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Exploring Financial and ESG Drivers of Firm Value: The Moderating Effect of Dividend Policy in the Energy Sector

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Abstract: The transition toward sustainable energy practices has created increasing pressure on companies to align financial performance with environmental, social, and governance (ESG) objectives. This study aims to examine the effects of sustainability, profitability, and capital structure on firm value, while analyzing the moderating role of dividend policy among energy sector companies listed on the Indonesia Stock Exchange (IDX). Sustainability is assessed using ESG Score, profitability by Return on Assets (ROA), capital structure by Debt to Equity Ratio (DER), and dividend policy by Dividend Payout Ratio (DPR). A quantitative method is employed, utilizing panel data from 28 firms selected through purposive sampling over the 2017–2023 period. The findings reveal that profitability and capital structure significantly influence firm value, while sustainability shows no significant effect. Furthermore, dividend policy negatively moderates the relationship between profitability and firm value, but does not moderate the effect of sustainability or capital structure. The study concludes that financial metrics remain dominant drivers of firm value in the energy sector, while ESG initiatives may require longer-term adoption to show measurable impact. These insights offer practical implications for corporate managers and investors in aligning strategic financial decisions with sustainability goals.

Keywords: sustainability, profitability, capital structure, dividend policy, firm value.

INTRODUCTION

Energy is a fundamental driver of global economic activity and a critical determinant of a nation's development trajectory (Pangestuti et al., 2022). In the 21st century, the transition from fossil-based energy systems to renewable energy sources has become an urgent global agenda, closely linked to decarbonization efforts and environmental sustainability. However, this transition is not merely a technical challenge—it also represents a structural economic and financial transformation that must reconcile sustainability goals with corporate performance (Rehman, 2016).

The global energy sector is currently navigating a complex landscape shaped by rising demand, resource constraints, and volatile commodity prices. High dependency on fossil fuels—such as oil, coal, and gas—exposes energy-intensive economies to systemic risks,

including supply shocks, price volatility, and environmental degradation (Liong & Su'un, 2023). Simultaneously, global frameworks such as the Paris Agreement have placed mounting pressure on nations and corporations alike to commit to carbon neutrality and sustainable development targets (Georgakopoulos et al., 2022).

In this context, companies operating in the energy sector are under increasing scrutiny to balance profitability with sustainability, while maintaining firm value amidst dynamic regulatory, environmental, and market expectations. These companies often face paradoxical conditions: on one hand, they contribute significantly to national and global GDP through fossil-based energy exports; on the other hand, they are expected to lead the transition towards clean energy systems (Cahyawati & Suryaningsum, 2024). Such dual expectations highlight the strategic importance of aligning financial performance with environmental, social, and governance (ESG) principles in order to maintain competitiveness and long-term value creation (Dagunduro et al., 2024; Lumentut & Mangantar, 2019; Naceur & Goaied, 2002; Wardhani et al., 2021; Wieczorek-Kosmala et al., 2021).

Firm value itself is influenced by multiple interrelated financial and non-financial variables. Profitability, capital structure, and sustainability disclosures are key strategic levers that shape investor perceptions and corporate reputation (Grabińska et al., 2021; Rasyid et al., 2022; Renaldo et al., 2025; Sevnia & Susi Dwi Mulyani, 2023). A firm's ability to maintain an optimal capital structure and generate stable returns enhances its capacity to invest in sustainable technologies and practices. At the same time, the disclosure of sustainability initiatives can serve as a signaling mechanism, fostering market trust and mitigating operational risk (Ariyanti et al., 2024).

Dividend policy, as a component of financial strategy, also plays a significant signaling role. It communicates managerial confidence in the firm's financial health and future outlook (Hendra & Absah, 2022). A well-aligned dividend policy can moderate stakeholder perceptions of risk, especially in capital-intensive industries like energy, where sustainability investments often involve long-term payback periods. Balancing dividend payouts with reinvestment in green technologies becomes crucial for signaling stability while supporting sustainable growth trajectories.

The increasing relevance of sustainability performance to firm valuation has elevated ESG disclosure from a reputational concern to a financial imperative. Sustainability is no longer considered a peripheral concern but is embedded in corporate strategy as a value-enhancing mechanism. As market participants, including investors and regulators, place greater emphasis on ESG criteria, firms must navigate complex trade-offs between short-term financial returns and long-term sustainable development objectives.

