; Pradina, 2025). This inconsistency indicates that the effectiveness of corporate governance is highly contingent on the specific mechanisms employed and the institutional context in which firms operate. In the energy sector, where firms face high regulatory scrutiny and environmental exposure, the role of governance mechanisms may differ from that observed in manufacturing or service industries, thereby warranting sector-specific investigation.

In parallel with corporate governance, sustainability performance has emerged as a prominent dimension in contemporary corporate evaluation. Sustainability performance, commonly reflected through sustainability reporting and ESG-related disclosures, represents firms' commitment to managing their economic, environmental, and social impacts. From the legitimacy and stakeholder theory perspectives, sustainability initiatives and transparent reporting enhance firms' social acceptance and stakeholder trust, which can translate into reputational benefits and improved market valuation (Alsayegh et al., 2022; Alofaysan et al., 2024). In Indonesia, the relevance of sustainability performance is reinforced by regulatory developments, such as the mandatory sustainability reporting framework under OJK Regulation No. 51/POJK.03/2017, which underscores the growing institutionalization of sustainability practices in corporate reporting (Desmiyawati et al., 2025).

Despite the growing emphasis on sustainability performance, empirical evidence regarding its direct impact on firm value remains mixed. Several studies find that sustainability reporting or CSR disclosure does not significantly influence firm value, particularly in resource-based sectors such as mining and energy, where investors may prioritize short-term financial returns over long-term sustainability considerations (Nuraisah & Laily, 2022; Atanti & Trisnaningsih, 2024). Conversely, other studies report a positive association between sustainability practices and firm value, suggesting that markets increasingly reward firms that demonstrate credible commitments to environmental and social responsibility (Hariadi & Nurwanda, 2024; Zahra et al., 2025). These divergent findings point to an empirical gap concerning the conditions under which sustainability performance becomes value-relevant in capital markets, especially within sectors characterized by high environmental externalities.

The empirical gap becomes even more pronounced when considering the specific context of the energy sector during the 2020–2024 period. This period was marked by multiple shocks and structural changes, including the economic disruption caused by the COVID-19 pandemic, the subsequent recovery phase, a commodity price boom that temporarily boosted energy firms' profitability, and renewed uncertainty associated with global geopolitical tensions and energy market normalization. Simultaneously, pressure

from regulators, investors, and civil society regarding ESG compliance intensified, placing energy companies in a strategic dilemma between short-term profitability and long-term sustainability investments. This paradox potentially shapes how investors interpret corporate governance quality and sustainability performance when forming expectations about firm value.

Moreover, sustainability performance in the energy sector is often perceived as involving substantial compliance and transition costs, which may not immediately generate tangible financial returns. As a result, capital market participants may discount sustainability initiatives if they are not accompanied by demonstrable improvements in operational efficiency or profitability. This phenomenon may explain why sustainability disclosures are not always directly priced by the market and why their valuation effects appear contingent upon broader performance signals. In contrast, strong corporate governance mechanisms may provide investors with greater assurance that sustainability investments are strategically aligned with long-term value creation rather than symbolic compliance, thereby moderating market responses to sustainability performance.

Given these conditions, existing empirical evidence has not sufficiently captured the dynamic interplay between corporate governance, sustainability performance, and firm value within the Indonesian energy sector. Most prior studies focus on manufacturing or diversified samples and employ pre-pandemic data, which may not adequately reflect the structural shifts in investor expectations and regulatory pressures observed in recent years (Mukhtaruddin et al., 2019; Husnaini & Basuki, 2020; Wahidahwati & Ardini, 2021). Consequently, there remains a critical need to reassess the determinants of firm value in the energy sector using more recent data and sector-specific perspectives.

This study seeks to address these gaps by examining the impact of corporate governance and sustainability performance on firm value in energy sector companies listed on the Indonesia Stock Exchange during the 2020–2024 period. By focusing on a sector characterized by high capital intensity, environmental exposure, and regulatory scrutiny, this research aims to provide more nuanced insights into how governance structures and sustainability practices are valued by the capital market. The findings are expected to contribute theoretically by refining the understanding of governance and sustainability as complementary mechanisms of value creation in resource-based industries. Practically, the results offer implications for corporate managers and policymakers regarding the design of governance frameworks and sustainability strategies that are not only compliant with regulatory expectations but also aligned with market-based value creation objectives.

