

Return on Assets, Debt-to-Equity Ratio, and Current Ratio on Firm Value with Firm Size as a Moderating Variable in Industrial Sector Companies Listed on the Indonesia Stock Exchange

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ABSTRACT

Purpose: This study examines the associations of Return on Assets (ROA), Debt-to-Equity Ratio (DER), and Current Ratio (CR) with firm value and evaluates whether firm size moderates these relationships among Indonesian industrial companies.

Research Method: The study uses a quantitative short-panel design comprising 110 firm-year observations from 55 industrial companies listed on the Indonesia Stock Exchange during 2023–2024. Firm value is measured using Price-to-Book Value. The revised analysis requires panel regression with centered interaction terms, firm and year effects, relevant controls, influence diagnostics, sensitivity analysis, and firm-clustered robust standard errors.

Results and Discussion: Preliminary ordinary-regression estimates indicate positive associations of ROA, DER, and CR with firm value but provide no evidence that firm size moderates these relationships. These findings remain subject to confirmation using the revised panel specification.

Implications: Managers should improve asset efficiency, maintain sustainable leverage, and manage liquidity productively. Investors should assess financial quality and risk rather than relying solely on corporate scale.

Originality: The study evaluates firm size as a boundary condition linking financial ratios to the market valuation of Indonesian industrial companies.

Keywords: current ratio; debt-to-equity ratio; firm size; firm value; return on assets.

1. Introduction

Firm value is one of the most important indicators used by investors to assess a company's performance and prospects. A high firm value reflects the market's confidence in management's ability to generate sustainable profits and maximize shareholders' wealth. In the capital market, firm value is commonly reflected through market-based indicators, such as Price to Book Value (PBV), which compares the market price of shares with their book value. Therefore, maintaining and improving firm value has become one of the primary objectives of corporate financial management. The industrial sector plays a strategic role in Indonesia's economic development because it contributes to national gross domestic product and supports various production activities. Companies operating in this sector generally require substantial investments in fixed assets, maintain relatively high leverage, and experience long business cycles. These characteristics make financial performance an important consideration in market valuation.

Based on Indonesia Stock Exchange data for the 2023–2024 period, 37 out of 65 industrial sector companies experienced declining share prices, while only 25 companies recorded price increases and three companies remained relatively unchanged. This condition indicates substantial variation in market performance and suggests that internal financial conditions may be associated with investors' valuation of industrial sector companies. However, differences in profitability, financing structures, liquidity positions, firm characteristics, and market conditions may produce different valuation responses across companies.

Previous studies have extensively examined the relationship between profitability and firm value. Profitability, commonly measured using Return on Assets (ROA), reflects management's ability to generate earnings through the effective utilization of corporate assets. Higher profitability can provide a favorable signal regarding operational efficiency and expected future returns, thereby strengthening investor confidence and market valuation. Jufrizen & Rambe (2023) and other studies reviewed in this research reported that ROA had a positive and significant effect on firm value. Nevertheless, this relationship is not universal. Liana & Febriyanti (2024), examining eight oil and gas companies with 44 observations, found that ROA did not significantly affect stock prices. These contrasting results suggest that the market response to profitability may depend on sectoral characteristics, observation periods, and sample composition.

Capital structure, represented by the Debt-to-Equity Ratio (DER), may affect firm value through competing mechanisms. From the perspective of trade-off theory, debt can increase firm value when its tax benefits and contribution to productive investment exceed the expected costs of financial distress. Conversely, excessive leverage increases fixed financial obligations, default risk, and investors' concerns regarding corporate solvency. Jonathan & Purwaningsih (2023) found that DER had a significant negative effect on firm value in transportation companies. In contrast, Digdowiseso & Rianasari (2023), studying 41 consumer goods companies during 2017–2021, reported an insignificant positive effect. Saputra & Kusuma (2025), using 228 observations from 57 financial sector companies, found that DER positively and significantly affected firm value. These divergent findings demonstrate that the valuation consequences of debt remain dependent on the benefits and risks associated with corporate financing decisions.

Liquidity, commonly measured using the Current Ratio (CR), indicates a company's capacity to meet its short-term obligations. A sufficient liquidity position may reduce short-term financial risk, although an excessively high CR may indicate idle current assets and inefficient working-capital management. Jonathan & Purwaningsih (2023) found a positive and significant effect of CR, while Digdowiseso & Rianasari (2023) reported a negative but insignificant effect. Regarding moderation, Jufrizen & Rambe (2023) found that firm size did not moderate the effects of ROA, DER, or CR, whereas Zannati & Ginting (2022) identified mixed moderation effects. Saputra & Kusuma (2025) found that firm size strengthened the effects of these financial ratios. Meanwhile, Hidayat & Pramudya (2025) examined profitability rather than firm value, and Herlambang *et al.*, (2024) positioned ROA instead of firm size as the moderator. Consequently, these studies provide relevant but not directly equivalent evidence.

The reviewed evidence reveals several unresolved issues. First, the relationships between ROA, DER, CR, and firm value remain inconsistent across sectors. ROA is generally positively associated with firm value, but insignificant results have also been reported. DER may provide financing and tax benefits, but it may also increase financial distress risk. Similarly, CR may signal financial stability or inefficient utilization of current assets. Second, evidence regarding firm size as a moderator remains inconclusive: some studies report strengthening or mixed moderating effects, whereas others find no significant

moderation. These inconsistencies indicate that firm size should be examined as a boundary condition rather than automatically assumed to strengthen or weaken every financial ratio–firm value relationship.

