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The Effect Of Financial Information On Firm Value With Csr Disclosure As A Moderating Variable In The Energy Sector On The Indonesia Stock Exchange 2021-2024 Period

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ABSTRACT

This study aims to analyze the effects of profitability, firm size, and leverage on firm value, as well as to examine the moderating role of CSR disclosure in energy sector companies listed on the Indonesia Stock Exchange during 2021–2024. This research employs a quantitative approach with a causal research design. Secondary data were obtained from financial statements and sustainability reports of energy sector companies. Data collection was conducted using documentation techniques with purposive sampling, resulting in 23 sample companies. Panel data regression with moderation analysis was applied using EViews 13 software. The results indicate that profitability and firm size have no significant effect on firm value, while leverage has a significant positive effect. CSR disclosure has a significant positive effect on firm value. Furthermore, CSR disclosure does not moderate the relationship between profitability and firm value nor between firm size and firm value, but it significantly weakens the positive effect of leverage on firm value in energy sector companies. These findings suggest that firm value in the energy sector is influenced not only by financial performance but also by sustainability considerations. Therefore, companies are encouraged to integrate financial strategies and CSR disclosure, while investors should consider both financial and nonfinancial information.

INTRODUCTION

The energy sector is a strategic sector that contributes significantly to the national economy and plays a crucial role in Indonesia's industrial structure. In 2023, the minerals and coal subsector contributed approximately 10.5% to the national Gross Domestic Product (GDP) (Kementerian ESDM RI, 2024), and when combined with other energy subsectors, the total contribution of the energy and natural resources sector reached approximately 12.5% of GDP (Waluyo, 2025). Furthermore, the energy sector is a major contributor to non-tax state revenue and plays a role in maintaining energy security by increasing domestic production (Kementerian

ESDM RI, 2025). In the capital market, the energy sector's performance has shown superior index growth compared to other sectors, indicating high investor interest in this sector.However, the development of energy sector company values does not always align with their financial performance. The 2021–2024 period showed fluctuating dynamics in profitability and company value, while leverage and company size tended to be more stable (Bursa Efek Indonesia, 2024). This condition indicates that the formation of the value of energy sector companies is influenced by more complex factors than just financial indicators.Several empirical studies have shown inconsistent results regarding the influence of profitability, firm size, and leverage on firm value. Some studies find a positive effect of profitability on firm value (Al-Omari et al., 2024; Endri & Fathony, 2020), but others show a negative or insignificant effect, particularly in highly volatile industries (Meliza et al., 2025; Reschiwati et al., 2020). Firm size also shows mixed results: some studies find a positive effect (Meiryani et al., 2020), while others show a negative impact on efficiency and firm value (Le, 2023). Regarding leverage, some studies suggest that leverage can increase firm value through expansion financing (Pham et al., 2023), but other studies confirm that high leverage increases financial risk, thus negatively impacting firm value (Uddin et al., 2022). These inconsistent findings indicate the presence of contingency factors that moderate the relationship between financial information and firm value.

From the perspective of stakeholder theory and legitimacy theory, the sustainability of a company's value depends not only on profit but also on social acceptance from stakeholders, which can be built through CSR disclosure (Faisal et al., 2020; Rahman & Alsayegh, 2021). Furthermore, signalling theory emphasizes that CSR disclosure and financial information act as signals to reduce information asymmetry and shape market perceptions of company value (Indriastuti et al., 2025). In line with this, the Financial Services Authority (OJK) requires issuers, including those in the energy sector, to prepare sustainability reports through POJK No. 51 of 2017; however, the quality of CSR disclosure in the energy sector remains variable, and many companies tend to focus on minimal compliance (Faisal et al., 2020; Hermawan et al., 2023). Furthermore, the reclassification of the energy sector by the Indonesia Stock Exchange through the IDX-IC framework, effective since 2021, makes the 2021–2024 period relevant for use to maintain consistency with the current sectoral structure.The discrepancy between financial performance and firm value indicates that investors respond not only to direct financial information but also consider the context of a company's sustainability and social legitimacy. Therefore, examining the role of CSR disclosure as a moderating variable is crucial to explaining how financial information is perceived by the market in shaping the value of energy sector companies.

LITERATURE REVIEW

Signalling Theory

Signaling theory, introduced by Spence (1973) and developed by Ross (1977) explains how the sender (management), who has more information, sends signals to the recipient (investors) to reduce information asymmetry. In the context of capital markets, these signals are realized through regularly published financial reports and sustainability reports. Company value, generally measured using the PBV ratio, reflects the market's response to the signals provided, both financial and nonfinancial. When signals are deemed high-quality and relevant to market conditions, investor confidence in the company increases. Conversely, unclear or untimely signals can create uncertainty that negatively impacts market valuation. Therefore, companies need to develop effective information disclosure strategies to strengthen positive investor perceptions. Successfully delivering credible signals is key to building a company's reputation in the capital market. This action aligns with the goal of signaling theory: to narrow the information gap between management and investors to increase the company's market value (Yasar et al., 2020).