2. LITERATUR REVIEW AND HYPOTHESIS DEVELOPMENT

2.1. Theoretical Foundations

The relationship between corporate governance, sustainability performance, and firm value can be explained through several complementary theoretical perspectives, notably agency theory, stakeholder theory, legitimacy theory, and signaling theory. Agency theory posits that separation of ownership and control creates agency conflicts between managers and shareholders, which can be mitigated through effective governance mechanisms such as board oversight, ownership structure, and audit committees (Widigdo, 2013; Mukhtaruddin et al., 2019). Strong governance is expected to reduce opportunistic managerial behavior, enhance transparency, and improve decision quality, thereby contributing to higher firm value.

Stakeholder theory extends the firm's objective beyond shareholder wealth maximization to encompass the interests of multiple stakeholder groups, including employees, communities, regulators, and the natural environment. From this perspective, sustainability performance reflects a firm's responsiveness to stakeholder expectations and social responsibilities, which can strengthen relational capital and reduce non-financial risks (Alsayegh et al., 2022). Legitimacy theory further argues that firms seek social acceptance by aligning their operations and disclosures with prevailing societal norms and regulatory expectations. In environmentally sensitive sectors such as energy, sustainability reporting functions as a legitimacy mechanism that helps firms maintain their "social license to operate" (Munir et al., 2019; Alofaysan et al., 2024).

Signaling theory provides an additional lens to understand how both corporate governance and sustainability performance influence market valuation. High-quality governance structures and credible

sustainability disclosures serve as positive signals to investors regarding managerial quality, risk management capability, and long-term strategic orientation. In markets characterized by information asymmetry, such signals can shape investor perceptions and expectations, thereby affecting firm value (Husnaini & Basuki, 2020; Alsayegh et al., 2022). Collectively, these theories suggest that corporate governance and sustainability performance constitute important non-financial determinants of firm value, particularly in sectors exposed to high environmental and regulatory risks.

2.2. Corporate Governance and Firm Value

Corporate governance has been widely examined as a determinant of firm value, with empirical studies demonstrating that governance mechanisms play a crucial role in enhancing market confidence and firm performance. In the Indonesian context, governance attributes such as institutional ownership, board size, and board independence are frequently used as proxies for governance quality. Strong governance structures are associated with more effective monitoring of managerial actions, reduced agency costs, and improved transparency, which in turn enhance firm value (Mukhtaruddin et al., 2019; Wahidahwati & Ardini, 2021).

Empirical evidence, however, reveals mixed findings regarding the magnitude and consistency of the governance–firm value relationship. Nuraisah and Laily (2022) report that certain governance mechanisms significantly influence firm value in mining companies, while others do not exhibit a statistically significant effect. Similarly, Pradina (2025) finds that ownership structure contributes positively to firm value, but the role of audit committees and board characteristics varies across firms and periods. These inconsistencies suggest that the effectiveness of governance mechanisms is context-dependent and may differ across industries with distinct risk profiles and regulatory environments.

In the energy sector, governance quality becomes particularly salient due to the high level of capital intensity, regulatory oversight, and exposure to environmental and social risks. Effective governance mechanisms can provide assurance to investors that firms are capable of managing complex operational risks and regulatory compliance, thereby reducing perceived uncertainty and enhancing firm value. Based on the theoretical arguments and empirical evidence, this study posits that stronger corporate governance is positively associated with firm value in energy sector companies.

H1: Corporate governance has a positive effect on firm value in energy sector companies listed on the Indonesia Stock Exchange.

2.3. Sustainability Performance and Firm Value

Sustainability performance, reflected through sustainability reporting and ESG-related disclosures, has gained prominence as a strategic factor influencing firm reputation and legitimacy. From the stakeholder and legitimacy perspectives, firms that demonstrate strong sustainability performance are more likely to gain social approval and stakeholder support, which can translate into enhanced market valuation (Munir et al., 2019; Alsayegh et al., 2022). Sustainability initiatives may also contribute to long-term value creation by reducing environmental risks, improving operational efficiency, and strengthening relationships with key stakeholders.