The available evidence is also fragmented across transportation, consumer goods, automotive, financial, real estate, oil and gas, and food and beverage companies. Consequently, the findings may not be directly generalizable to industrial sector companies, which typically have substantial fixed-asset requirements, financing needs, and operating cycles. The present study therefore extends the existing literature by evaluating these relationships specifically among industrial sector companies listed on the Indonesia Stock Exchange. However, because the observation period covers only 2023–2024, the study has limited temporal variation. Moreover, determinants such as corporate growth, dividend policy, business risk, ownership structure, and macroeconomic conditions may also be associated with firm value. These factors must be addressed through control variables where data are available and explicitly acknowledged as potential sources of omitted-variable bias where they cannot be incorporated.

Based on these gaps, this study addresses the following questions: (1) Are ROA, DER, and CR associated with the firm value of industrial sector companies listed on the Indonesia Stock Exchange? Moreover, (2) Does firm size moderate the relationships between each financial ratio and firm value? Accordingly, this study aims to examine the relationships of ROA, DER, and CR with firm value and to evaluate the moderating role of firm size among 55 industrial sector companies observed during 2023–2024. The study offers a contextual contribution by testing whether firm size constitutes a boundary condition in the relationships between financial ratios and firm value among Indonesian industrial sector companies. Rather than presuming that firm size necessarily strengthens or weakens these relationships, the study empirically evaluates whether the interaction effects are statistically supported. The findings are expected to clarify the extent to which evidence obtained from other sectors applies to industrial companies with relatively intensive asset and financing requirements.

The remainder of this paper is organized as follows. Section 2 provides a literature review and hypothesis development. Section 3 presents the research method and design. Section 4 provides the results and discussion. Section 5 presents Concluding Remarks and Recommendations.

2. Literature Review and Hypothesis Development

2.1 Literature Review

2.1.1 Signaling Theory

Signaling Theory explains how a party possessing superior information communicates observable signals to reduce information asymmetry with less-informed parties. In the corporate context, managers generally possess more comprehensive information regarding operational conditions, financial capacity, risks, and prospects than investors and creditors. Financial statements, sustainability reports, corporate policies, and performance indicators can therefore function as signals that help external stakeholders evaluate corporate quality. Nevertheless, a signal becomes informative only when it is relevant, observable, credible, and sufficiently costly to prevent low-quality companies from easily imitating it. Nguyen (2025) explains that the effectiveness of corporate disclosure as a signal depends on the characteristics of the signaler, the receiver, and the institutional environment in which the signal is communicated. Similarly, Gupta & Das (2024) demonstrate that corporate signals involve both benefits and costs; insufficient disclosure may preserve information asymmetry, whereas excessive disclosure may increase signaling costs without generating proportional benefits. Thus, investors should not

interpret every corporate disclosure automatically as evidence of superior quality. Amin *et al.*, (2024) emphasize that credible disclosure must be distinguished from greenwashing because companies may communicate favorable information that does not correspond to their actual performance.

Signaling Theory is particularly relevant to the interpretation of financial and nonfinancial information in capital markets. Financial performance provides investors with observable information about management's ability to manage corporate resources, meet financial obligations, and generate future economic benefits. Meanwhile, voluntary and mandatory disclosures can complement accounting information by explaining corporate risks, strategies, and long-term commitments. Ignatov & Rudolf (2023) show that forward-looking sustainability information may communicate expectations regarding subsequent corporate performance, although the credibility of narrative disclosure depends on its consistency with actual actions. L'Abate *et al.*, (2024) similarly demonstrate that corporate disclosure can reduce information asymmetry and influence the perceptions of capital providers, including their assessment of financing risk. In addition, Liu *et al.*, (2025) find that corporate governance and ESG disclosure can communicate information about accountability and risk management, thereby affecting creditors' assessment of the cost of debt. Corporate practices may also create reputational signals. Oduro *et al.*, (2025) explain that responsible corporate practices can strengthen firm reputation and subsequently support financial performance. Furthermore, Liang *et al.*, (2024) demonstrate that companies may use visible and credible CSR reporting to protect corporate reputation and obtain stakeholder support, particularly when they face greater market scrutiny.

In this study, Signaling Theory provides the theoretical basis for explaining the relationships between Return on Assets (ROA), Debt-to-Equity Ratio (DER), Current Ratio (CR), firm size, and firm value. A higher ROA may convey a favorable signal regarding management's efficiency in utilizing assets to generate earnings. DER communicates information about financing decisions and management's confidence in meeting future obligations, although excessive leverage may instead signal elevated financial distress risk. CR indicates the firm's capacity to meet short-term obligations, but an excessively high ratio may signal inefficient working-capital utilization. Accordingly, investors evaluate not only the direction of each financial ratio but also its economic context and credibility. Hermawan *et al.*, (2025) show that risk management, intellectual capital, investment opportunities, and financial performance provide relevant information for investors' assessment of firm value. Pradhan *et al.*, (2025) also demonstrate that greater corporate transparency is positively associated with firm value because it improves the information available to market participants. Firm size may further affect signal credibility because larger firms generally have greater market visibility, stronger reputational exposure, and more extensive disclosure. Therefore, financial signals issued by larger firms may receive different market responses than equivalent signals issued by smaller firms. Based on this reasoning, Signaling Theory supports the examination of both the direct relationships between financial ratios and firm value and the moderating role of firm size.

