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**ANALYSIS OF FIRM VALUE IN INDONESIA THE ROLE OF GREEN INVESTMENT, FINANCIAL PERFORMANCE AND CORPORATE SOCIAL RESPONSIBILITY AS MODERATION**



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**Abstract**

This study aims to analyze the effect of Green Investment, Profitability, and Leverage on Firm Value with Corporate Social Responsibility (CSR) as a moderating variable in energy sector companies listed on the Indonesia Stock Exchange (IDX) for the 2019-2023 period. This study uses quantitative methods with moderated regression analysis (MRA) techniques. The population of this study is an energy sector company listed on the Indonesia Stock Exchange as many as 87 companies, and sampling through purposive sampling method resulted in 10 companies. The results showed that Green Investment can contribute to company value, Profitability can contribute to Company Value, and Leverage has no contribution to Company Value. CSR can strengthen the influence of Green Investment on Firm Value, but is unable to moderate the relationship between Profitability on Firm Value, and unable to moderate the relationship between Leverage on Firm Value. This study provides practical implications for companies to continue to strengthen sustainable investment and Corporate Social Responsibility (CSR) transparency to increase firm value.

**Keywords:** Corporate Social Responsibility, Firm Value, Green Investment, Leverage, Profitability

## INTRODUCTION

The level of carbon emissions in Indonesia continues to increase by 0.5 degrees Celsius each year. This has led to various extreme weather events, including heatwaves, heavy rainfall, and droughts (Intergovernmental Panel on Climate Change, 2023). The highest level of carbon emissions in Indonesia occurred in 2022, reaching 251,802 MtCO<sub>2</sub>eq or the equivalent of 251.802 million tons of carbon dioxide. One of the causes of this increase is the exploitation of fossil energy sources by companies in the energy sector through mining, production, and management activities (Demirdelen et al., 2023).

The government has planned various measures toward carbon neutrality, such as renewable energy allocation laws, the reduction of coal-fired power plants, the transition from solar to gas energy, and the development of renewable energy based on natural resources. These initiatives aim to achieve the renewable energy target of 23% by 2025 and 100% by 2060. The Indonesian government has successfully increased green investment by 20% annually over the past five years. The target of 30.3% of total investment, or IDR 496 trillion out of IDR 1,600 trillion, has been met through green investment. The energy sector—including electricity, geothermal energy, and biofuels—accounts for more than 30% of the green investment program ([www.esdm.go.id](http://www.esdm.go.id)).

According to the World Economic Forum (2019), a country's economic growth is greatly influenced by energy consumption. High business activity—such as the use of fossil energy sources and coal for electricity generation, as well as support for other sectors like transportation and industry—has made the energy sector one of the main drivers of carbon emissions in Indonesia ([www.lcdi.Indonesia.go.id](http://www.lcdi.Indonesia.go.id)).

The value of a business is usually correlated with its financial success; strong performance attracts investors and increases stock prices. One method to determine a company's level of success is through financial performance analysis using financial ratios (Pradani et al., 2021). A study by Jiang et al (2022) found that companies that fail to adapt to carbon reduction policies tend to face higher investment risks, including potential decreases in firm value.

One of the main issues in recent years is the decline in firm value in Indonesia's energy sector. Environmental pressure, changes in investment policies, and global market dynamics have contributed to this trend. Indonesian coal producers have faced difficulties obtaining funding for coal-related projects due to environmental concerns, pushing them to diversify into other sectors such as nickel and aluminium processing (Imanullah & Syaichu, 2023). In addition, environmental, social, and governance (ESG) aspects are now considered essential elements of non-financial information that are gaining increasing attention from companies and stakeholders (Chen & Xie, 2022). However, if companies fail to pay attention to environmental aspects in the long term, this may harm their firm value (Ethika et al., 2019). Therefore, companies must maintain good relationships with investors, including the public and the environment, while ensuring environmental sustainability to prevent negative impacts in the future (Meidijati & Augustine, 2020).

According to Adi Cakranegara (2021), ESG risk factors affect a company's valuation. Each company has elements that create value, and if environmental issues damage those elements, the firm's value may decrease. By focusing on social, environmental, and governance aspects, green investment—also referred to as green financing or sustainable

investment—aims to promote the sustainability of both the economy and the planet's ecosystems (Syabilla et al., 2021). Fluctuations in green investment, measured through PROPER certification during the research period, showed a decline in 2020, a rise through 2022, and another decline in 2023. This reflects the challenges companies face in allocating resources toward sustainability amid economic pressure and energy price volatility.