Stakeholder Theory

The stakeholder theory developed by Freeman (1984), the principle of corporate governance stems from the view that companies are responsible not only to shareholders but also to various groups with interests in the company's activities, such as employees, consumers, the community, suppliers, and the government. In this context, a company's value is determined by its ability to manage relationships and meet the expectations of all stakeholders. Profitability serves not only as an indicator of efficiency but also as a resource for meeting stakeholder demands. Companies with high profits tend to be better able to provide adequate compensation, contribute to society, and invest in sustainability. Conversely, the larger the company, the more complex the relationships it must maintain with stakeholders. Larger companies face higher expectations regarding transparency and accountability. Meanwhile, high leverage can increase stakeholder concerns about financial risk. Therefore, management is required to manage profitability, size, and leverage wisely to maintain stakeholder support, which ultimately increases the company's value. (Dao & Phan, 2023).

Agency Theory

The agency theory proposed by Jensen dan Meckling (1976) emphasizes that the relationship between shareholders (principals) and management (agents) often presents a conflict of interest, particularly when information and decision-making are concentrated in management. Internal factors such as profitability, firm size, and leverage reflect financial decisions made by management and have the potential to impact firm value. High profitability can indicate effective management, but it also opens up opportunities for misappropriation of profits for personal gain if left unchecked. The larger the firm, the more complex its organizational structure, opening up opportunities for opportunistic behavior by managers. On the other hand, high leverage can pose additional risks because managers may be encouraged to make aggressive decisions to meet debt obligations, even if this is detrimental to shareholders. Therefore, effective oversight of managerial decisions is key to ensuring that internal policies align with shareholder interests and contribute to increasing firm value (Khan et al., 2020).

Legitimacy Theory

Legitimacy theory holds that companies can only survive and thrive if they gain social approval from society and stakeholders. According to Suchman (1995), legitimacy is the perception that a company's actions and activities are considered to align with prevailing social norms, values, and beliefs. In the context of modern capital markets, legitimacy is derived not only from financial performance but also from the extent to which a company demonstrates its social responsibility. Therefore, CSR disclosure is a crucial instrument in gaining and maintaining this legitimacy, particularly in sensitive sectors such as energy and mining (Ahsan et al., 2022; Hermawan et al., 2023). Companies in these sectors often face high regulatory and social pressures due to the environmental impacts of their operations, thus sustainability reporting serves to reduce the legitimacy gap between economic activity and public expectations (Faisal et al., 2020).

Trade-off Theory

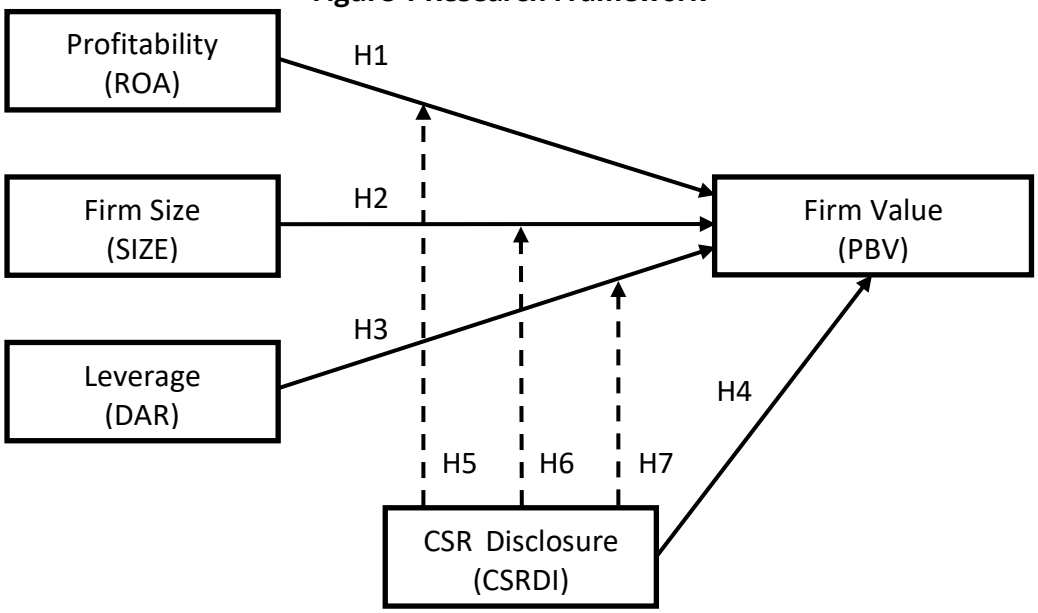
Modigliani dan Miller (1963) proposed the trade-off theory as an improvement on their initial model (MM-1), which later became known as the MM-2 model. This theory assumes a trade-off between the costs of using leverage (such as the risk of financial distress and bankruptcy) and the benefits of using leverage (such as tax savings). In the MM-1 model, the use of debt was assumed to have no effect on firm value, but in the MM-2 model, it was found that the use of debt can increase firm value through tax savings (a tax shield). This savings arises because interest payments on debt reduce taxable income. The benefit of the tax shield

