

The Effect of Solvency, Profitability, Growth, and Firm Size on Firm Value in Indonesia's Oil and Gas Subsector (2019–2023)

Muhamad Althoriq Alwi Fadilah & Novi Susyani

Universitas Jenderal Achmad Yani, Indonesia

thoriq530@gmail.com; novi.susyani855@lecture.unjani.ac.id

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Abstract

This study addresses the limited research on financial determinants of firm value in Indonesia's oil and gas subsector, a strategic industry for both energy security and capital market performance. It examines the effects of solvency, profitability, firm growth, and firm size on firm value during 2019–2023. Using a quantitative approach, secondary data from 13 listed companies were selected through purposive sampling, sourced from audited annual reports, and analyzed using panel regression with the Random Effect Model. The findings reveal that profitability (ROA) has a significant positive effect on firm value (PBV), whereas solvency (DER), firm size (LN.TA), and firm growth have no significant effects. These results suggest that in a capital-intensive, commodity-driven sector, operational efficiency is a stronger driver of market valuation than scale or leverage. Managerially, oil and gas companies should prioritize improving ROA through cost efficiency, asset optimization, and stable production rather than focusing solely on asset expansion. For investors, profitability emerges as a more reliable valuation indicator than firm size or debt structure. For regulators and the Indonesia Stock Exchange, sector-specific disclosures emphasizing operational efficiency and production performance could enhance market transparency. Future studies are encouraged to incorporate macroeconomic

variables, global oil price movements, and non-financial performance metrics to provide a more comprehensive understanding of firm value in the energy sector.

Keywords: Firm Value; Profitability; Solvency; Firm Size; Oil and Gas

INTRODUCTION

The dynamics of geopolitical conflict, volatility in global energy markets, and the structural transformation of the Indonesian economy have positioned the oil and gas sector as a strategic focal point for academic inquiry and national policy. According to the International Energy Agency (IEA, 2023), global dependence on fossil fuels remains high despite ongoing efforts to promote energy transition (Safitri et al., 2023). In Indonesia, the oil and gas sector contributed IDR 117 trillion to non-tax state revenues in 2023, surpassing its target despite a decline compared to the previous year (Ministry of Energy and Mineral Resources, 2024). The fluctuation in the Indonesian Crude Price (ICP), driven by international conflicts such as those involving Russia and Ukraine as well as Palestine and Israel, has led to increased uncertainty regarding the valuation of energy companies. Concurrently, the enactment of regulatory policies such as Ministry of Trade Regulation No. 21 of 2019 reflects the government's attempt to strengthen domestic energy security. Amid these complexities, a central issue for publicly listed companies remains how to maintain or increase firm value in the face of market instability.

According to the Indonesia Stock Exchange (IDX) and Ministry of Energy and Mineral Resources (MEMR) data, the oil and gas subsector contributed approximately IDR 163 trillion to the state revenue in 2022, accounting for nearly 9.5 percent of total national income from the energy sector. Despite this significant contribution, the market performance of oil and gas companies on the IDX remains volatile. For example, during 2019–2023, the average PBV of the subsector ranged widely from 0.04 to 252.42, with extreme fluctuations driven by global crude oil price changes, shifting government policies on energy transition, and the lingering impact of the COVID-19 pandemic on global demand. These conditions highlight a structural challenge: while the sector is crucial to the economy, not all companies are able to translate asset size and revenue growth into higher firm value. This gap between

economic contribution and capital market valuation underscores the need to identify which internal financial factors most significantly influence firm value in this subsector.

In response to this issue, the present study examines four key financial factors that are theorized to influence firm value: solvency, profitability, firm growth, and firm size (Andriani et al., 2023). These variables are deeply rooted in both classical and modern financial theories, which suggest that a company's fundamentals are critical in shaping investor perceptions and decisions (Radja & Artini, 2020). For instance, signaling theory (Spence, 1973) posits that firms with strong financial performance convey positive signals to the market, which in turn drive up their stock prices. Meanwhile, stakeholder theory, broadens the analytical lens by asserting that a firm's value is shaped not only by shareholder interests but also by how well it meets the expectations of its broader stakeholder network (Oktasari et al., 2025). Therefore, understanding the role of these financial metrics in influencing firm value is essential, particularly within energy-related sectors that are exposed to high capital requirements and commodity price volatility (Cahyani et al., 2023).