Profitability serves to assess the extent to which a company's assets contribute to generating net income (Pratama & Takarini, 2021). Furthermore, companies with carbon reduction strategies tend to have better return on assets and profit margins compared to those that have not implemented environmentally friendly policies (Liu et al., 2021). In the context of the energy sector, profitability can be highly influenced by energy price fluctuations, government policies, and operational costs related to energy transition.

By using the solvency ratio, commonly referred to as leverage, a business can determine the proportion of its assets financed by debt and the amount of debt that must be repaid relative to its assets. Companies with high leverage are more vulnerable to financial risks due to increasingly strict carbon policies, as large debt burdens can limit their flexibility in adopting sustainability strategies (Seghini, 2024).

According to the World Business Council for Sustainable Development (WBCSD), companies have both moral and operational responsibilities to manage the impact of their activities on society and the environment. Companies that enhance their CSR efforts experience increases in stock value and better financial performance, especially when they focus on reducing carbon emissions (Gallego-Álvarez et al., 2015). Consistency in disclosing environmental information helps companies maintain legitimacy in the eyes of the public, ultimately having a positive impact on firm value (Constantinescu & Lungu, 2021).

Most existing research has examined how green investment and corporate social responsibility affect firm value, but the majority of these studies focus on the mining and manufacturing industries, with limited research conducted in the energy sector. Moreover, while some studies show that green investment increases firm value, other findings are inconclusive, particularly regarding leverage and profitability.

Based on the phenomena discussed, this study aims to determine how green investment, profitability, and leverage influence firm value. With Corporate Social Responsibility as a moderating variable, the study seeks to understand how these effects occur. This research will use PROPER ratings, Return on Assets (ROA), Debt to Equity Ratio (DER), Tobin's Q, and companies' GRI Reports.

## REVIEW OF LITERATURE

### Signalling Theory

As a response to information asymmetry between management and external parties, companies are encouraged to share information with internal parties as well. According to signalling theory developed by Ross (1997), companies should disclose all their information—both financial and non-financial—to reduce this asymmetry. Dewi and Ekadjaja (2020) stated that the implementation of signalling theory aims to mitigate the problem of information asymmetry, which is the imbalance of information understanding between two parties, such as between company management and investors (Pratama & Takarini, 2021). Management's efforts to provide accurate and comprehensible information

to investors regarding the company's financial condition and future prospects reflect the application of signalling theory.

### **Firm Value**

Firm value can be understood as the price a prospective buyer is willing to pay if the company were to be sold (Syaharani & Nur, 2022). When a company's stock price increases, it indicates that the market has a high level of confidence in the company and is willing to pay more (Pradani et al., 2021). Optimal firm value is achieved when the stock price reaches its highest possible point, where it can no longer increase at that moment (Utomo & Kaujan, 2019).

### **Green Investment**

A company's effort to reduce air pollutants and greenhouse gas emissions in its operations without drastically reducing energy and non-energy production and consumption is referred to as green investment (Eyraud et al., 2011). According to the findings of Utomo et al (2020), green investment aims to align economic objectives with environmental preservation. Through this approach, both in the short and long term, companies are expected to increase their value.

### **Profitability**

A business's ability to generate profits is measured using profitability ratios. These ratios assess the company management's ability to generate profit from sales or investments over time. To determine whether a company is expanding or contracting over a given period, and to identify the reasons behind such shifts, this ratio can be calculated by comparing various components of financial statements, particularly the income statement and balance sheet (Sari & Hidayat, 2022).

### **Leverage**

The amount of debt a business must repay and the proportion of its assets financed by debt can be assessed using solvency ratios, also referred to as leverage. In liquidation scenarios, this ratio typically evaluates a company's ability to meet its short-term and long-term debt obligations (Sari & Hidayat, 2022). Through solvency ratio analysis, companies can evaluate their use of equity and debt, as well as their ability to fulfil financial obligations (Ranti & Pertiwi, 2022). This helps management in formulating policies to balance the use of capital and ensure that the company's performance aligns with its objectives (Hanafi & Halim, 2016).

### **Corporate Social Responsibility**

According to the World Business Council for Sustainable Development (WBCSD), companies have both moral and operational obligations to manage the impact of every decision and activity they undertake on society and the surrounding environment. This responsibility should be carried out with honesty, transparency, and in alignment with sustainable development principles that support overall societal well-being. The implementation of social responsibility must be reflected throughout the organization, encompassing various processes and operational policies, thereby promoting sustainability and shared accountability (Ayu & Suarjaya, 2017).