encourages firms to borrow more to increase firm value. However, if a firm uses too much debt, it will experience financial distress and agency costs due to worsening agency conflicts between managers and shareholders. Therefore, financial managers need to calculate the trade-off between the costs and benefits of using debt to find the optimal capital structure that maximizes firm value (Nguyen, 2024).

Firm Value

According to Alghifari et al. (2022), firm value reflects investors' views or assessments of a company, which are generally associated with stock prices on the capital market. Valencia (2025) stated that a strong company value indicates the well-being of its shareholders. A high stock price indicates that investors will receive greater profits. High stock prices are usually caused by good company performance. If a company performs well, its stock price will rise, and the company's value will increase. When analyzing a company's condition, one essential component to consider is Price to Book Value (PBV). Pratama et al. (2025) stated that PBV has several advantages. First, PBV is easy to calculate because it only requires market price and book value data available in the company's financial statements. Second, book value demonstrates the consistency of accounting standards across companies, allowing PBV to be compared across companies to indicate whether a company is undervalued or overvalued. Third, PBV can still be applied to evaluate stocks experiencing losses. The higher the PBV ratio, the greater the market's confidence in the company's future prospects. PBV also measures a company's ability to create value on invested capital. Therefore, PBV is crucial for investors in determining investment decisions.

Figure 1 Research Framework



Source: Data by Author (2026)

METHODS

Research Method

This research is an associative-causal study with a quantitative approach, which aims to examine the relationship and influence between variables formulated in the hypothesis, namely the influence of financial information, consisting of profitability, company size, and leverage, on company value with CSR disclosure as a moderating variable. The quantitative approach was chosen because this research focuses on empirical hypothesis testing through numerical data processing and objective statistical analysis (Sugiyono, 2022).

Population and Sampling

Table 1 Research Sampling Criteria

Description	Amount
Population: Companies operating in the energy sector and listed on the IDX throughout the period 2021 to 2024	91
Sampling selection with criteria:	
1. Energy sector companies conducting an initial public offering (IPO) after 2021	(18)
2. Energy sector companies that moved to other sectors on the IDX	(2)
3. Energy sector companies affected by the suspension or temporary suspension of share trading by the IDX	(8)
4. Energy sector companies affected by delisting or removal of shares from the trading list on the stock exchange by the IDX	0
5. Energy sector companies that do not consistently publish annual reports and/or financial reports that have been audited by independent auditors	(1)
6. Energy sector companies that do not publish GRI-standard sustainability reports consecutively	(39)
Research sample (n)	23
Total sampel (n x research period) (23 x 4 years)	**92**

Based on these selection criteria, 23 companies met the sample criteria set in this study. Considering the four-year observation period, the total number of analysis units obtained was 92 research samples.

Data Collection Method

The research data was collected through documentation techniques by downloading financial reports, annual reports, and sustainability reports from energy sector companies listed on the Indonesia Stock Exchange for the 2021–2024 period, obtained from the company's official website and the official IDX website. All collected financial and nonfinancial data were then compiled in a Microsoft Excel spreadsheet and analyzed using EViews version 13 software to support panel data processing and research model testing.

Measurement

The variables studied consist of independent variables, dependent variables, and moderating variables. The independent variables include profitability, company size, and leverage. The dependent variable in this study is company value, and the moderating variable is CSR disclosure. The measurement of each variable is explained in the following table.