Nonetheless, empirical findings on the impact of sustainability performance on firm value remain inconclusive. Several studies in emerging markets report that sustainability reporting does not exert a direct and significant influence on firm value, particularly in environmentally intensive sectors such as mining and energy, where investors may prioritize short-term financial outcomes over long-term sustainability considerations (Nuraisah & Laily, 2022; Atanti & Trisnaningsih, 2024). Conversely, other studies document a positive association between sustainability performance and firm value, suggesting that markets increasingly recognize the strategic importance of sustainability in mitigating long-term risks and enhancing corporate reputation (Hariadi & Nurwanda, 2024; Zahra et al., 2025).

These divergent findings point to an empirical gap regarding the value relevance of sustainability performance, particularly in sectors characterized by high environmental externalities. In the Indonesian energy sector, where sustainability issues are closely intertwined with regulatory compliance and societal expectations, the extent to which sustainability performance is priced by the market remains an open question. Accordingly, this study hypothesizes that sustainability performance has a positive effect on firm

value, although the magnitude of this effect may vary depending on market conditions and investor perceptions.

H2: Sustainability performance has a positive effect on firm value in energy sector companies listed on the Indonesia Stock Exchange.

2.4. The Joint Role of Corporate Governance and Sustainability Performance

Corporate governance and sustainability performance are not independent dimensions of corporate conduct; rather, they are interrelated components of broader corporate accountability. Strong governance structures can enhance the credibility and quality of sustainability initiatives by ensuring that sustainability policies are effectively implemented and monitored. Conversely, sustainability performance may reinforce the reputational benefits of good governance by signaling a firm's commitment to responsible and transparent management. Prior studies suggest that governance mechanisms can influence the extent and quality of sustainability disclosure, although the strength of this relationship varies across contexts (Husnaini & Basuki, 2020; Irfan & Sarumpaet, 2023).

In the energy sector, where sustainability challenges are particularly salient, the interaction between governance quality and sustainability performance may play a critical role in shaping investor perceptions. Firms with strong governance but weak sustainability performance may be perceived as prioritizing short-term compliance over long-term responsibility, while firms with sustainability initiatives unsupported by robust governance structures may face credibility issues. Therefore, examining the simultaneous impact of corporate governance and sustainability performance provides a more comprehensive understanding of how non-financial factors contribute to firm value in environmentally sensitive industries.

2.5. Research Gap and Hypothesis Development

Despite the growing body of literature on corporate governance, sustainability performance, and firm value, several gaps remain. First, existing empirical findings on the direct effects of corporate governance and sustainability performance on firm value are inconsistent, particularly in emerging markets and resource-based sectors. Second, most prior studies employ multi-sector samples or focus on manufacturing firms, limiting the generalizability of their findings to the energy sector, which exhibits distinct risk characteristics and regulatory pressures (Mukhtaruddin et al., 2019; Husnaini & Basuki, 2020). Third, relatively few studies utilize post-pandemic data that capture the structural shifts in investor expectations and regulatory emphasis on ESG issues observed during the 2020–2024 period. By focusing specifically on energy sector companies listed on the Indonesia Stock Exchange and employing recent data, this study seeks to address these gaps and provide updated empirical evidence on the value relevance of corporate governance and sustainability performance. Building on the theoretical arguments and prior empirical findings, the study proposes the following hypotheses:

H1: Corporate governance has a positive effect on firm value in energy sector companies listed on the Indonesia Stock Exchange.

H2: Sustainability performance has a positive effect on firm value in energy sector companies listed on the Indonesia Stock Exchange.

3. METHODS

3.1. Research Design and Approach

This study employs a quantitative research design with an explanatory approach to examine the causal relationships between corporate governance, sustainability performance, and firm value in energy sector companies listed on the Indonesia Stock Exchange (IDX). The study utilizes secondary data derived from publicly available annual reports, sustainability reports, and financial statements of listed energy firms. A panel data framework is adopted to capture both cross-sectional differences among firms and time-series variations over the observation period, thereby enabling a more robust assessment of the dynamic relationships among variables.

3.2. Population and Sample

The population of this study consists of all energy sector companies listed on the Indonesia Stock Exchange during the 2020–2024 period. A purposive sampling technique is applied to select firms that meet the following criteria: (1) companies are consistently listed in the energy sector throughout the observation period; (2) companies publish complete annual reports and financial statements for each year of observation; and (3) companies disclose sustainability information that allows the construction of sustainability

performance indicators. Firms with incomplete data or those experiencing delisting during the period are excluded from the sample. The final sample comprises firm-year observations that satisfy these criteria, forming a balanced (or unbalanced, if applicable) panel dataset.