## RESEARCH METHOD

To understand how green investment, profitability, and leverage affect firm value, this study employs a quantitative approach to test and evaluate the proposed hypotheses, with Corporate Social Responsibility (CSR) as a moderating variable. Secondary data used in this study were obtained from the Ministry of Environment and Forestry (KLHK), the official websites of the sampled companies, and the Indonesia Stock Exchange (IDX). The population of this study includes companies in the energy sector listed on the Indonesia Stock Exchange between 2019 and 2023, as shown in Table 1.

**Table 1**  
**Measurement variables**

Dependent Variable (Y)	Measurement	Source
Firm Value	$Tobin's\ Q = \frac{Total\ Market\ Value + Total\ Book\ Value\ of\ Liabilities}{Total\ Book\ value\ of\ Assets}$	(Iman et al., 2021)
Independent Variable (X)		
Green Investment	Score 1 = Black Rank Score 2 = Red Rank Score 3 = Blue Rank Score 4 = Green Rank Score 5 = Gold Rank	(Syabilla et al., 2021)
Profitability	$Return\ on\ Asset = \frac{Net\ Profit}{Total\ Asset} \times 100\%$	(Sari & Hidayat, 2022)
Leverage	$Rumus\ Debt\ to\ Equity = \frac{Total\ Liabilities}{Total\ Equity}$	(Hanafi & Halim, 2016)
Moderating Variable (Z)		
Corporate Social Responsibility	$GRI = \frac{\sum Xi}{Ni}$	(Tarjo et al., 2022)

The population in this study includes all energy sector companies listed on the Indonesia Stock Exchange (IDX), totaling 87 companies. This study uses purposive sampling to select sample companies within the period from 2019 to 2023. Based on the sample selection process, 50 data points met the predetermined criteria.

This study conducts multiple linear regression analysis using the Moderating Regression Analysis (MRA) method with SPSS version 26 as the analytical tool. This model assists the energy sector in Indonesia in understanding how CSR moderates the effect of green investment, profitability, and leverage on firm value.

## RESULTS AND DISCUSSION

**Table 2**  
**Simultaneous Test**

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	4.710	7	.673	55.347	.000 <sup>b</sup>
Residual	.498	41	.012		
Total	5.208	48			

Source: Data processed by the researcher, 2025

The significance value (Sig.) of 0.000 is less than the threshold of 0.05, based on the results of the F-test. Therefore, it can be concluded that firm value is jointly influenced by Green Investment, Profitability, Leverage, and Corporate Social Responsibility (CSR).

**Table 3.**  
**Variable Interaction Test Results**

Model	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
Green Investment	.240	.044	.451	5.482	.000
Profitability	.017	.007	.459	2.419	.020
Leverage	-.020	.029	-.203	-.682	.499
Corporate Social Responsibility	2.076	.204	1.474	10.201	.000
Green Investment*CSR	.571	.128	.852	4.454	.000
Profitability*CSR	.003	.017	.033	.173	.864
Leverage*CSR	.131	.092	.409	1.429	.161

Source: Data processed by the researcher, 2025

**Green Investment Has a Significant Positive Effect on Firm Value**

The first hypothesis is supported, indicating that green investment, particularly that certified by PROPER, has a significant and positive impact on firm value. This finding aligns with prior studies by Murwaningsari and Rachmawati (2023) and Mentari and Dewi (2023), which also found that green investment positively and significantly affects firm value. According to signalling Theory by Ross (1977), companies actively engaging in sustainable investment and obtaining environmental certifications send positive signals to investors. These signals reflect the company's strong commitment to environmental sustainability, which enhances market trust and attracts more investors. Such trust is reflected in increased company valuation, as investors perceive the company to be more stable with promising long-term prospects.

According to Ross's Signaling Theory (1977), companies that actively engage in sustainable investments and obtain environmental certifications send positive signals to investors. These signals indicate that the company has a strong commitment to environmental sustainability, which ultimately enhances market trust and attracts more investors. This trust will be reflected in an increase in the company's valuation, as investors perceive the company as more stable and having favorable long-term prospects.

**Profitability Has a Significant Positive Effect on Firm Value**

The second hypothesis, which posits that profitability—measured by Return on Assets (ROA)—has a significant and positive influence on firm value, is supported by the findings of this study. These results are consistent with studies by Syaharani and Nur (2022) and Hermida and Yuniningsih (2022), which also confirm that profitability significantly and positively impacts firm value. This finding is in line with signalling Theory (Ross, 1977), which suggests that strong financial indicators, such as high profitability, serve as positive signals to investors and the market. A firm's ability to generate substantial profits reflects operational efficiency and asset management capabilities. This signal ultimately enhances investor perception and boosts firm value (Pingkan & Pertiwi, 2022).