Table 2 Operational Definition of Research Variables

No	Variable Definition	Variable Measurement	Variable Scale
1	Firm value is the investor's perception of the company's success in managing its resources, which can be seen from the share price on the capital market. (Alghifari et al., 2022)	$PBV = \frac{\text{Market price per share}}{\text{Book value per share}}$ Source: Badruzaman et al. (2022); Pratama et al. (2025)	Ratio
2	Profitability is the ability of a company to generate profits by utilizing its assets effectively in a period (Sumani & Suryaningsih, 2022).	$ROA = \frac{\text{Net income}}{\text{Total assets}}$ Source: Al-Omari et al. (2024); Petrovic et al. (2022)	Ratio

No	Variable Definition	Variable Measurement	Variable Scale
3	Firm size is the scale of how large or small a company is seen from the total assets it owns (Endri & Fathony, 2020).	SIZE = Ln (Total assets) Source: Le (2023); Meiryani et al. (2020)	Ratio
4	Leverage is the use of debt in a company's capital structure to fund its assets and operations (Tsolas, 2021).	$DAR = \frac{\text{Total liabilities}}{\text{Total assets}}$ Source: Luo et al. (2021); Uddin et al. (2022)	Ratio
5	CSR disclosure is the disclosure of company information regarding social and environmental performance as a form of transparency and accountability to stakeholders (Machmuddah et al., 2020).	$CSRDI_j = \frac{\sum X_{ij}}{n_j}$ Source: Berg et al. (2022); Ningsih et al. (2021); Prihandono & Yuniarti (2023)	Ratio

Analysis Technique

The data analysis technique used was panel data regression with moderation (MRA). Multiple linear regression analysis of panel data is a statistical method for examining the influence of several independent variables on a single dependent variable using a combination of time series and cross-sectional data. Furthermore, this analysis also examines the direction of the relationship between the independent variables and the dependent variable, whether it has a positive or negative effect (Napitupulu et al., 2021). This study uses two research models, namely a panel data regression model without moderation for the first model and a panel data regression model with moderation for the second model.

$$PBV_{it} = a + b_1ROA_{it} + b_2SIZE_{it} + b_3DAR_{it} + e_{it} \text{ (1st model)}$$

$$PBV_{it} = a + b_1ROA_{it} + b_2SIZE_{it} + b_3DAR_{it} + b_4CSRDI_{it} + b_5(ROA*CSRDI)_{it} + b_6(SIZE*CSRDI)_{it} + b_7(DAR*CSRDI)_{it} + e_{it} \text{ (2nd model)}$$

Description:

PBV	= Firm value
a	= Constant
b1 – b7	= Regression coefficient
ROA	= Profitability
SIZE	= Firm size
DAR	= Leverage
CSRDI	= CSR disclosure
ROA*CSRDI	= Interaction between profitability and CSR disclosure
SIZE*CSRDI	= Interaction between firm size and CSR disclosure
DAR*CSRDI	= Interaction between leverage and CSR disclosure
e	= Error
i	= Entity i
t	= Period t

RESULTS

Descriptive statistical analysis of research variables

Descriptive statistics are used to provide a general overview of the characteristics of the research data, including the average value (mean), standard deviation, maximum value, and minimum value of each research variable, namely Price to Book Value (PBV), Return on Assets (ROA), firm size (SIZE), Debt to Asset Ratio (DAR), and Corporate Social Responsibility Disclosure Index (CSRDI).

Table 3 Descriptive Statistics Results

	PBV	ROA	SIZE	DAR	CSRDI
Mean	1.210353	0.073087	30.27268	0.497011	0.701886
Std. Dev.	1.560161	0.098784	1.549240	0.194906	0.181308
Maximum	11.96600	0.454267	32.75395	0.878093	1.000000
Minimum	0.231575	-0.383619	26.96941	0.048031	0.358974
Observations	92	92	92	92	92

Source: Secondary data was processed with EViews 13 (2025)

Based on Table 3 the average firm value (PBV) was 1.210, indicating that energy sector companies were generally traded slightly above their book value during 2021–2024, but with high variation (SD = 1.560 > mean). The maximum PBV of 11.966 was recorded at PT Batulicin Energi Selaras Tbk (BESS) in 2021, while the minimum PBV of 0.232 was recorded at PT Radiant Utama Interinsco Tbk (RUIS) in 2024. Profitability (ROA) had an average of 0.073 with high variation (SD = 0.099 > mean), indicating a fairly wide difference in asset efficiency between companies and periods. The maximum ROA of 0.454 was achieved by PT Indo Tambangraya Megah Tbk (ITMG) in 2022, while the minimum ROA of -0.384 occurred in PT Buana Lintas Lautan Tbk (BULL) in 2021. Company size (SIZE) has an average of 30.273 with a relatively low spread (SD = 1.549), indicating that the scale of energy company assets tends to be homogeneous; the maximum value of 32.754 was found in PT Adaro Energy Indonesia Tbk (ADRO) in 2022 and the minimum of 26.969 in PT Ulima Nitra Tbk (UNIQ) in 2021. Leverage (DAR) has an average of 0.497 (SD = 0.195) which indicates that almost half of the assets are financed by debt, in accordance with the character of the capital-intensive sector; The maximum value of 0.878 was recorded in PT Delta Dunia Makmur Tbk (DOID) in 2024 and the minimum value of 0.048 in PT Mitrabahtera Segara Sejati Tbk (MBSS) in 2021. CSR disclosure (CSRDI) showed an average of 0.702 (SD = 0.181), indicating that the company disclosed around 70% of CSR items; the maximum value of 1.000 was achieved by ITMG in 2024, while the minimum value of 0.359 was recorded in BESS in 2022–2023.