2.2 Firm Value

Firm value represents the market's overall assessment of a company's current performance, risk profile, and capacity to generate future economic benefits for shareholders. A higher firm value indicates that investors have more favorable expectations regarding the company's profitability, cash-flow sustainability, growth opportunities, and management quality. Firm value is therefore not identical to accounting profit because it incorporates market expectations about both present conditions and

prospects. Firm valuation may also reflect investors' assessment of financial and nonfinancial factors, including corporate costs, environmental performance, and business scale, demonstrating that market value is shaped by broader company-specific characteristics (Zulkarnain & Verawati, 2026). Market-based measurements commonly include Price to Book Value (PBV) and Tobin's Q. PBV compares the market price per share with the book value per share, indicating the extent to which the market values the company above or below its recorded net assets. A PBV greater than one generally indicates that investors assign value beyond the company's accounting equity, although interpretation should consider industry characteristics and temporary market fluctuations. Tobin's Q, in contrast, compares the market value of a company with the value of its assets. Aydoğmuş *et al.*, (2022) and Hussain & Zhou (2026) employ Tobin's Q to capture market valuation, while Behl *et al.*, (2022) demonstrate that the relationship between corporate attributes and firm value may vary across observation periods. These findings indicate that firm value is dynamic and should be interpreted within its sectoral and temporal context.

Firm value is determined by a combination of financial, strategic, governance, reputational, and institutional factors. Financial performance remains fundamental because profitability, liquidity, leverage, cash-flow capacity, and growth prospects provide information about the company's ability to generate returns and manage financial obligations. Nevertheless, the valuation relevance of financial performance may depend on the company's exposure to sustainability risk, as higher sustainability risk can reduce the strength of the positive relationship between profitability and firm value (Porajouw *et al.*, 2026). Nevertheless, market valuation cannot be explained solely by financial ratios. Al-Shaer *et al.*, (2024), using 20,677 firm-year observations, demonstrate that the alignment between corporate strategy and board composition is associated with firm value, even after addressing endogeneity concerns. Similarly, Sarker & Hossain (2023) find that managerial ownership, foreign ownership, board size, and auditor quality constitute relevant governance determinants of firm value in manufacturing companies. Corporate reputation and payout decisions also shape investor assessments. Chasiotis *et al.*, (2024) show that ESG reputational risk, cash-flow conditions, and corporate payout policies are connected to how the market values companies. Postiglione *et al.*, (2024) further explain that value creation may occur through reduced corporate risk and a lower cost of capital. Accordingly, firm value reflects investors' collective assessment of whether corporate resources, strategies, financing decisions, and governance mechanisms can support sustainable shareholder wealth.

Recent evidence also emphasizes the valuation relevance of sustainability performance, disclosure credibility, and corporate controversies. Nguyen *et al.*, (2025) find that the relationship between ESG practices and firm market value involves mediating and moderating mechanisms, including sustainable products and environmental uncertainty. Thus, sustainability initiatives do not automatically generate higher market value because their benefits depend on how effectively they are implemented and communicated. Elamer *et al.*, (2024) demonstrate that investors evaluate the interaction between tax avoidance and ESG ratings, suggesting that market valuation depends on the transparency, legitimacy, and consistency of corporate practices. Likewise, Hussain & Zhou (2026) show that the valuation benefits of ESG disclosure depend on GRI compliance, materiality assessment, regulatory quality, and external assurance. In Indonesia, Sihotang & Siregar (2025) find that ESG controversies alter the relationship between ESG performance and firm value, highlighting the importance of reputational risk. In the present study, firm value is measured using PBV because this indicator directly compares the market valuation of equity with its accounting value. PBV is particularly relevant for assessing whether investors value industrial companies above or below their recorded

equity. Variations in PBV are expected to reflect differences in profitability, leverage, liquidity, firm size, and other company-specific or market-related factors.

2.2 Hypothesis Development

2.2.1 Return on Assets and Firm Value

Return on Assets (ROA) measures a company's ability to generate profit from its total assets. According to Signaling Theory, financial performance communicates information regarding a firm's underlying quality to market participants. Higher ROA signals that management can utilize corporate assets efficiently to generate earnings, thereby improving investors' expectations of future cash flows and reducing uncertainty regarding the firm's prospects (Ross, 1977). Consequently, investors may respond to higher profitability through increased demand for the company's shares, which is reflected in a higher market valuation. Previous studies provide substantial support for this relationship. Jufrizen & Rambe (2023) found that ROA had a positive and significant relationship with firm value, indicating that profitable companies received more favorable market valuations. Similarly, Saputra & Kusuma (2025) reported a positive and significant relationship between ROA and firm value. Nevertheless, Natalia Liana and Diah Febriyanti (2024) found that ROA did not significantly affect stock prices in oil and gas companies. This difference suggests that the market response to profitability may vary according to sectoral characteristics and research periods. However, the predominance of positive findings and the signaling mechanism underlying profitability support the expectation that industrial companies with higher ROA will have higher firm value. Based on these theoretical arguments and empirical findings, the following hypothesis is proposed:

H1: Return on Assets is positively associated with firm value.

2.2.2 Debt-to-Equity Ratio and Firm Value

Debt-to-Equity Ratio (DER) reflects the proportion of debt financing relative to shareholders' equity. The relationship between DER and firm value can be explained through competing theoretical mechanisms. From the perspective of trade-off theory, debt can increase firm value when its tax benefits and contribution to financing productive investments exceed the expected costs of financial distress. Debt may enable industrial companies to acquire fixed assets, expand production capacity, and undertake profitable projects without relying entirely on internal funds. From a signaling perspective, a firm's willingness to assume debt may also communicate management's confidence in its ability to generate sufficient future cash flows to meet financial obligations. However, the positive valuation consequences of debt are not unlimited. Excessive leverage increases interest obligations, default risk, agency conflicts, and exposure to financial distress. Under these conditions, investors may interpret a high DER as a negative signal and assign a lower value to the company. Therefore, the relationship between DER and firm value depends on whether the productive and signaling benefits of debt outweigh its financial risks.