3.3. Data Sources and Collection

Secondary data are obtained from multiple sources, including (1) annual reports and sustainability reports published by each firm; (2) the official website of the Indonesia Stock Exchange (www.idx.co.id); and (3) corporate websites and financial information platforms. Corporate governance variables are collected from corporate governance disclosures in annual reports, sustainability performance data are constructed based on sustainability reporting indicators (e.g., GRI-based disclosure index), and firm value and financial performance indicators are derived from audited financial statements and market data.

3.4. Variable Measurement

Firm Value (Dependent Variable)

Firm value is proxied by Price to Book Value (PBV), calculated as the market price per share divided by book value per share. PBV reflects market valuation relative to the firm's accounting equity and is widely used in capital market research to capture investors' perceptions of firm performance and growth prospects.

Corporate Governance (Independent Variable)

Corporate governance is measured using governance-related proxies commonly applied in the Indonesian context, including board characteristics and ownership structure. Specifically, this study employs indicators such as the proportion of independent commissioners, board size, audit committee size, and institutional ownership. These proxies reflect the monitoring and control mechanisms embedded in firms' governance structures.

Sustainability Performance (Independent Variable)

Sustainability performance is proxied by a Sustainability Reporting Disclosure Index (SRDI), constructed based on the extent of sustainability disclosure in firms' sustainability reports using GRI-based indicators. Each disclosure item is scored using a dichotomous approach (1 = disclosed; 0 = not disclosed), and the index is calculated as the ratio of disclosed items to the total applicable items, thereby reflecting the comprehensiveness of firms' sustainability reporting practices.

Control Variables

To mitigate potential omitted variable bias, several control variables commonly associated with firm value are included in the model, such as firm size (measured by the natural logarithm of total assets). These controls capture firm-specific characteristics that may influence market valuation beyond governance and sustainability performance.

3.5. Model Specification

To examine the impact of corporate governance and sustainability performance on firm value, the following panel data regression model is estimated:

$$PBV_{it} = \alpha + \beta_1 GCG_{it} + \beta_2 SP_{it} + \beta_3 SIZE_{it} + \varepsilon_{it}$$

where PBV_{it} denotes firm value of firm i in year t; GCG_{it} represents corporate governance proxies; SP_{it} denotes sustainability performance; $SIZE_{it}$ is firm size; and ε_{it} is the error term.

3.6. Panel Data Estimation Technique

The analysis is conducted using EViews 12 software. Panel data estimation is performed by comparing three alternative models: Pooled Ordinary Least Squares (Pooled OLS), Fixed Effects Model (FEM), and Random Effects Model (REM). Model selection is based on the Chow test (to compare Pooled OLS and FEM), the Hausman test (to compare FEM and REM), and the Breusch–Pagan Lagrange Multiplier test (to compare Pooled OLS and REM). The most appropriate model is selected based on statistical criteria and theoretical considerations. To ensure the reliability of estimation results, several diagnostic tests are conducted. Multicollinearity among independent variables is examined using variance inflation factors (VIF) and correlation matrices. Heteroskedasticity and autocorrelation issues are addressed using robust standard errors where necessary. In addition, cross-sectional dependence tests may be applied given the possibility of common shocks affecting firms in the energy sector during the observation period.

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3.8. Hypothesis Testing

Hypotheses are tested based on the significance and direction of estimated coefficients. A positive and statistically significant coefficient of corporate governance (β_1) supports H1, while a positive and statistically significant coefficient of sustainability performance (β_2) supports H2. Statistical significance is evaluated at conventional levels (5%). The results are interpreted in light of theoretical expectations and prior empirical findings.

4. RESULTS AND DISCUSSIONS

4.1. Result

This section presents the empirical results of the study and provides a comprehensive discussion of the findings. The analysis begins with the model specification tests and diagnostic checks, followed by the estimation results of the panel data regression. The discussion then interprets the empirical evidence in light of relevant theories and previous empirical studies to explain the effects of corporate governance mechanisms and sustainability performance on firm value in energy sector companies listed on the Indonesia Stock Exchange.