Panel Regression Analysis

Panel data regression analysis was conducted on two models: the first model without the moderating effect of the CSR disclosure variable, and the second model with the moderating effect of the CSR disclosure variable. The steps in panel data regression analysis include selecting the best model, testing the classical assumptions, and then proceeding to hypothesis testing.

Panel Data Regression Model Selection for 1st Model (without moderating effect)

The Chow test was conducted to select the appropriate panel data regression model between CEM and FEM. The results of the Chow test for 1st model are shown in Table 4 below.

Table 4 Chow Test for 1st Model

Effects Test	Statistic	d.f.	Prob.
Cross-section F	1.528836	(22,66)	0.0951
Cross-section Chi-square	37.890444	22	0.0188

Source: Secondary data was processed with EViews 13 (2025)

The results in Table 4.4 show a cross-section probability value of 0.0951, which is greater than 0.05. Therefore, the appropriate model between CEM and FEM is CEM. Therefore, the next testing step is the Lagrange Multiplier test.

Table 5 LM Test for 1st Model

	Test Hypothesis		
	Cross-section	Time	Both
Breusch-Pagan	0.407727	0.003668	0.411395
	(0.5231)	(0.9517)	(0.5213)

Source: Secondary data was processed with EViews 13 (2025)

The results in Table 5 show a Breusch-Pagan probability value of 0.5231, which is greater than 0.05. This result confirms that the best panel data regression model, among the CEM and REM, is CEM. After this, there is no need to proceed with the Hausman test, as the selected model has already been confirmed to be the Common Effect Model (CEM).

Panel Data Regression Model Selection for 2nd Model (with moderating effect)

The results of the Chow test conducted for 2nd model, namely the model involving the moderating effect of CSR disclosure (CSRDI), are shown in Table 6 below.

Table 6 Chow Test for 2nd Model

Effects Test	Statistic	d.f.	Prob.
Cross-section F	2.146203	(22,62)	0.0099
Cross-section Chi-square	52.090174	22	0.0003

Source: Secondary data was processed with EViews 13 (2025)

The results show a cross-section probability value of 0.0099, which is less than 0.05. Therefore, the most appropriate model between CEM and FEM is FEM. Therefore, the testing step continues with the Hausman test.

Table 7 Hausman Test for 2nd Model

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	23.860294	7	0.0012

Source: Secondary data was processed with EViews 13 (2025)

The results in Table 7 show a random cross-section probability of 0.0012, which is less than 0.05. This result indicates that the best panel data regression model between REM and FEM is FEM. After this, there is no need to proceed with the Lagrange Multiplier test, as the selected model has already been confirmed to be the Fixed Effect Model (FEM).

Classical Assumption Test

A classical assumption test on 1st Model, which does not involve moderating variables, was conducted to ensure the feasibility of the panel data regression model estimated using the Common Effect Model (CEM). Multicollinearity testing showed that all correlation values between independent variables were below the 0.85 threshold, thus ensuring the model did not experience multicollinearity issues (Napitupulu et al., 2021). However, the results of the heteroscedasticity test using the Glejser method indicated heteroscedasticity, indicated by the probability value of the firm size variable being less than 0.05. Therefore, to address differences in residual variance between firms, the model was improved using the Generalized Least Squares (GLS) approach through the application of cross-section weights, ensuring that the estimation results remained valid and could be interpreted accurately (Ahmed et al., 2023).

In 2nd Model, which uses CSR disclosure as a moderating variable and is estimated using the Fixed Effect Model (FEM), initial multicollinearity testing indicated a high correlation between

the independent variables and the interaction variable. To address this, a centering approach was used by subtracting the average value of each variable before forming the interaction variable, as recommended by Frazier et al. (2004) and Shieh (2011). The test results after centering showed that all correlation values were below 0.85, thus confirming the model was free from multicollinearity (Napitupulu et al., 2021). Furthermore, the Glejser heteroscedasticity test showed that all variables had probability values above 0.05, indicating no heteroscedasticity problem. Thus, 2nd model met all classical assumptions and was suitable for hypothesis testing.

Panel Data Regression Equation 1st Model

After testing the selection of the best panel data regression model, 1st model was determined using the Common Effect Model (CEM) with the following results.