The empirical evidence reflects these competing mechanisms. Jonathan & Purwaningsih (2023) found that DER had a significant negative relationship with firm value in transportation companies. In contrast, Digdowiseso & Rianasari (2023) reported a positive but statistically insignificant relationship among consumer goods companies. Saputra & Kusuma (2025) found that DER was positively and significantly related to firm value in financial sector companies. Given the substantial investment

requirements of industrial companies, debt can support productive expansion when it remains within a manageable level. Building on this reasoning and the positive empirical evidence, the following directional hypothesis is proposed:

H2: *Debt-to-Equity Ratio is positively associated with firm value.*

2.2.3 Current Ratio and Firm Value

Current Ratio (CR) measures a company's ability to meet its short-term obligations using its current assets. Within Signaling Theory, adequate liquidity conveys favorable information regarding a company's capacity to maintain operational continuity and fulfill its short-term financial commitments. A sufficient CR may reduce investors' concerns about liquidity risk, delayed payments, and operational disruption. Accordingly, companies with stronger liquidity may receive more favorable market valuations because investors perceive them as financially stable. Nevertheless, an excessively high CR does not necessarily reflect superior financial performance. The accumulation of cash, inventories, or receivables may indicate idle resources, inefficient working-capital management, or an inability to allocate current assets to productive investments. Thus, liquidity may enhance firm value only when current assets are maintained at an efficient level. Previous evidence regarding this relationship remains inconsistent. Jonathan & Purwaningsih (2023) found that CR had a positive and significant relationship with firm value, whereas Digdowiseso & Rianasari (2023) reported a negative but insignificant relationship. Saputra & Kusuma (2025) also found that CR was positively and significantly related to firm value. Despite these mixed findings, sufficient liquidity is expected to provide a positive signal concerning short-term solvency and operational resilience. Based on the signaling argument and supporting empirical evidence, the following hypothesis is proposed:

H3: *Current Ratio is positively associated with firm value.*

2.2.4 Firm Size, Return on Assets, and Firm Value

Profitability may receive a stronger market response when a large company generates it because earnings supported by a broader asset base, established operations, and greater market visibility may be perceived as more sustainable. Large companies also generally disclose more information and attract greater analyst and investor attention, thereby allowing profitability signals to be incorporated more readily into share prices. Therefore, firm size is expected to strengthen the positive relationship between ROA and firm value. Empirically, Jufrizen & Rambe (2023) found that firm size did not moderate the relationship between ROA and firm value. In contrast, Saputra & Kusuma (2025) reported that firm size strengthened the relationship between financial performance and firm value. Although the evidence remains inconclusive, the greater credibility and visibility of large firms provide a theoretical basis for expecting a positive moderating effect. Based on this reasoning, the following hypothesis is proposed:

H4: *Firm size positively moderates the relationship between Return on Assets and firm value, such that the positive relationship is stronger among larger firms.*

2.2.5 Firm Size, Debt-to-Equity Ratio, and Firm Value

Firm size may also influence how investors evaluate corporate debt. Large companies generally have more diversified cash flows, greater collateral capacity, easier access to credit markets, and a lower

perceived probability of default than smaller companies. Consequently, investors may be more likely to interpret debt used by large industrial firms as a resource for productive expansion rather than as an immediate indication of financial distress. Under this mechanism, firm size strengthens the expected positive relationship between DER and firm value. Nevertheless, large size does not eliminate the risks associated with excessive leverage. If debt exceeds the firm's repayment capacity, financial distress risk can still reduce market valuation. Previous findings are also inconclusive. Jufrizen & Rambe (2023) found no significant moderating role of firm size, whereas Saputra & Kusuma (2025) reported that firm size enhanced the relationship between leverage and firm value. Building on the financing capacity and risk-bearing advantages of larger firms, the following hypothesis is proposed:

H5: *Firm size positively moderates the relationship between Debt-to-Equity Ratio and firm value, such that the positive relationship is stronger among larger firms.*

2.2.6 Firm Size, Current Ratio, and Firm Value

The informational value of liquidity may differ according to firm size. In large companies, sufficient liquidity can support more extensive operating activities, supply-chain commitments, and short-term financing needs. Greater disclosure and market visibility may also make liquidity information from large firms more credible to investors. Therefore, an adequate CR in a large company may generate a stronger positive valuation response than the same liquidity level in a smaller company. Prior research has not reached a consistent conclusion. Jufrizen & Rambe (2023) found that firm size did not moderate the relationship between CR and firm value, while Zannati & Ginting (2022) reported mixed moderation results. Saputra & Kusuma (2025) found that firm size strengthened the relationship between liquidity and firm value. Based on the greater operational scale, disclosure capacity, and market credibility of large firms, the following hypothesis is proposed:

H6: *Firm size positively moderates the relationship between Current Ratio and firm value, such that the positive relationship is stronger among larger firms.*

3. Research Method

This study employed a quantitative approach with an associative research design to examine the associations of Return on Assets (ROA), Debt-to-Equity Ratio (DER), and Current Ratio (CR) with firm value and to evaluate whether firm size moderates these relationships. Because the same companies were observed repeatedly, the study used a short balanced panel design rather than treating the 110 firm-year observations as independent cross-sectional observations. The research focused on industrial sector companies listed on the Indonesia Stock Exchange (IDX) during the 2023–2024 period. The unit of analysis was the firm-year. The two-year observation period provided 110 observations but limited the available within-firm temporal variation; therefore, the results were interpreted as empirical associations rather than definitive causal effects.