Table 1. Chow Test
Redundant Fixed Effects Tests
Equation: Untitled
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	2.521907	(30,118)	0.0002
Cross-section Chi-square	76.787781	30	0.0000

The results indicate that the Cross-section F statistic is 2.5219 with a probability of 0.0002, and the Cross-section Chi-square statistic is 76.7878 with a probability of 0.0000. Since both p-values are below 0.05, the null hypothesis is rejected. This implies that the Fixed Effects model is more appropriate than the Common Effects (pooled OLS) model. Accordingly, there are significant firm-specific effects that need to be controlled for in the panel regression.

Table 2. Hausmann Test
Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	13.268758	6	0.0390

The Hausman test results indicate a Chi-square statistic of 13.27 with p-value = 0.039. Since the p-value is below 0.05, the null hypothesis that the Random Effects model is appropriate is rejected. This implies that the individual effects are correlated with the regressors. Therefore, the Fixed Effects Model (FEM) is the appropriate specification for estimating the panel regression in this study.

Table 3. Multicollinearity Test

	IND_COMMISSONERS	BOARD_SIZE	AUDIT_COMMITTEE	INST_OWNERSHIP	SUST_PERFORMANCE	FIRM_SIZE
IND_COMMISSONERS	1.00	0.77	-0.08	0.02	0.20	-0.03
BOARD_SIZE	0.77	1.00	-0.13	0.09	0.31	-0.06
AUDIT_COMMITTEE	-0.08	-0.13	1.00	0.08	0.06	-0.11

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INST_OWNERSHIP	0.02	0.09	0.08	1.00	0.22	0.20
SUST_PERFORMANCE	0.20	0.31	0.06	0.22	1.00	0.03
FIRM_SIZE	-0.03	-0.06	-0.11	0.20	0.03	1.00

The multicollinearity test based on the correlation matrix shows that all pairwise correlation coefficients among the independent variables are below the common threshold of 0.80. The highest correlation appears between Independent Commissioners and Board Size (0.77), which is still within the acceptable limit. Other correlations are relatively low to moderate. Therefore, it can be concluded that there is no serious multicollinearity problem in the model, and all independent variables can be retained for further regression analysis.

Table 4. Heteroskedasticity Test
Dependent Variable: ABS(RESID)
Method: Panel Least Squares
Date: 01/10/26 Time: 17:26
Sample: 2020 2024
Periods included: 5
Cross-sections included: 31
Total panel (balanced) observations: 155

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.659134	0.402315	-1.638352	0.1035
IND_COMMISSONERS	-0.004603	0.094505	-0.048702	0.9612
BOARD_SIZE	-0.055359	0.045963	-1.204429	0.2303
AUDIT_COMMITTEE	0.048574	0.075757	0.641184	0.5224
INST_OWNERSHIP	-0.001957	0.001899	-1.030552	0.3044
SUST_PERFORMANCE	0.339170	0.166686	2.034781	0.0637
FIRM_SIZE	0.045116	0.011363	3.970370	0.0001

Root MSE	0.531532	R-squared	0.138518
Mean dependent var	0.336176	Adjusted R-squared	0.103593
S.D. dependent var	0.574528	S.E. of regression	0.543956
Akaike info criterion	1.664214	Sum squared resid	43.79150
Schwarz criterion	1.801659	Log likelihood	-121.9766
Hannan-Quinn criter.	1.720041	F-statistic	3.966147
Durbin-Watson stat	1.867748	Prob(F-statistic)	0.001042

The heteroskedasticity test based on the ABS(RESID) panel regression (Glejser-type test) indicates that most independent variables are not statistically significant at the 5% level, namely Independent Commissioners, Board Size, Audit Committee, Institutional Ownership, and Sustainability Performance. Only Firm Size is statistically significant ($p = 0.0001$), suggesting that the variation in the absolute residuals tends to be influenced by firm scale. These findings indicate that heteroskedasticity does not occur uniformly across all variables, but rather appears only in specific aspects related to firm size characteristics. Therefore, the model can generally be considered relatively stable, although there is evidence of partial heteroskedasticity.