Previous empirical studies have yielded inconsistent and, at times, contradictory findings. Several studies have indicated that solvency, as measured by the debt-to-equity ratio (DER), has a negative impact on firm value due to increased financial risk (Reschiwati et al (2020); Murti and Azizah (2024)), while others report a positive effect (Mansikkamäki, 2023). Similarly, profitability indicators such as return on assets (ROA) have been shown to have both positive (Armana and Purbawangsa (2021); Yadav et al (2022)) and negative or insignificant effects (Pradika and Dwiati (2021); Pangaribuan et al (2022)) on firm value. The same inconsistency applies to firm growth and firm size, where some studies support their positive impact (Handini and Susilo (2025); Jihadi et al (2021)), while others argue otherwise (Meiryani et al., 2020). These mixed findings highlight a notable research gap, especially in studies specifically focused on the oil and gas subsector during periods of economic uncertainty and industry transformation.

The lack of context-specific research that directly addresses firm value dynamics within the oil and gas subsector, particularly post-pandemic and amid global energy crises, underscores the urgency of this study. While many prior studies tend to adopt an aggregate or cross-sectoral approach, this research seeks to narrow its focus to a high-impact sector with unique characteristics such as high capital intensity, long business cycles, and global price dependencies. Recent trends in PBV fluctuations among oil and gas issuers listed on

the Indonesia Stock Exchange from 2019 to 2023 reveal patterns that are not always aligned with theoretical expectations. This suggests a gap between theoretical assumptions and practical realities. By utilizing panel data analysis, the study aims to empirically verify the relationship between internal financial fundamentals and firm value, thus providing both theoretical enrichment and practical implications for investors, analysts, and policymakers operating within the strategic energy sector.

Based on the significance of this issue and the identified gaps in the literature, this study aims to analyze the influence of solvency, profitability, firm growth, and firm size on firm value in publicly listed companies within the oil and gas subsector in Indonesia during the 2019 to 2023 period. Firm value is proxied by the price-to-book value (PBV) ratio, while the explanatory variables include DER, ROA, asset growth, and total assets. Through this analysis, the study is expected to provide empirical evidence on the extent to which these internal financial indicators influence market valuation, offering valuable insights for both theoretical development and practical decision-making in the capital market and energy investment domains.

METHODS

Research Type

This study employs a quantitative research approach, which emphasizes the measurement of variables through numerical data and the application of statistical methods for analysis. According to Sugiyono (2024), quantitative research is suitable for examining relationships between variables in a population using structured and objective techniques. The rationale for choosing this approach lies in the nature of the research objective, which is to empirically test the influence of solvency, profitability, firm growth, and firm size on firm value using secondary data derived from financial statements. The use of quantitative methods allows for hypothesis testing and generalization across the targeted population of firms, making it appropriate for a study of this nature where precision and objectivity are critical.

Research Design

The research design used in this study is a causal-comparative design with a panel data approach. This design was selected because it enables the researcher to analyze the causal

relationship between multiple independent variables (solvency, profitability, firm growth, and firm size) and the dependent variable (firm value) over a defined time period. As stated by Andriani (2022), causal-comparative designs are effective for identifying cause-and-effect relationships among variables without manipulation. The longitudinal nature of panel data provides the added advantage of capturing both cross-sectional and time-series variation, enhancing the robustness of the findings. Compared to previous studies that used cross-sectional or single-year data (Fitri et al., 2023), this study offers improved explanatory power by tracking financial performance trends from 2019 to 2023 across 13 companies in the oil and gas subsector listed on the Indonesia Stock Exchange (IDX).

Population and Sample

The population in this research includes all oil and gas companies listed on the Indonesia Stock Exchange (IDX) during the 2019 to 2023 period, totaling 16 companies. The sampling technique employed is purposive sampling, which is appropriate when the researcher selects units that meet specific criteria relevant to the research objectives. As explained by Sugiyono (2024), purposive sampling is suitable for studies where certain characteristics are necessary for inclusion, such as availability of consistent financial reports. The criteria used in this study include: (1) companies must have published complete financial reports from 2019 to 2023, and (2) companies must disclose firm value indicators such as Price to Book Value (PBV). Based on these criteria, 13 companies were selected as the final sample, including PT Medco Energi Internasional Tbk (MEDC), PT Perusahaan Gas Negara Tbk (PGAS), and PT AKR Corporindo Tbk (AKRA), among others.