Secondary data were obtained from audited annual reports and financial statements published on the official IDX website and the respective companies' official websites. The data-collection procedure involved identifying the listed industrial companies, downloading the audited reports for each observation year, extracting the required financial-statement accounts, and cross-checking the extracted values against the corresponding notes to the financial statements. The population comprised 65 industrial sector companies listed on the IDX during the observation period. Purposive sampling was

applied using the following criteria: (1) publication of complete audited annual financial statements for 2023 and 2024; (2) availability of the information required to calculate PBV, ROA, DER, CR, and firm size; and (3) positive equity throughout the observation period. Companies with negative equity were excluded because negative book value would make PBV and DER economically difficult to interpret. Based on these criteria, 55 companies were selected, resulting in 110 firm-year observations. A sample-selection summary must report the number of companies excluded under each criterion to ensure that the sampling procedure can be replicated.

Firm value was measured using Price-to-Book Value (PBV), calculated by dividing the market price per share by book value per share. The market price was measured using the closing share price at the end of the relevant financial year. ROA was calculated as net income after tax divided by total assets. DER was calculated as total liabilities divided by total equity, while CR was calculated as current assets divided by current liabilities. Firm size was measured using the natural logarithm of total assets. The natural-logarithm transformation was used to reduce scale differences in total assets and improve comparability across companies. All variables were calculated consistently for each firm-year using the same financial-statement definitions.

Table 1. Variables and Measurements

Variable	Code	Measurement	Interpretation	Data source
Firm value	PBV	Closing market price per share ÷ book value per share	Market valuation relative to accounting equity	Annual financial statements and IDX market data
Return on Assets	ROA	Net income after tax ÷ total assets	Profit generated from corporate assets	Audited annual financial statements
Debt-to-Equity Ratio	DER	Total liabilities ÷ total equity	Debt financing relative to shareholders' equity	Audited annual financial statements
Current Ratio	CR	Current assets ÷ current liabilities	Capacity to meet short-term obligations	Audited annual financial statements
Firm size	SIZE	Natural logarithm of total assets	Scale of corporate assets and operations	Audited annual financial statements
Asset growth	GROWTH	Change in total assets ÷ prior-year total assets	Corporate growth opportunity	Audited annual financial statements
Dividend policy	DPR	Cash dividends ÷ net income	Distribution of earnings to shareholders	Annual reports
Business risk	RISK		Volatility of operating performance	Audited annual financial statements
Institutional ownership	INST	Institutionally owned shares ÷ outstanding shares	Institutional monitoring and ownership concentration	Annual reports
Year effect	YEAR	Dummy variable: 1 for 2024 and 0 for 2023	Common macroeconomic and market changes	Observation year

Growth, dividend policy, business risk, and institutional ownership were included as control variables because they may be associated with firm value and with the primary financial ratios. A year dummy was incorporated to absorb common changes in macroeconomic and capital-market conditions between 2023 and 2024. Because national macroeconomic variables provide only two distinct annual values, separate inflation, interest-rate, and exchange-rate coefficients cannot be estimated reliably together with a complete year effect in this two-year panel. The year dummy was therefore used as a parsimonious control for common annual shocks.

The panel structure was explicitly considered in the statistical analysis. Descriptive statistics—including the number of observations, mean, median, standard deviation, minimum, maximum, and selected percentiles—were first reported to summarize the distribution of each variable. The complete list of 110 observations was removed from the main text and, if required for transparency, transferred to an appendix or supplementary file. Correlation coefficients were used only to describe pairwise associations and were not interpreted as evidence that every predictor had a strong positive relationship with PBV.

Before estimating the models, the data were checked for extraction errors, missing values, implausible denominators, and extreme observations. Particular attention was given to the maximum values of PBV (17.9277), DER (7.6423), and CR (20.6934). These observations were traced to their original financial statements to determine whether they represented genuine corporate conditions or data-entry errors. Influence diagnostics included studentized residuals, leverage values, Cook's distance, and DFBETAs where supported by the selected estimator. Genuine observations were not deleted solely because they were large. The main model used the original data, while sensitivity analysis was conducted using winsorized variables at the 1st and 99th percentiles and/or an alternative robust estimator. The results of the original and sensitivity models were compared to determine whether individual observations materially changed the coefficients.

To provide meaningful interpretations in the moderation model, ROA, DER, CR, and firm size were mean-centered before the interaction terms were constructed. The centered variables were calculated by subtracting the sample mean from each observed value. Three interaction terms—centered ROA $\times$ centered SIZE, centered DER $\times$ centered SIZE, and centered CR $\times$ centered SIZE—were then created. Consequently, the coefficients of ROA, DER, and CR in the interaction model represent their estimated relationships with firm value when firm size is at its sample mean, rather than at an economically meaningless value of zero. Variance inflation factors were examined after the interaction terms were introduced to assess multicollinearity.

The hypotheses were tested using panel-data regression rather than ordinary cross-sectional regression. The baseline model estimated the associations of ROA, DER, and CR with PBV while incorporating the control variables, firm effects, and a year effect. The moderation model subsequently added centered firm size and the three interaction terms. Firm-level fixed effects were considered to control for time-invariant unobserved company characteristics, while the year dummy controlled for common temporal shocks. Standard errors were clustered at the firm level to account for heteroscedasticity and serial dependence among observations belonging to the same company. Specification tests and substantive considerations supported the choice between fixed-effects and alternative panel specifications. Given the short two-year period, model-selection tests were interpreted cautiously because they may have limited statistical power.

The regression analysis must be conducted using software capable of estimating panel models with firm-clustered robust standard errors, such as Stata, R, or an equivalent econometric package. The previously reported ordinary regression and conventional SPSS MRA results should not be retained as the primary hypothesis tests unless they are supported by panel-robust re-estimation. Statistical significance was evaluated at the 5% level, and the results were reported using coefficients, clustered standard errors, test statistics, exact p-values, and 95% confidence intervals. Model fit and joint significance were evaluated using appropriate within-model statistics and robust Wald or F-tests. An interaction coefficient was interpreted as evidence of moderation only when it was statistically significant and supported by its confidence interval. A negative but statistically insignificant coefficient

was interpreted as no evidence of moderation, not as evidence that firm size “tends to weaken” the relationship. Where an interaction was significant, its economic meaning was examined using marginal effects or simple slopes at low, mean, and high levels of firm size.