Table 5. Fixed Effects Model
Dependent Variable: FIRM_VALUE
Method: Panel Least Squares
Date: 01/10/26 Time: 17:18
Sample: 2020 2024
Periods included: 5
Cross-sections included: 31

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Total panel (balanced) observations: 155

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.146993	2.117292	-0.541726	0.5890
IND_COMMISSONERS	0.597991	0.288510	2.072686	0.0404
BOARD_SIZE	0.063980	0.151232	0.423057	0.6730
AUDIT_COMMITTEE	0.335987	0.258539	1.299562	0.1963
INST_OWNERSHIP	-0.012242	0.017360	-0.705161	0.4821
SUST_PERFORMANCE	-0.303545	0.396553	-0.765459	0.4455
FIRM_SIZE	0.007268	0.061033	0.119085	0.9054
	Effects Specification			
Cross-section fixed (dummy variables)				
Root MSE	0.764996	R-squared		0.453238
Mean dependent var	0.420093	Adjusted R-squared		0.286430
S.D. dependent var	1.037924	S.E. of regression		0.876766
Akaike info criterion	2.779526	Sum squared resid		90.70884
Schwarz criterion	3.506021	Log likelihood		-178.4133
Hannan-Quinn criter.	3.074612	F-statistic		2.717114
Durbin-Watson stat	2.833065	Prob(F-statistic)		0.000028

The Fixed Effects Model (FEM) estimation was employed to examine the determinants of firm value in energy sector companies listed on the Indonesia Stock Exchange during the 2020–2024 period. The results indicate that the model appropriately controls for unobserved firm-specific heterogeneity through cross-section fixed effects. Based on the estimation output, the panel regression equation can be expressed as follows:

$$\text{Firm Value}_{it} = -1.1469 + 0.5979\ \text{IND\_COMMISSIONERS}_{it} + 0.0640\ \text{BOARD\_SIZE}_{it} + 0.3360\ \text{AUDIT\_COMMITTEE}_{it} - 0.0122\ \text{IN}$$

The estimation results show that Independent Commissioners have a positive and statistically significant effect on firm value ($\beta = 0.5979$; $p = 0.0404$). This finding indicates that a higher proportion of independent commissioners strengthens the monitoring function of the board, enhances managerial accountability, and improves investor confidence, which is reflected in higher firm valuation. This result is consistent with corporate governance theory, which emphasizes the role of independent oversight in mitigating agency problems and improving firm performance.

In contrast, Board Size, Audit Committee, and Institutional Ownership do not exhibit statistically significant effects on firm value. Although the coefficients of board size and audit committee are positive, their effects are not strong enough to be statistically meaningful. This suggests that the mere presence or size of governance structures does not automatically translate into higher market valuation unless accompanied by effective governance practices. Similarly, institutional ownership does not significantly influence firm value, implying that institutional investors may not actively exert monitoring pressure in the context of energy sector firms during the observed period.

With respect to sustainability performance, the coefficient is negative and statistically insignificant, indicating that sustainability performance does not directly affect firm value in the short run. This result implies that the market may not immediately capitalize sustainability-related performance into firm valuation, particularly in capital-intensive and commodity-based industries such as the energy sector, where investors tend to prioritize financial fundamentals over non-financial disclosures.

Firm size also shows a positive but statistically insignificant effect on firm value, suggesting that larger firm scale alone does not guarantee higher market valuation after controlling for firm-specific fixed effects. This finding implies that investors in the energy sector place greater emphasis on governance quality and firm-specific performance rather than on size per se.

The F-test result indicates that the model is jointly significant (F-statistic = 2.7171; p-value = 0.000028). This implies that all explanatory variables, taken together, significantly explain variations in firm value. Therefore, the proposed model is statistically valid for explaining firm value in the energy sector.

In terms of explanatory power, the model yields an R-squared of 0.4532 and an Adjusted R-squared of 0.2864. This indicates that approximately 45.32% of the variation in firm value is explained by the independent variables and firm-specific fixed effects included in the model, while the remaining variation is explained by other factors outside the model. The adjusted R-squared reflects a moderate explanatory power after adjusting for the number of regressors and cross-sectional effects, which is considered reasonable for panel data studies in corporate governance and sustainability research.

Overall, the Fixed Effects Model results suggest that corporate governance mechanisms, particularly board independence, play a more prominent role in shaping firm value than sustainability performance and firm characteristics in energy sector companies. This finding highlights the importance of strengthening governance quality to enhance firm value, while the economic benefits of sustainability initiatives may require a longer time horizon to be fully recognized by the capital market.