Table 8 Results of Panel Data Regression Analysis 1st Model (Without Moderating Effect)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.739222	0.977216	3.826404	0.0002
ROA	3.243840	0.459769	7.055376	0.0000
SIZE	-0.113614	0.031900	-3.561525	0.0006
DAR	0.829333	0.213964	3.876039	0.0002

Source: Secondary data was processed with EViews 13 (2025)

Based on Table 8, the following equation is obtained for the panel data regression results for 1st model without moderation with the CEM model.

PBV = 3,739222 + 3,243840ROA – 0,113614SIZE + 0,829333DAR

1. The constant value of 3.739222 (positive) means that without the ROA, SIZE, and DAR variables, the PBV value is estimated to be 3.739222.
2. The regression coefficient value b_1 on the ROA variable is 3.243840. This indicates that every one unit increase in ROA will increase PBV by 3.243840, assuming other variables are constant.
3. The regression coefficient value b_2 on the SIZE variable is -0.113614. This means that every one unit increase in SIZE will decrease PBV by 0.113614, assuming the other variables are constant.
4. The regression coefficient value b_3 on the DAR variable is 0.829333. This means that every time DAR increases by one unit, PBV will increase by 0.829333, assuming the other independent variables are constant.

Panel Data Regression Equation 2nd Model

After testing the selection of the best panel data regression model, 2nd model was determined using the Fixed Effect Model (FEM) with the following results.

Table 9 Results of Panel Data Regression Analysis 2nd Model (With Moderating Effect)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.464627	28.87670	0.016090	0.9872
ROA	3.080636	2.782096	1.107307	0.2724
SIZE	-0.140965	0.980072	-0.143831	0.8861
DAR	5.564610	2.348840	2.369089	0.0210
CSRDI	3.765218	1.801961	2.089512	0.0408
ROA*CSRDI	-8.791203	12.34331	-0.712224	0.4790
SIZE*CSRDI	-2.451517	1.915689	-1.279705	0.2054
DAR*CSRDI	-19.79644	8.199609	-2.414315	0.0187

Source: Secondary data was processed with EViews 13 (2025)

Based on Table 9, the equation for the MRA panel data regression results for 2nd model with the FEM model is as follows:

PBV = 0,464627 + 3,080636ROA – 0,140965SIZE + 5,564610DAR + 3,765218CSRDI – 8,791203(ROA*CSRDI) – 2,451517(SIZE*CSRDI) – 19,79644(DAR*CSRDI)

The explanation is as follows:

1. The constant value of 0.464627 (positive) means that without the variables ROA, SIZE, DAR, CSRDI, ROA*CSRDI, SIZE*CSRDI, and DAR*CSRDI, the PBV value is estimated at 0.464627.
2. The regression coefficient b_1 for the ROA variable is 3.080636. This indicates that every one-unit increase in ROA will increase PBV by 3.080636, assuming the other variables remain constant.
3. The regression coefficient b_2 for the SIZE variable is -0.140965. This means that every one-unit increase in SIZE will decrease PBV by 0.140965, assuming the other variables remain constant.
4. The regression coefficient b_3 for the DAR variable is 5.564610. This means that every time DAR increases by one unit, PBV will increase by 5.564610, assuming the other independent variables remain constant.
5. The b_4 regression coefficient for the CSRDI variable is 3.765218. This means that every one-unit increase in CSRDI will increase PBV by 3.765218, assuming the other variables remain constant.
6. The b_5 regression coefficient for the ROA-CSRD interaction variable is -8.791203. This indicates that every one-unit increase in the interaction between ROA and CSRDI will decrease PBV by 8.791203, assuming the other variables remain constant.
7. The b_6 regression coefficient for the SIZE-CSRD interaction variable is -2.451517. This means that every one-unit increase in the interaction between SIZE and CSRDI will decrease PBV by 2.451517, assuming the other variables remain constant.
8. The regression coefficient value of b_7 on the interaction variable between DAR and CSRDI is -19.79644. This indicates that every one unit increase in the interaction between DAR and CSRDI will decrease PBV by 19.79644, assuming other variables are constant.

F Test and Coefficient of Determination (R^2)

The results of the F test and coefficient of determination (R^2) for the 1st model are presented in Table 10, while those for the 2nd model are shown in Table 11.