Data Collection Instruments and Techniques

The data collection technique used is documentation, specifically through the collection of secondary data from company financial statements and annual reports publicly available on the IDX and each company's official website. This method is consistent with the approach described by Aprila et al (2023), who note that documentation is ideal for accessing financial performance data over time. The variables used in the study are operationalized as follows: solvency is measured by the Debt to Equity Ratio (DER), profitability by Return on Assets (ROA), firm growth by asset growth, firm size by the natural logarithm of total assets, and firm value by Price to Book Value (PBV). Since the data are obtained from audited financial statements, they are considered reliable and valid without

requiring instrument validation in the conventional sense (e.g., Cronbach's alpha), which is typically applied in primary data collection.

Data Analysis

The data analysis technique adopted in this study involves both descriptive and inferential statistics, using EViews 10 software for processing panel data. Descriptive statistics are used to summarize the mean, standard deviation, maximum, and minimum values of each variable. Inferential statistics include multiple linear regression for panel data, utilizing fixed effect or random effect models based on Hausman tests. Classical assumption tests such as normality, multicollinearity, heteroscedasticity, and autocorrelation tests are also conducted to ensure the validity of the regression results. This methodological approach aligns with the panel regression procedures outlined by Ghazali (2014), and the choice of EViews is supported by its capability to efficiently process large datasets with time-series and cross-sectional components.

RESULTS

Descriptive Statistics and Visualization

The first step in understanding the relationship between financial indicators and firm value in the oil and gas subsector is to examine the general trends and characteristics of the data. Figure 1 illustrates the dispersion of firm value, represented by the Price to Book Value (PBV), across 13 oil and gas companies listed on the Indonesia Stock Exchange (IDX) during the period 2019 to 2023.

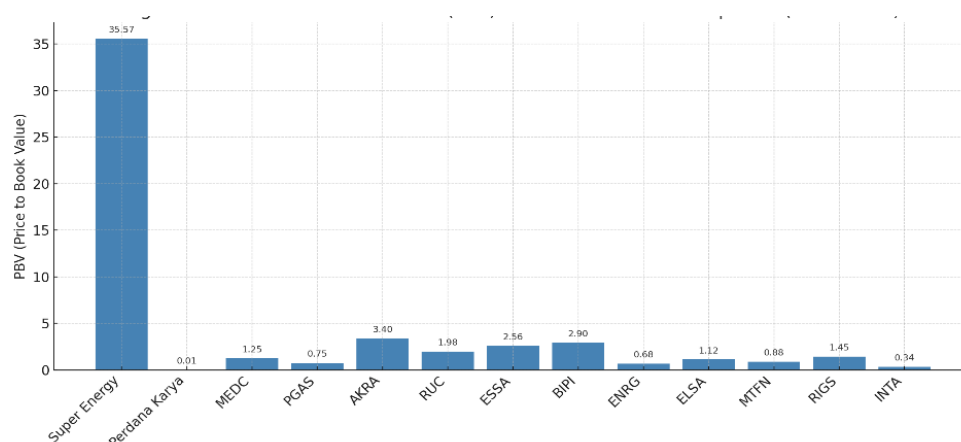


Figure 1. Distribution of Firm Value (PBV) across Oil and Gas Companies (2019–2023)

Source: Processed using EViews 12, 2025

Figure 1 presents the distribution of firm value as measured by the Price to Book Value (PBV) for 13 oil and gas subsector companies listed on the Indonesia Stock Exchange during 2019–2023. The PBV values show significant variation, ranging from the lowest at 0.04 for Perdana Karya Perkasa Tbk to the highest at 252.42 for Super Energy Tbk. This wide disparity reflects the heterogeneous nature of the subsector, where differences in operational scale, profitability, capital structure, and project maturity strongly influence investor perception. In the context of oil and gas, companies with established production facilities, long-term contracts, and efficient cost structures tend to enjoy higher PBV, as these factors signal lower operational risk and stable future cash flows. Conversely, firms still in exploration or early development phases may exhibit lower PBV due to the uncertainty of revenue realization, despite holding large asset bases.