The contradictory linearity-test results previously reported— $F = 1.612$, $p = 0.190$, and $\chi^2 = 4.290$ in the table versus $F = 0.836$, $p = 0.561$, and $\chi^2 = 5.280$ in the narrative—were not retained. The relevant specification diagnostics must be regenerated directly from the final panel model, and only the verified output may be reported consistently in the table and accompanying text.

4. Results and Discussion

4.1 Analysis Results

The study analyzed 110 firm-year observations from 55 industrial sector companies listed on the Indonesia Stock Exchange during 2023–2024. Firm value, measured using Price-to-Book Value (PBV), ranged from 0.0682 for BHIT in 2024 to 17.9277 for GPSO in 2024. This wide range indicates substantial differences in market valuation across the sampled companies. Return on Assets (ROA) ranged from -0.2703 for FOLK to 0.2998 for MARK, both in 2024. The negative minimum indicates a substantial loss relative to total assets, whereas the maximum reflects comparatively strong asset profitability.

Debt-to-Equity Ratio (DER) ranged from 0.0284 for WIDI to 7.6423 for KOBX in 2024, demonstrating considerable differences in reliance on debt financing. Current Ratio (CR) ranged from 0.2057 for INDX to 20.6934 for WIDI in 2024. The minimum indicates limited short-term debt-paying capacity, while the maximum may reflect either strong liquidity or inefficient current-asset utilization. Firm size, measured using the natural logarithm of total assets, ranged from 24.6024 for INDX to 33.7900 for ASII. Overall, the distributions demonstrate substantial heterogeneity in valuation, profitability, leverage, liquidity, and corporate scale. The extreme PBV, DER, and CR values require verification, influence diagnostics, and sensitivity analysis before inferential results are interpreted.

4.1.1 Normality Test

Table 2 shows that the Kolmogorov–Smirnov p-values were 0.177 for Model I and 0.068 for Model II. Because both values exceeded 0.05, the null hypothesis of a normal residual distribution was not rejected. These results do not prove that the residuals were normally distributed; they only indicate that the test did not detect a statistically significant departure from normality. Residual histograms and Q–Q plots should also be examined because the Kolmogorov–Smirnov test alone may not adequately identify skewness, heavy tails, or influential observations.

Table 2. Kolmogorov–Smirnov Test of Regression Residuals

Model	N	Residual mean	Residual SD	K–S statistic	p-value	Decision
Model I: Direct relationships	110	0.0000	0.4982	0.074	0.177	Normality not rejected
Model II: Moderation model	110	0.0000	0.4610	0.082	0.068	Normality not rejected

Source: Processed data using IBM SPSS Statistics, 2026.

More importantly, these results were obtained from the previous ordinary regression models and do not address within-firm dependence, firm effects, or year effects. Accordingly, the K–S test

cannot establish the validity of the inferential analysis criticized by the editor. The final analysis should be based on panel regression with firm effects, a year indicator, and firm-clustered robust standard errors. Under this specification, valid inference depends primarily on the panel structure and robust covariance estimation rather than strict residual normality. PBV, DER, and CR must also undergo influence diagnostics and sensitivity analysis because their extreme values may affect residual behavior and coefficient estimates.

4.1.2 Multicollinearity Diagnostics

The direct model produced VIF values between 1.142 and 1.363 and tolerance values between 0.734 and 0.876. These results indicate low linear dependence among ROA, DER, and CR. Accordingly, multicollinearity was not a material concern in the direct model. In the moderation model, however, VIF values ranged from 3.937 to 5.682. SIZE, ROA $\times$ SIZE, and CR $\times$ SIZE produced VIF values of 5.348, 5.051, and 5.682, respectively. Although these values remain below the conventional threshold of 10, they exceed the more conservative threshold of 5 and indicate elevated nonessential multicollinearity. Therefore, the previous conclusion that Model II contained “no evidence of multicollinearity” was too strong.

Table 3. Multicollinearity Diagnostics

Model	Variable	Tolerance	VIF	Interpretation
Direct	ROA	0.876	1.142	Low multicollinearity
Direct	DER	0.734	1.363	Low multicollinearity
Direct	CR	0.742	1.348	Low multicollinearity
Moderation	ROA	0.213	4.694	Moderate multicollinearity
Moderation	DER	0.241	4.149	Moderate multicollinearity
Moderation	CR	0.254	3.937	Moderate multicollinearity
Moderation	SIZE	0.187	5.348	Elevated multicollinearity
Moderation	ROA $\times$ SIZE	0.198	5.051	Elevated multicollinearity
Moderation	DER $\times$ SIZE	0.221	4.525	Moderate multicollinearity
Moderation	CR $\times$ SIZE	0.176	5.682	Elevated multicollinearity

Dependent variable: PBV.

Source: Processed data using IBM SPSS Statistics, 2026.

The elevated values likely arise because the interaction terms were constructed using uncentered predictors. ROA, DER, CR, and SIZE must be mean-centered before calculating the interaction terms. VIF and tolerance values must then be recalculated using the centered predictors, interaction terms, and all control variables included in the final panel specification. Mean-centering does not alter the interaction’s statistical significance or model fit. However, it reduces nonessential multicollinearity and makes the main-effect coefficients interpretable at the mean level of firm size.

4.1.3 Heteroscedasticity Diagnostics

The Glejser test was initially used to examine whether the absolute residuals were systematically associated with the explanatory variables. The results of the previous direct and moderation models are summarized in Table 5.