This study aims to investigate how sustainability, profitability, and capital structure influence firm value in the energy sector, while exploring whether dividend policy serves as a moderating factor in these relationships. This inquiry is situated within the broader theoretical frameworks of signaling theory and stakeholder theory, which emphasize the strategic importance of transparent communication and the balancing of stakeholder interests in enhancing firm value.

METHODS

This study adopts a quantitative approach using statistical analysis on panel data to examine causal relationships among Sustainability (X1), Profitability (X2), and Capital Structure (X3) on Firm Value (Y), with Dividend Policy (Z) serving as a moderating variable. The research utilizes secondary data from 10 energy sector companies listed on the Indonesia Stock Exchange during the period 2017–2023, selected through purposive sampling. The data collected include annual financial reports and sustainability reports.

Sustainability (X1) is measured by the ESG Score (ranging from 0 to 100) sourced from sustainability reports or Bloomberg (Brandon et al., 2021). Profitability (X2) is represented by

Return on Assets (ROA), calculated as Net Income divided by Total Assets (Brigham & Ehrhardt, 2017). Capital Structure (X3) is proxied by the Debt to Equity Ratio (DER), calculated as Total Debt over Equity (Brigham & Houston, 2018). Firm Value (Y) is measured using the Price to Book Value (PBV), calculated as the Market Price per Share divided by Book Value per Share (Risman, 2023; Sudana, 2017). Dividend Policy (Z), as a moderating variable, is assessed using the Dividend Payout Ratio (DPR), calculated as Dividend per Share over Earnings per Share.

From a population of 89 energy firms, only 10 companies met the sample criteria. These firms consistently published both financial and sustainability reports throughout the 2017–2023 period. Financial performance data were obtained from the companies' annual reports, while ESG Scores were sourced from sustainability reports or reputable data providers like Bloomberg.

Data analysis involves both descriptive and inferential statistics. Descriptive analysis summarizes the characteristics of the variables, while inferential analysis applies panel data regression and Moderated Regression Analysis (MRA) to test the proposed hypotheses. The panel regression model used is:

$$Y = \alpha + \beta 1X1 + \beta 2X2 + \beta 3X3 + \beta Z + \beta 4X1Z + \beta 5X2Z + \beta 6X3*Z + \varepsilon.$$

Model selection follows the Chow test, Hausman test, and Lagrange Multiplier test to determine the best fit. Hypothesis testing is conducted using F-test, t-test, and the coefficient of determination (R^2). Classical assumption testing is considered optional in panel data analysis, as justified by Gujarati and Porter (2012) and Risman (2023), due to the robustness of panel regression techniques in handling statistical biases.

RESULTS AND DISCUSSION

Result

Selection of Panel Data Regression Method

The analysis employed panel data combining time series and cross-sectional observations. The model selection process involved two key statistical tests. The Chow Test (CEM vs. FEM) produced an F-statistic of 1.497852 (p = 0.1730) and a Chi-square value of 15.863349 (p = 0.0698), both greater than 0.05. These results indicate no significant differences in intercepts among the companies, suggesting that the Common Effect Model (CEM) is more appropriate than the Fixed Effect Model (FEM).

Subsequently, the Lagrange Multiplier (LM) Test (CEM vs. REM) yielded p-values for the cross-section effect (0.8184), time effect (0.9381), and both effects (0.8085), all of which exceeded the 0.05 significance level. This confirms that the Random Effect Model (REM) does not outperform the CEM. Therefore, the CEM was selected as the most suitable estimation method for further analysis.

Table 1. Model Selection Tests (Chow Test and Lagrange Multiplier Test)

Test Type	Statistic	d.f.	p-Value	Decision
Chow Test (Cross-section F)	1.497852	(9,53)	0.1730	No significant difference → Use CEM
Chow Test (Chi-square)	15.863349	9	0.0698	No significant difference → Use CEM
LM Test (Breusch-Pagan, Cross-section)	0.052701	—	0.8184	No significant difference → Use CEM
LM Test (Breusch-Pagan, Time)	0.006033	—	0.9381	No significant difference → Use CEM

LM Test (Breusch-Pagan, Both)	0.058734	—	0.8085	No significant difference → Use CEM

Model Feasibility Test (*Goodness of Fit*)

The model's explanatory power and overall fit were assessed through the coefficient of determination and the F-test. The R-squared value was 0.509825, indicating that the model explains approximately 50.98% of the variation in firm value (PBV). The adjusted R-squared was 0.454483, showing a good balance between explanatory capacity and model parsimony. The F-statistic was 9.212223 with a p-value of 0.000000 (< 0.05), confirming the model's statistical significance.