However, this result contradicts the findings of Robiyanto et al (2020), who found that profitability negatively impacts firm value. Such contrasting results may arise due to external factors, including investor expectations or company policies on profit allocation. For example, if a company retains its earnings rather than distributing dividends, investors might view it as less attractive, leading to a decline in stock value despite high profitability. Moreover, if high profits stem from unsustainable or high-risk business activities, investors may respond negatively due to concerns over long-term stability.

#### **Leverage Has a Negative and Insignificant Effect on Firm Value**

The third hypothesis testing reveals that the Debt-to-Equity Ratio (DER), as a measure of leverage, has a negative coefficient and does not significantly affect firm value. These findings are in line with studies by Lutfi and Yudiana (2021) and Ndruru et al (2020), which show that leverage tends to negatively and significantly influence firm value. According to signalling theory, a firm's capital structure can provide investors with insights into its financial health and future outlook. High leverage may send negative signals to the market, as a high level of debt can be perceived as a major financial risk. Investors might interpret this as a lack of cash flow management capability or an overreliance on external funding, ultimately leading to reduced confidence and firm value (Saputri & Anwar, 2021). When a firm reaches its optimal capital structure, minor changes in leverage might not significantly influence firm value. This could explain why, in the context of energy sector companies, leverage fluctuations do not directly impact firm value, as investors may view leverage as part of the company's long-term strategic planning.

These results contradict the findings of Anggraeni (2020), who reported a positive influence of leverage on firm value. This discrepancy can be understood from another perspective—if investors view debt utilization as a strategic approach to expansion or a sign of growth potential, leverage may be perceived positively. However, in the highly volatile energy sector, investors tend to be more sensitive to financial risks than to potential gains from leverage, which may explain the absence of a significant positive effect in this study. The findings of this research indicate that leverage has a negative and insignificant effect on firm value, which is consistent with the characteristics of the energy sector, where companies typically carry higher debt-to-equity ratios throughout the study period. High interest expenses resulting from large debts can impact the firm's capital structure and financing capacity. Given the risks and financial pressure associated with debt financing, the potential benefits may be outweighed, rendering leverage ineffective in enhancing firm value.

#### **Corporate Social Responsibility (CSR) Moderates the Relationship Between Green Investment and Firm Value**

According to the fourth hypothesis based on the data analysis, the relationship between green investment and firm value can be strengthened by Corporate Social Responsibility (CSR). This finding supports previous research by Indriastuti and Chariri (2021), which found that CSR enhances the impact of green investment on firm value. Based on signalling theory (Ross, 1977), companies use signals to communicate their quality and future prospects to investors. When a company allocates funds to green investment and actively engages in CSR initiatives, it sends a positive signal to the market regarding its environmental commitment. This signal strengthens market perceptions, ultimately increasing the perceived value of the firm. Investors may view companies that invest in

environmentally friendly practices and demonstrate transparency through CSR as stable and sustainable in the long term, and therefore capable of generating higher returns.

Additionally, this finding is aligned with legitimacy theory as proposed by Gray, Owen, and Adams (1997), which states that companies act in accordance with prevailing societal norms and values to gain social legitimacy. In this context, green investment supported by CSR is viewed as a strategic effort to gain legitimacy from the public, government, and other stakeholders.

Contrasting results from studies such as Mentari and Dewi (2023) with Ardian and Wahyudi (2023), which found that CSR did not moderate the relationship between green investment and firm value, could be attributed to differences in sample characteristics, research periods, or indicators used to measure CSR. For instance, if CSR disclosure is merely symbolic (i.e., greenwashing) and lacks real implementation, then CSR may not be strong enough to reinforce the effect of green investment on firm value.

### **Corporate Social Responsibility (CSR) Does Not Moderate Profitability on Firm Value**

Based on the results of the fifth hypothesis test, it is found that the relationship between profitability and firm value cannot be moderated by Corporate Social Responsibility (CSR). This finding is consistent with the research by Hafidah (2017), which concluded that CSR does not moderate the relationship between profitability and firm value. However, this finding contrasts with the study by Winarso and Christina (2019), which indicated that CSR can moderate the relationship between profitability and firm value. When CSR fails to moderate the relationship between profitability and firm value, this may occur because the market perceives social responsibility more as a moral obligation or regulatory compliance rather than a strategy to influence firm value. If investors primarily assess financial performance as a key indicator, the signals sent through CSR activities might not be strong enough to influence their perceptions of firm value, especially for companies with high profitability.