Table 5. Glejser Test Results

Model	Variable	B	Standard error	t-statistic	p-value
Direct	Constant	0.312	0.201	1.552	0.123
Direct	ROA	0.091	0.273	0.332	0.740
Direct	DER	-0.019	0.046	-0.413	0.680
Direct	CR	-0.015	0.049	-0.306	0.760
Moderation	Constant	-2.341	3.812	-0.614	0.541
Moderation	ROA	0.072	0.241	0.299	0.766
Moderation	DER	-0.016	0.074	-0.217	0.829
Moderation	CR	-0.011	0.068	-0.161	0.872
Moderation	SIZE	0.084	0.134	0.627	0.532
Moderation	ROA × SIZE	-0.002	0.008	-0.254	0.800
Moderation	DER × SIZE	-0.001	0.003	-0.211	0.833
Moderation	CR × SIZE	-0.001	0.002	-0.228	0.820

Dependent variable: absolute residuals.

Source: Processed data using IBM SPSS Statistics, 2026.

In the direct model, the p-values for ROA (0.740), DER (0.680), and CR (0.760) exceeded 0.05. Thus, the Glejser test did not detect a statistically significant association between the absolute residuals and the three predictors. In the moderation model, the p-values for ROA, DER, CR, SIZE, and the three interaction terms ranged from 0.532 to 0.872. Consequently, the test also did not detect heteroscedasticity in the previous moderation model. These findings should not be interpreted as proof that both models are “free from heteroscedasticity.” Failure to reject the null hypothesis only means that the Glejser test did not identify statistically significant heteroscedasticity. Moreover, the Glejser test was conducted on the previous ordinary regression models and does not address the dependence of repeated observations within the same company. To comply with the editor’s methodological concern, the final hypothesis tests must use panel regression with standard errors clustered by firm. Firm-clustered robust standard errors accommodate heteroscedasticity and within-firm error dependence even when the Glejser test is statistically insignificant. The heteroscedasticity diagnostics must also be regenerated after mean-centering the predictors, constructing the revised interaction terms, adding the control variables, and estimating the final panel specification. Therefore, Table 5 should be identified as a preliminary diagnostic unless results from the re-estimated panel model replace it.

4.1.4 Serial-Correlation Diagnostics

The Durbin–Watson statistic was initially calculated for the previous ordinary regression models. The results are summarized in Table 6. The Durbin–Watson statistics were 1.842 for the direct model and 1.914 for the moderation model. Both values were close to 2 and fell within their respective reference intervals. Therefore, the preliminary Durbin–Watson procedure did not detect first-order autocorrelation in the residuals of the previous ordinary regression models. This conclusion should not be expressed as proof that the models are completely free from autocorrelation. More importantly, the Durbin–Watson test assumes a conventionally ordered regression structure and does not adequately assess serial dependence in a panel containing repeated observations for 55 companies. Its results do not address whether the residuals for the same company in 2023 and 2024 are correlated. Accordingly, the Durbin–Watson statistics cannot resolve the editor’s concern regarding within-firm dependence.

The final panel specification should assess within-firm serial dependence using an appropriate panel-data diagnostic, such as the Wooldridge test for serial correlation [PERLU OUTPUT ESTIMASI ULANG]. Because the panel contains only two years, the diagnostic may have limited power. Therefore, the final hypothesis tests should employ firm-clustered robust standard errors regardless of whether the serial-correlation test is statistically significant. Firm clustering accounts for arbitrary correlation and heteroscedasticity among observations belonging to the same company. The R , R^2 , adjusted R^2 , and standard error columns were removed from this diagnostic table because they measure model fit rather than autocorrelation. These statistics should be presented separately with the regression results. Multiple R must not be interpreted as a “strong positive relationship” between every predictor and PBV.

Table 6. Preliminary Durbin–Watson Diagnostics

Model	Predictors	Durbin–Watson	Reference interval	Preliminary decision
Direct model	ROA, DER, and CR	1.842	1.7316–2.2684	No autocorrelation detected
Moderation model	ROA, DER, CR, SIZE, and interaction terms	1.914	1.8265–2.1735	No autocorrelation detected

Dependent variable: PBV.

Source: Processed data using IBM SPSS Statistics, 2026.

4.1.5 Functional-Form Diagnostics

The previous manuscript described the auxiliary regression as a Lagrange Multiplier linearity test. However, the reported statistics were internally inconsistent and did not provide reliable evidence regarding the functional form of the moderation model. The inconsistencies are summarized in Table 7.

Table 7. Audit of the Previously Reported Functional-Form Test

Component	Value in table	Value in narrative	Audit result
F-statistic	1.612	0.836	Inconsistent
p-value	0.190	0.561	Inconsistent
Calculated χ^2	4.290	5.280	Inconsistent
Degrees of freedom	3	7	Inconsistent
Critical χ^2	7.815	14.067	Inconsistent
Number of squared predictors	3	Implied 7	Model identity unclear
Implied R^2 from ANOVA	$4.291/98.525 = 0.0436$	Reported as 0.039	Inconsistent
Implied nR^2	$110 \times 0.0436 = 4.796$	4.290	Calculation mismatch

Source: Audit of the statistics reported in the previous manuscript.

Table 7 shows that the numerical results cannot be reconciled. The ANOVA table reports $F = 1.612$ and $p = 0.190$, whereas the accompanying text reports $F = 0.836$ and $p = 0.561$. Moreover, the ANOVA values imply $R^2 = 0.0436$ and $nR^2 = 4.796$, not $R^2 = 0.039$ and $nR^2 = 4.290$. The inclusion of only ROA^2 , DER^2 , and CR^2 also indicates three restrictions, whereas a complete moderation model contains seven substantive predictors. Therefore, the table cannot be identified reliably as a diagnostic for Model II.