Simultaneous Test and Coefficient of Determination

The F-test results demonstrated that ESG, ROA, DER, and DPR jointly have a significant effect on firm value (PBV) (F-statistic = 9.212223, $p < 0.05$). The coefficient of determination (R^2) of 0.509825 indicates that 50.98% of the variation in PBV is explained by the independent variables, while the remaining variation is attributable to factors outside the model.

Moderated Regression Analysis (MRA) Results

Table 2. Moderated Regression Analysis (MRA) Results

Variable	Coefficient	t-Statistic	p-Value	Significance
ESG	0.002359	0.3603	0.7199	Not significant
ROA	5.166224	4.0156	0.0002	Significant (+)
DER	0.151203	6.8679	0.0000	Significant (+)
DPR	-0.03194	-0.0839	0.9695	Not significant
ESG×DPR	0.019389	1.1791	0.2429	Not significant
ROA×DPR	-4.7631	-2.0732	0.0423	Significant (-)
DER×DPR	-0.36041	-1.5889	0.1172	Not significant

The MRA results indicate that ROA and DER have positive and significant effects on PBV, while ESG has no significant direct effect. Dividend policy (DPR) shows a significant negative moderating effect only on the ROA–PBV relationship, suggesting that higher dividend payouts weaken the positive influence of profitability on firm value. Other moderating effects of DPR are statistically insignificant.

Hypothesis Testing Results

Table 3. Hypothesis Testing Results

Hypothesis	Statement	p-Value	Decision
H1	ESG → PBV	0.7199	Rejected
H2	ROA → PBV	0.0002	Accepted
H3	DER → PBV	0.0000	Accepted
H4	ESG×DPR → PBV	0.2429	Rejected
H5	ROA×DPR → PBV	0.0423	Accepted (negative moderation)
H6	DER×DPR → PBV	0.1172	Rejected

In summary, the findings reveal that profitability (ROA) and capital structure (DER) are key drivers of firm value in the Indonesian energy sector, while sustainability performance (ESG) shows no significant direct impact. The moderating role of dividend policy (DPR) is limited, with a notable negative effect only in the profitability–firm value relationship, indicating that high dividend payouts may dilute the positive impact of profitability on valuation.

Discussion

Effect of Sustainability on Firm Value

The results show that sustainability, measured by ESG Score, has no significant effect on firm value. This indicates that improvements in ESG performance have not yet translated into a direct increase in the market valuation of energy sector companies in Indonesia during the observation period. This finding leads to the rejection of the first hypothesis (H1). Several factors may explain this outcome. First, domestic investors may still pay limited attention to sustainability indicators when making investment decisions, with a stronger focus on short-term financial performance. Second, sustainability reporting practices in the energy sector often remain procedural rather than fully integrated into business strategies. Third, any shift in market perception toward ESG as a long-term value signal may require a longer observation period, in line with the gradual development of the sustainable investment ecosystem in Indonesia.

From the perspective of stakeholder theory, companies that account for social and environmental aspects can gain social legitimacy, potentially leading to long-term performance improvements. Signaling theory also suggests that high-quality ESG disclosures can act as positive signals for stability, risk management capacity, and growth prospects. The absence of a significant impact in this study may therefore indicate that such market recognition has yet to materialize in this sector.

Effect of Profitability on Firm Value

Profitability, measured by ROA, has a positive and significant effect on firm value. This suggests that efficiency in asset utilization and the ability to generate profits are key factors enhancing investor confidence. High profitability reflects a healthy financial position, which the market rewards through higher valuations.