Table 1. Descriptive Statistics of Research Variables

Indicators	Mean	Median	Max	Min	Std. Dev.	N
PBV (Firm Value)	2.09	0.90	35.57	0.01	4.55	65
DER (Solvency)	2.06	1.14	57.16	-29.14	9.57	65
ROA (Profitability)	-1.34	0.43	99.89	-99.15	25.36	65
Firm Size (LN.TA)	22.78	22.49	28.21	14.50	4.08	65
Sales Growth (SG)	0.50	0.16	9.73	-1.15	1.48	65

Source: Processed using EViews 12, 2025

The mean PBV of 2.09 indicates that on average, companies are traded slightly above their book value. The large standard deviation (4.55) reflects high volatility in market perception. For solvency, DER averages 2.06 with a maximum of 57.16, showing that some companies are heavily financed by debt, while others even report negative equity. Profitability (ROA) displays extreme values, which may indicate high earnings volatility or accounting anomalies. These descriptive findings suggest the presence of financial asymmetry among firms, reinforcing the relevance of conducting inferential tests.

Model Selection and Justification

Before estimating the panel regression model, it is necessary to determine the appropriate model type: Pooled Least Squares (PLS), Fixed Effect Model (FEM), or Random Effect Model (REM). To accomplish this, the Chow, Hausman, and Lagrange Multiplier (LM) tests were conducted sequentially.

Table 2. Chow Test Result (Fixed Effect vs Pooled OLS)

Effects Test	Statistic	d.f.	Prob.
Cross-section F	4.3126	(12, 48)	0.0001
Cross-section Chi-square	47.5463	12	0.0000

Source: Processed using EViews 12, 2025

The Chow test results show that the p-value (0.0001) is significantly less than 0.05, indicating that the Fixed Effect Model is more suitable than the pooled regression. This means that cross-sectional differences among companies cannot be ignored. To further distinguish between FEM and REM, the Hausman test is used:

Table 3. Hausman Test Result (Fixed Effect vs Random Effect)

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	7.9690	4	0.0927

Source: Processed using EViews 12, 2025

The Hausman test yields a p-value of 0.0927, greater than the 0.05 threshold, suggesting that the Random Effect Model is statistically more efficient and consistent. Lastly, the LM test confirms the preference for a panel model over pooled OLS:

Table 4. Lagrange Multiplier (Breusch-Pagan) Test

Test	Value	Prob.
Cross-section	8.8816	0.0029
Time	1.2731	0.2592
Both	10.1547	0.0014

Source: Processed using EViews 12, 2025

Based on these three diagnostic tests, the Random Effect Model (REM) was selected for final estimation as it balances efficiency and accounts for individual heterogeneity.

Regression Model and Mathematical Expression

The estimated REM regression equation to test the relationship between firm fundamentals and firm value is as follows:

Equation (1):

$$PBV_{it} = 8.4633 + 0.0219 \cdot DER_{it} + 0.0403 \cdot ROA_{it} - 0.2855 \cdot LNTA_{it} + 0.2943 \cdot SG_{it} + \epsilon_{it}$$

This model reflects the expected change in firm value for each unit change in the independent variables, assuming all other variables are held constant. The detailed regression results are presented in Table 5.

Table 5. Regression Results – Random Effect Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	8.4633	4.0866	2.0710	0.0427
DER	0.0220	0.0497	0.4420	0.6601
ROA	0.0403	0.0201	2.0088	0.0491
LN.TA	-0.2855	0.1738	-1.6424	0.1057
SG	0.2943	0.3433	0.8571	0.3948

Source: Processed using EViews 12, 2025

Among the four predictors, only profitability (ROA) has a statistically significant positive effect on firm value ($p = 0.0491$). This indicates that investors place a premium on firms with better asset efficiency. Other variables such as DER, sales growth, and firm size show no significant influence, suggesting they may be less relevant in determining market valuation for oil and gas firms in Indonesia.

Simultaneous Test and Coefficient of Determination

The F-test was conducted to assess the joint significance of all independent variables in explaining the variation in PBV.