The ineffectiveness of CSR in moderating the relationship between profitability and firm value can also be explained by the limitations in CSR disclosure. Although CSR has the potential to affect a company's reputation and strengthen relationships with stakeholders, in practice, energy companies often fail to fully disclose sustainability aspects in line with the Global Reporting Initiative (GRI) 2016 standards. Incomplete disclosures limit the contribution of CSR to investor perceptions, thereby making its impact on the relationship between profitability and firm value insignificant.

However, this result does not imply that CSR is unimportant for companies. In certain contexts, CSR plays a role in strengthening a company's reputation and legitimacy in the eyes of the public and investors. This means that although CSR may not strengthen the relationship between profitability and firm value in the short term, its long-term potential remains relevant, particularly in building a positive image that could impact customer loyalty and investor trust.

### **Corporate Social Responsibility (CSR) Does Not Moderate Leverage on Firm Value**

The relationship between leverage and firm value cannot be moderated by Corporate Social Responsibility (CSR), according to the findings of the sixth hypothesis test. These results align with those of Ardian and Wahyudi (2023), who also concluded that CSR does not moderate the relationship between leverage and firm value. However, this differs from Sitanggang (2020) findings, which suggested that CSR could moderate the relationship

between leverage and firm value. According to signalling theory by Ross (1977), companies use signals to communicate their financial condition and business prospects to the market. High leverage is often considered a negative signal as it reflects high financial risk and potential liquidity difficulties. If CSR fails to alter this negative perception, it may be because investors focus more on the company's capital structure, which is perceived as risky, rather than on the company's social initiatives. In other words, despite a company's CSR efforts, the negative signal from high leverage tends to dominate investor perceptions, leading to no significant increase in firm value.

CSR disclosure limitations may explain why it is unable to moderate the relationship between leverage and firm value. Partial CSR disclosure may worsen investor perceptions of financial risk in the energy sector, where companies typically have debt-dominated capital structures. Consequently, CSR may not be able to mitigate the negative effects of leverage on firm value.

When energy companies rely heavily on debt to fund large-scale projects, the high interest burden can affect profitability and reduce the company's capacity to invest in long-term sustainability initiatives. Additionally, the lack of disclosure of key indicators, such as environmental impact, labour rights, and community engagement, diminishes investor trust in the company's sustainability commitment. In situations of high leverage, where liquidity pressures and default risks increase, the lack of transparency in CSR may exacerbate investor concerns regarding the company's long-term stability. As a result, instead of strengthening the relationship between leverage and firm value, incomplete CSR initiatives fail to balance the negative sentiment arising from high debt ratios.

## CONCLUSION

This study shows that green investment and financial performance play a significant role in enhancing the firm value of energy companies in Indonesia. Green investment has been proven to contribute to an increase in firm value, where investments focused on sustainability strengthen a company's competitiveness and attract investor interest. Similarly, high profitability is a key factor that indicates a company's strong financial health, which can generate positive market perceptions of its long-term prospects. However, leverage shows the opposite effect. While it can be a useful financial tool, high debt levels pose risks that can reduce firm value, particularly amid the uncertainties in the energy market.

Corporate Social Responsibility (CSR) can strengthen the relationship between green investment and firm value. The results emphasize the importance of sustainable business practices. On the other hand, CSR cannot moderate the relationship between profitability and leverage with firm value, suggesting that sustainability is more influential as a tool to enhance company image than as a counterbalance to internal financial factors.

It is recommended that Corporate Social Responsibility (CSR) should not only be viewed as an obligation but as a company communication strategy to build public legitimacy and strengthen relationships with investors. Transparency in sustainability reporting will serve as a strong signal of the company's commitment to environmental and social aspects. Based on the research findings, companies should continue to enhance green investments and adopt eco-friendly technologies as part of their sustainable business strategy. In addition to increasing business opportunities, this approach will bolster the company's appeal amid the

global energy transition. Corporate management should also optimize operational strategies to improve profitability without relying too heavily on debt financing to maintain financial stability.

For future research, it is recommended to extend the study period and increase the sample size, possibly exploring other sectors. Integrating external factors such as environmental regulations or technological innovations could also offer valuable insights into the factors influencing the relationship between green investment, financial performance, and firm value in energy companies listed on the Indonesia Stock Exchange (IDX).

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