Table 10 Results of F Test and R^2 for 1st Model

R-squared	0.384030	**Mean dependent var**	3.282156
Adjusted R-squared	0.363031	**S.D. dependent var**	3.289126
S.E. of regression	1.340588	**Sum squared resid**	158.1516
F-statistic	18.28800	**Durbin-Watson stat**	1.019528
Prob(F-statistic)	0.000000		

Source: Secondary data was processed with EViews 13 (2025)

Based on Table 10, the results of the simultaneous influence test on 1st model (without moderating effect) obtained an F-value of 18.28800 > F-table of 3.10007 and a probability value of 0.000000 <0.05, so Ha is accepted and H0 is rejected, meaning that the ROA, SIZE, and DAR variables simultaneously influence the PBV of energy sector companies on the IDX for the 2021-2024 period. This finding confirms that the combination of profitability, company size, and leverage collectively plays an important role in explaining variations in company value as reflected in PBV. The results of the determination coefficient test in 1st model (without moderating effect) obtained an Adjusted R-squared value of 0.363031, meaning that the ROA, SIZE, and DAR variables were only able to explain changes in the PBV variable of energy sector

companies on the IDX for the 2021-2024 period by 36.30%, while the remaining 63.70% was explained by other variables not included in 1st model of this study.

Table 11 Results of F Test and R^2 for 2nd Model

R-squared	0.480799	**Mean dependent var**	1.210353
Adjusted R-squared	0.237947	**S.D. dependent var**	1.560161
S.E. of regression	1.361953	**Akaike info criterion**	3.713236
Sum squared resid	115.0048	**Schwarz criterion**	4.535558
Log likelihood	-140.8088	**Hannan-Quinn criter.**	4.045132
F-statistic	19.79804	**Durbin-Watson stat**	2.034634
Prob(F-statistic)	0.012417		

Source: Secondary data was processed with EViews 13 (2025)

Based on Table 11, the results of the simultaneous influence test on 2nd model (with CSRDI moderating effect) obtained an F-value of 19.79804 > F-table of 2.20855 and a probability value of 0.012417 <0.05, so Ha is accepted and H0 is rejected, meaning that the variables ROA, SIZE, DAR, CSRDI, ROA*CSRDI, SIZE*CSRDI, and DAR*CSRDI simultaneously influence the PBV of energy sector companies on the IDX for the 2021-2024 period. This finding indicates that by including CSRDI as a moderating variable, the simultaneous influence of financial and nonfinancial variables on the value of energy sector companies becomes more comprehensive. The results of the determination coefficient test in 2nd model (with CSRDI moderating effect) obtained an Adjusted R-squared value of 0.237947, meaning that the variables ROA, SIZE, DAR, CSRDI, ROA*CSRDI, SIZE*CSRDI, and DAR*CSRDI were only able to explain changes in the PBV variable of energy sector companies on the IDX for the 2021-2024 period by 23.79%, while the remaining 76.21% was explained by other variables not included in 2nd model of this study.

Hypothesis Testing 1st Model and 2nd Model

Referring to the results of the panel data regression analysis conducted on 1st model which does not involve the moderating effect and 2nd model which involves the moderating effect of the CSR disclosure variable (CSRDI), the conclusions of the previously proposed hypothesis testing are summarized in Table 12 below.

Table 12 Results of Hypothesis Testing for 1st Model and 2nd model

Hypothesis		Regression Results 1st Model	Regression Results 2nd Model	Conclusion
H1	Profitability is suspected to have a positive effect on firm value	Positive and significant	Positive and insignificant	Rejected
H2	Firm size is suspected to have a negative effect on firm value	Negative and significant	Negative and insignificant	Rejected
H3	Leverage is suspected to have a positive effect on firm value	Positive and significant	Positive and significant	Accepted
H4	CSR disclosure is suspected to have a positive effect on firm value	-	Positive and significant	Accepted
H5	CSR disclosure is suspected to weaken the positive effect of profitability on firm value	-	Negative and insignificant	Rejected

H6	CSR disclosure is suspected to strengthen the negative effect of firm size on firm value	-	Negative and insignificant	Rejected
H7	CSR disclosure is suspected to weaken the positive effect of leverage on firm value	-	Negative and significant (weakens the positive effect)	Accepted

Source: Processed by researchers (2025)

DISCUSSION

The results show that profitability has a positive and significant effect on firm value prior to the inclusion of CSR moderation. This finding indicates that higher profitability serves as a positive signal for investors regarding managerial efficiency and future earnings potential, consistent with signaling theory (Spence, 1973). Similar results were reported by Al-Omari et al. (2024) and Hermawan et al. (2023), who found that profitable firms tend to receive higher market valuations. However, after CSR disclosure was incorporated into the model, the effect of profitability became insignificant. This result aligns with Hirdinis (2019), Indupurnahayu et al. (2023), and Reschiwati et al. (2020), suggesting that in sustainability-sensitive industries such as energy, investor assessment shifts from short-term profitability toward long-term sustainability considerations.