Table 6. F-Test Result

F-statistic	Prob (F-statistic)
1.4897	0.2167

Source: Processed using EViews 12, 2025

The F-statistic is not statistically significant ($p > 0.05$), indicating that jointly, the four independent variables do not significantly predict firm value. This may reflect that external factors such as commodity prices, geopolitical risks, or investor behavior have stronger effects than internal financial indicators. In terms of explanatory power, the R-squared and adjusted R-squared are both relatively low.

Table 7. Coefficient of Determination

R-squared	Adjusted R ²
0.0903	0.0297

Source: Processed using EViews 12, 2025

Only 9.03% of the variation in firm value is explained by the model, confirming the modest predictive power of the selected variables. This suggests the need for further research incorporating macroeconomic or qualitative factors.

DISCUSSION

This study finds that only profitability (ROA) has a statistically significant effect on firm value (PBV) among the four tested independent variables DER, ROA, firm size (LN.TA), and sales growth based on the Random Effect Model estimation. The positive and significant coefficient of ROA affirms that the ability of a firm to generate net income from its total assets is a key determinant of its market valuation in the Indonesian oil and gas subsector. This is aligned with the basic premise of signaling theory (Spence, 1973), where profitability functions as an informational signal to external investors about operational effectiveness and managerial quality. Particularly in sectors prone to price volatility and high capital expenditure such as oil and gas, investors are likely to favor firms that demonstrate superior returns on their invested capital. This confirms that internal efficiency matters more than sheer growth or expansion in the eyes of market participants.

The results are consistent with several prior studies. For instance, (Mansikkamäki, 2023) and Armana and Purbawangsa (2021) also found that ROA has a positive and significant impact on firm value, both in manufacturing and mining sectors. These studies emphasized that companies with high ROA tend to be more attractive to investors because they are perceived as more capable of sustaining profitability. The consistency across sectors reinforces the universal importance of profitability as a core driver of firm value, even in capital-intensive industries. However, this study's result contrasts with that of Yadav et al (2022), who argued that ROA is less relevant in sectors where tangible assets dominate valuation decisions. The present findings challenge that assertion and emphasize that even in the asset-heavy oil and gas sector, efficiency in generating returns remains a significant differentiator.

The extreme PBV variation in the oil and gas subsector can be explained by the unique operational and market dynamics of the industry. High-PBV firms such as Super Energy Tbk likely benefit from market optimism driven by successful exploration outcomes, strategic partnerships, or significant production growth coinciding with favorable crude oil prices. According to the signaling theory, such performance sends a strong positive signal to

investors, leading to valuation multiples far above the industry average. In contrast, low-PBV firms like Perdana Karya Perkasa Tbk may be constrained by limited production capacity, heavy debt burdens, or operational setbacks, which undermine investor confidence despite potentially sizable physical assets.

Moreover, the subsector's dependence on global oil prices means that firm value is not solely determined by internal financial metrics, but also by external macroeconomic and geopolitical conditions. For example, during the COVID-19 pandemic in 2020, the sharp drop in oil demand and prices disproportionately affected smaller firms or those with higher operating costs, further depressing their PBV. Larger or more diversified companies may have weathered the volatility better due to economies of scale, integrated operations, or long-term offtake agreements. This explains why profitability (ROA) emerges as the only significant determinant of PBV in this study, as it captures the ability to generate consistent returns regardless of external shocks.

In essence, the PBV distribution in this subsector underscores the critical importance of operational efficiency and market positioning over mere asset size or revenue growth. Investors appear to reward companies capable of converting their capital base into sustainable profits, while penalizing those with high operational risks or uncertain project outcomes. This sector-specific pattern supports the argument that financial performance indicators should be interpreted in light of industry characteristics, especially in capital-intensive and commodity-driven sectors like oil and gas.

On the contrary, the study reveals that solvency (DER) has no significant impact on firm value. This finding deviates from research conducted by Reschiwati et al (2020) and Murti and Azizah (2024), who concluded that high DER tends to decrease firm value due to the perception of heightened financial risk. In contrast, the current study suggests that investors may not automatically penalize high leverage in the oil and gas subsector. This could be due to the industry's capital structure norms, where long-term debt financing is common to support exploration and infrastructure development. Thus, the market may view leverage as a necessary operational condition rather than an indicator of instability. This sectoral nuance reinforces the idea that financial indicators must be interpreted within the context of industry characteristics, investor behavior, and macroeconomic cycles.