4.2. Discussions

The empirical findings indicate that independent commissioners play a meaningful role in enhancing firm value in energy sector companies. The positive and significant effect suggests that stronger board independence improves monitoring quality, reduces managerial opportunism, and enhances transparency, which are valued by investors. This result is consistent with agency theory, which posits that independent oversight mitigates conflicts of interest between managers and shareholders, thereby improving firm outcomes. In capital-intensive and high-risk industries such as energy, the credibility of governance structures becomes particularly salient because operational risks, regulatory exposure, and environmental liabilities heighten information asymmetry. Effective board independence thus serves as a governance signal that strengthens market confidence.

The absence of significant effects from board size and audit committee characteristics indicates that structural aspects of governance do not automatically translate into higher market valuation. This finding implies that governance effectiveness depends more on the substantive functioning and quality of oversight rather than on formal compliance with governance structures. In practice, large boards or audit committees may face coordination problems, limited decisional efficiency, or symbolic roles that do not materially improve monitoring quality. This nuance helps explain why investors may not systematically reward firms merely for having larger boards or audit committees, particularly in environments where governance reforms are driven by regulatory compliance rather than performance-oriented governance.

Institutional ownership does not exhibit a significant association with firm value, suggesting that institutional investors in the energy sector may adopt a passive monitoring stance during the observed period. This outcome may reflect the strategic nature of energy firms, where ownership concentration and state or affiliated ownership structures limit the influence of external institutional investors on managerial decisions. Moreover, in periods characterized by commodity price volatility, institutional investors may prioritize short-term financial returns over active engagement in governance, thereby weakening the expected monitoring effect.

Sustainability performance does not show a direct impact on firm value, indicating that the capital market may not immediately capitalize sustainability-related initiatives into valuation. In the energy sector, where firms are structurally associated with environmental externalities, sustainability disclosures may be perceived as compliance-driven rather than value-enhancing signals. Investors may remain skeptical about the short-term economic benefits of sustainability initiatives, particularly when such initiatives require substantial capital expenditures and may compress margins in the short run. This finding suggests that the valuation effect of sustainability performance is likely contingent on the extent to which sustainability strategies are integrated into core business models and translated into tangible financial outcomes.

Firm size also does not significantly influence firm value after controlling for firm-specific fixed effects. This result indicates that scale alone does not guarantee superior valuation in the energy sector. Larger firms may benefit from economies of scale, but they also face higher regulatory scrutiny, operational

complexity, and exposure to political and environmental risks. Consequently, the market appears to differentiate firm value based on governance quality and firm-specific performance rather than on size per se.

Taken together, these findings highlight that governance quality, particularly board independence, is more immediately reflected in firm value than sustainability performance in the energy sector. This pattern suggests that investors prioritize mechanisms that directly mitigate agency risks and enhance decision-making quality, while the economic value of sustainability initiatives may require longer horizons and clearer financial linkages to be fully recognized by the market. The results imply that firms seeking to enhance market valuation should strengthen substantive governance practices and strategically align sustainability initiatives with financial performance to ensure that non-financial commitments translate into credible value creation.

5. CONCLUSION

This study examines the effects of corporate governance mechanisms and sustainability performance on firm value in energy sector companies listed on the Indonesia Stock Exchange during the 2020–2024 period using a Fixed Effects Model. The findings indicate that board independence, as reflected by the presence of independent commissioners, has a positive and significant impact on firm value. This result underscores the importance of effective monitoring and governance quality in mitigating agency problems and strengthening investor confidence in a high-risk and capital-intensive industry. In contrast, board size, audit committee, institutional ownership, sustainability performance, and firm size do not exhibit significant effects on firm value. These findings suggest that formal governance structures and sustainability initiatives are not automatically capitalized by the market unless they are perceived to enhance managerial effectiveness and economic performance. Overall, the results imply that investors in the energy sector prioritize governance mechanisms that directly improve oversight and accountability, while the valuation effects of sustainability-related efforts may require a longer time horizon and stronger integration with core business strategies. This study contributes to the corporate governance and sustainability literature by providing updated evidence from the Indonesian energy sector and highlights the need for firms to strengthen substantive governance practices to enhance firm value.

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