Firm size was found to have a negative and significant effect on firm value in the model without CSR moderation. This indicates that large asset ownership in capital-intensive industries may increase operational complexity and inefficiency, leading to lower valuations by investors (Le, 2023; Putra et al., 2021). From an agency perspective, large firms face higher agency costs and managerial rigidity (Jensen & Meckling, 1976). However, when CSR disclosure was introduced, the negative effect of firm size became insignificant. This finding supports legitimacy and stakeholder theories, which emphasize that CSR disclosure can reduce perceived risk and shift investor focus from firm scale to social and environmental responsibility (Ahsan et al., 2022; Habakkuk et al., 2023).

Leverage consistently showed a positive and significant effect on firm value in both models. This result implies that debt is perceived as a productive financing instrument in the energy sector, supporting large-scale and long-term investments. The finding supports trade-off theory, which suggests that firms seek an optimal capital structure by balancing tax benefits and financial risk (Nguyen, 2025). This result is consistent with Pham et al. (2023), although it differs from studies reporting negative leverage effects in other industries (Le, 2023; Uddin et al., 2022), highlighting the importance of industrial context.

CSR disclosure was found to have a positive and significant effect on firm value, indicating that sustainability information has become an important nonfinancial signal in investor decision-making. This finding is consistent with prior studies showing that CSR enhances corporate reputation, legitimacy, and investor trust (Ahsan et al., 2022; Hermawan et al., 2023). In line with legitimacy theory, CSR disclosure helps energy companies manage social and environmental risks inherent to the industry (Faisal et al., 2020). However, this result contrasts with Guo et al. (2020), who argued that CSR may create inefficiencies when not supported by strong internal capabilities.

Regarding moderation effects, CSR disclosure did not moderate the relationship between profitability and firm value. This suggests that profitability remains a dominant financial signal that is evaluated independently from CSR disclosure. From a signaling perspective, financial performance provides direct and short-term information to investors, whereas CSR represents long-term reputational signals (Guo et al., 2020). Similar reasoning explains why CSR also failed

to moderate the relationship between firm size and firm value. Consistent with Chen et al. (2024), firm size and CSR appear to be perceived as separate dimensions in investor evaluation, resulting in an insignificant interaction effect.

In contrast, CSR disclosure significantly weakened the positive effect of leverage on firm value. This finding indicates that when firms demonstrate strong sustainability commitment, investors become more cautious in evaluating aggressive financing policies. In line with trade-off and legitimacy theories, high leverage may be perceived as inconsistent with long-term sustainability orientation, thereby reducing its positive valuation effect (Faisal et al., 2020; Nguyen, 2025). This result confirms that CSR not only directly increases firm value but also reshapes how financial policies are interpreted by the market.

CONCLUSION

Based on the analysis, this study shows that profitability and company size significantly influence company value before CSR disclosure is included, but after CSR is included as a moderating variable, both variables become insignificant. This finding indicates that the presence of CSR disclosure shifts investor assessment orientation from financial indicators and asset scale to aspects of sustainability and social legitimacy of energy sector companies. Leverage is proven to have a positive and significant effect on company value both before and after moderation, although CSR disclosure significantly weakens the strength of the leverage effect.

Furthermore, CSR disclosure has a direct positive effect on company value, indicating that CSR has become a strategic factor in shaping the value of energy sector companies. Overall, the results of this study confirm that the value of energy sector companies is not only determined by financial performance, but also influenced by the quality of sustainability disclosure that shapes investor perceptions of risk, social responsibility, and the company's long-term prospects.

IMPLICATIONS

Based on the research findings, energy sector companies are advised to manage their funding structure and CSR disclosure in a balanced and integrated manner. Leverage can be used as a strategic funding instrument to support long-term investments, but its use must be aligned with sustainability commitments to avoid creating excessive risk perceptions among investors. Furthermore, CSR disclosure should be positioned not merely as a regulatory obligation, but as part of a corporate strategy to build legitimacy, reputation, and market trust.

For investors, this study demonstrates the importance of considering a combination of financial and nonfinancial information when assessing energy sector companies. High leverage levels do not necessarily reflect growth prospects if not accompanied by quality CSR disclosure. Therefore, sustainability and social responsibility aspects need to be included in fundamental analysis, particularly in the energy sector, which carries relatively high environmental and social risks.

For future research, it is recommended to expand the observation period to capture the long-term dynamics of the relationship between financial performance, CSR disclosure, and firm value. Furthermore, the use of alternative sustainability standards, such as the industry-specific Sustainability Accounting Standards Board (SASB), could provide a more meaningful perspective for investors. Future research could also develop more complex methodological approaches, such as nonlinear models, to gain a more comprehensive understanding of the mechanisms of sustainable firm value formation.

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