Firm size, as measured by the logarithm of total assets, also does not exhibit a statistically significant relationship with firm value in this study. This result contrasts with

Handini and Susilo (2025) and Jihadi et al (2021), who found that larger firms tend to have greater investor trust and higher PBV due to scale economies, asset security, and diversification capacity. However, our finding may indicate that in the oil and gas sector, size alone is not a sufficient metric of value creation. Without operational efficiency and profit conversion, large asset bases may even raise concerns about asset utilization and cost management. Therefore, the study challenges the assumption that firm size universally enhances value and suggests that size must be evaluated alongside productivity and profitability metrics. Moreover, during uncertain periods like the COVID-19 pandemic, the risk of asset underutilization may overshadow the supposed benefits of scale, reducing the valuation premium typically associated with size.

Similarly, sales growth does not significantly influence firm value in this study, which contrasts with the conclusions of Handini and Susilo (2025), where sales growth was found to be a strong indicator of positive future expectations and enhanced firm value. The discrepancy may be explained by the unique volatility of revenue streams in the oil and gas sector, where earnings fluctuations often stem from external factors such as global oil prices, OPEC policies, and geopolitical tensions, rather than purely from operational expansion. Consequently, growth in sales may not be interpreted as a reliable signal of strategic success. This reinforces the argument that financial ratios must be interpreted within the industrial and macroeconomic context. In this sector, investors may prioritize operational resilience and return consistency over top-line growth alone.

Theoretical and practical implications can be drawn from these findings. Theoretically, this research supports signaling theory while challenging the universal applicability of the trade-off theory and firm growth hypothesis in the energy sector. The results also contribute to empirical finance literature by clarifying that not all traditional indicators hold consistent explanatory power across different industries. Practically, this study provides strategic guidance for corporate managers to prioritize enhancing ROA as a key indicator of performance in capital markets. Managers should avoid overemphasizing size expansion or debt structuring without clear profitability improvements. For investors and analysts, this research highlights the importance of sector-sensitive evaluation models. Lastly, for regulators and policymakers, the findings suggest a potential need for differentiated financial disclosure requirements that better reflect performance in energy-related sectors.

Despite the rigorous approach and robust modeling used, this study acknowledges several limitations. The relatively small sample size of 13 firms over a five-year period may limit the generalizability of the findings. In addition, the data set focuses solely on quantitative financial indicators, excluding non-financial factors such as ESG performance, board structure, or stakeholder engagement, which have been gaining prominence in valuation models. The relatively low R-squared value of 0.0903 indicates that other unobserved variables may better explain variations in firm value. Moreover, the study period overlaps with the COVID-19 pandemic and global oil price fluctuations, which may have introduced temporary distortions into the firms' financial reports. These limitations open avenues for future research, including the integration of qualitative metrics, the use of macroeconomic controls, or even longitudinal analysis post-pandemic to validate or refine these results.

CONCLUSION

This study investigates the effect of solvency (Debt to Equity Ratio), profitability (Return on Assets), firm size (natural logarithm of total assets), and sales growth on firm value (Price to Book Value) among companies in the Indonesian oil and gas subsector from 2019 to 2023. Based on the Random Effect Model estimation, the findings demonstrate that only profitability has a statistically significant and positive impact on firm value. This suggests that investors prioritize asset efficiency and profit generation capacity when assessing company valuation in this capital-intensive sector. In contrast, solvency, firm size, and sales growth do not significantly influence firm value, indicating that these variables may be less relevant or interpreted differently in the context of the oil and gas industry. These results reinforce the signaling theory and challenge the uniform applicability of traditional valuation models across sectors.

Future research is recommended to explore broader samples across different energy-related sectors and incorporate both financial and non-financial indicators, including governance, environmental impact, and stakeholder engagement metrics. Integrating qualitative dimensions or using mixed-methods designs could enhance explanatory depth. Moreover, researchers should consider macroeconomic and geopolitical variables to improve model robustness. Such efforts would contribute to a more nuanced understanding of value creation in industries sensitive to global and structural shocks.

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