From a signaling perspective, strong profitability communicates to investors that the company has sound management, efficient operations, and strong future cash flow potential. In stakeholder theory terms, profitability can be seen as an indicator that the company creates value not only for shareholders but for all stakeholders. In the energy industry, where companies face external pressures such as commodity price fluctuations and regulatory shifts, the ability to consistently generate profits signals resilience and adaptability, which investors respond to positively.

Effect of Capital Structure on Firm Value

Capital structure, represented by the debt-to-equity ratio (DER), has a positive and significant impact on firm value. This indicates that, when optimally managed, debt can serve as a strategic financing tool to enhance market valuation. An optimal leverage level sends a positive signal to investors about financial stability and growth prospects. In the energy sector—characterized by high capital intensity—controlled debt usage can indicate confidence in long-term business prospects and an ability to fund productive investments. However, this positive relationship only holds when debt levels remain within a manageable range. Excessive leverage could increase financial risk and erode investor confidence in the company's sustainability. This underscores the need for careful capital structure planning to support long-term growth without compromising financial stability.

The Moderating Role of Dividend Policy on the Sustainability–Firm Value Relationship

Dividend policy does not significantly moderate the relationship between ESG and firm value, leading to the rejection of the fourth hypothesis (H4). This suggests that other factors—such as financial performance or corporate governance policies—may play a more dominant role in influencing this relationship.

The absence of a moderating effect implies that dividend distribution, even when applied, does not alter investor perceptions of how sustainability contributes to market value. Several factors could explain this: the tendency of investors in the energy sector to focus more on financial and macroeconomic factors, the lack of standardized ESG reporting in Indonesia, and the fluctuating nature of dividend policies in the sector. These results indicate that dividend policy and sustainability initiatives may operate independently in shaping firm value in this context.

The Moderating Role of Dividend Policy on the Profitability–Firm Value Relationship

Dividend policy significantly moderates the relationship between profitability and firm value, but with a negative direction. This finding supports the acceptance of the fifth hypothesis (H5). It suggests that higher dividend payouts weaken the positive impact of profitability on firm valuation.

A high dividend payout can limit the funds available for reinvestment, potentially restricting future growth opportunities—particularly in the capital-intensive energy sector. This can lead to investor perceptions that the company prioritizes short-term shareholder returns over long-term growth prospects. In some cases, aggressive dividend policies may also trigger a "dividend trap" effect, where stock prices drop after the ex-dividend date due to profit-taking behavior, ultimately reducing market value. This highlights the importance of aligning dividend policy with sustainable growth strategies, especially in industries that require continuous investment.

The Moderating Role of Dividend Policy on the Capital Structure–Firm Value Relationship

The results indicate that dividend policy does not significantly moderate the relationship between capital structure and firm value, leading to the rejection of the sixth hypothesis (H6). This means that the effect of leverage on market valuation operates independently of dividend policy.

In practice, this suggests that investors may assess leverage and dividend policy separately when evaluating company value in the energy sector. The high volatility of the industry, coupled with long-term financing needs, may diminish the perceived interaction between these two factors. While signaling theory posits that dividends could offset the uncertainty caused by high leverage, the results here imply that such a moderating effect does not manifest in this specific context.

CONCLUSION

This study examined the impact of sustainability (ESG Score), profitability (ROA), and capital structure (DER) on firm value (PBV), with dividend policy (DPR) as a moderating variable, using panel data regression and Moderated Regression Analysis (MRA) across ten energy sector firms listed on the Indonesia Stock Exchange during 2017–2023. The findings reveal that while profitability and capital structure significantly enhance firm value, sustainability does not exert a statistically significant influence. Moreover, dividend policy fails to moderate the relationship between ESG and firm value and between capital structure and firm value. Interestingly, dividend policy significantly weakens the positive effect of profitability on firm value, suggesting that excessive dividend payouts may reduce reinvestment potential, particularly in capital-intensive industries like energy.

These results contribute to industrial science by emphasizing the context-specific nature of financial signal interpretation in capital markets, particularly in emerging economies where environmental disclosures have yet to fully influence investor decision-making. This study highlights the importance of efficient asset management and strategic capital structuring in value creation. In practice, energy companies should prioritize operational profitability and

optimal leverage strategies to maintain investor confidence and enhance market valuation. Additionally, while sustainability practices may not currently translate into immediate financial value, they remain vital for long-term competitiveness and compliance in the global transition toward responsible energy development.

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