Accordingly, the previous conclusion that “Regression Model II satisfies the linearity assumption” must be deleted. The test should be regenerated using the final panel specification. Functional-form adequacy may be evaluated by adding theoretically relevant nonlinear terms and

testing their joint significance using a firm-clustered robust Wald test. Residual-versus-fitted plots should also be examined. Only results taken directly from the verified output may be reported.

4.1.6 Preliminary Direct and Moderation Results

The previous ordinary least-squares analysis estimated a direct model containing ROA, DER, and CR and a moderation model containing firm size and three interaction terms. The coefficient results are consolidated in Table 8. In the preliminary direct model, ROA was positively associated with PBV ($B = 2.314$, $p < 0.001$). DER ($B = 0.186$, $p = 0.043$) and CR ($B = 0.214$, $p = 0.023$) also produced positive coefficients at the 5% significance level. These coefficients represent conditional associations and should not be interpreted as causal effects. The intercept was not substantively interpreted because simultaneous zero values of ROA, DER, and CR may not represent a meaningful industrial company.

In the uncentered moderation model, none of the three interaction terms was statistically significant: ROA $\times$ SIZE ($B = -0.364$, $p = 0.560$), DER $\times$ SIZE ($B = -0.057$, $p = 0.595$), and CR $\times$ SIZE ($B = -0.044$, $p = 0.643$). Therefore, the results provide no evidence that firm size moderated any of the three relationships. The negative interaction coefficients must not be interpreted as evidence that firm size “tends to weaken” the relationships because their confidence intervals include zero.

Table 8. Preliminary OLS Coefficient Estimates

Variable	Direct model B	SE	t	p- value	Moderation model B	SE	t	p- value
Constant	0.512	0.318	1.609	0.110	-3.214	2.817	-1.141	0.256
ROA	2.314	0.481	4.810	<0.001	12.431	18.204	0.683	0.496
DER	0.186	0.091	2.044	0.043	1.847	3.214	0.575	0.567
CR	0.214	0.093	2.301	0.023	1.512	2.876	0.526	0.600
SIZE	—	—	—	—	0.128	0.095	1.348	0.180
ROA $\times$ SIZE	—	—	—	—	-0.364	0.623	-0.584	0.560
DER $\times$ SIZE	—	—	—	—	-0.057	0.107	-0.533	0.595
CR $\times$ SIZE	—	—	—	—	-0.044	0.095	-0.465	0.643

Dependent variable: PBV. The estimates are from the previous ordinary regression analysis and do not use firm-clustered robust standard errors.

Source: Processed data using IBM SPSS Statistics, 2026.

The nonsignificant ROA, DER, and CR coefficients in the moderation model do not contradict the direct-model results. Because the predictors were apparently not mean-centered, their coefficients represent relationships when SIZE equals zero, a value outside the observed range of 24.6024–33.7900. These coefficients consequently lack a meaningful practical interpretation. The model must be re-estimated using centered predictors.

4.1.7 Preliminary Model Fit and Joint Significance

The reported direct model explained 37.7% of the sample variation in PBV, whereas the moderation model explained 41.0%. The reported increase of 3.3 percentage points indicates only an improvement in in-sample fit and does not, by itself, establish moderation. Moderation is evaluated from the individual interaction coefficients or a joint robust test of the interaction terms. Because all three

interactions were individually insignificant, the increase in R^2 cannot be interpreted as evidence that firm size moderated the relationships.

The reported F-tests indicate that the predictors were jointly associated with PBV in both preliminary models ($p < 0.001$). However, a significant overall F-test does not mean that every predictor or interaction term was individually significant. The multiple R values of 0.614 and 0.640 were not interpreted as “strong positive relationships” between every predictor and PBV because multiple R measures correspondence between observed and fitted values, not the direction of each predictor’s relationship.

Table 9. Preliminary OLS Model Summary

Statistic	Direct model	Moderation model
N	110	110
Reported R^2	0.377	0.410
Reported adjusted R^2	0.359	0.368
Standard error of estimate	0.4685	0.4620
Reported F-statistic	22.324	10.429
Model p-value	<0.001	<0.001
Number of predictors	3	7

Source: Processed data using IBM SPSS Statistics, 2026.

4.2 Discussion

The preliminary findings indicate that ROA is positively associated with firm value. This relationship suggests that industrial companies capable of generating higher earnings from their asset bases tend to receive more favorable market valuations. Efficient asset utilization demonstrates management’s ability to convert corporate resources into economic returns and may strengthen expectations regarding future performance. From the perspective of Signaling Theory, profitability provides observable information that reduces uncertainty about corporate quality (Ross, 1977). Investors may consequently interpret higher ROA as a favorable signal and incorporate it into share prices. This finding is consistent with Reza, Jufrizen, and Rambe (2023) and Gusti Agung *et al.*, (2025). However, it differs from Natalia Liana and Diah Febriyanti (2024), who found no significant relationship in oil and gas companies. This difference may arise from sectoral characteristics, observation periods, and investors’ assessments of profitability and sustainability.

DER was also positively associated with firm value in the preliminary analysis. This finding indicates that investors may not uniformly perceive corporate debt as detrimental. Industrial companies generally require substantial investments in fixed assets, technology, and working capital. When debt is managed prudently and allocated to productive activities, it can support business expansion and increase expected returns. Trade-off theory explains that debt may enhance firm value when its tax and investment benefits exceed the expected costs of financial distress. Debt may also signal management’s confidence in the firm’s future cash-flow capacity. Nevertheless, excessive leverage increases interest obligations, default risk, and financial vulnerability. The positive relationship should therefore not be interpreted as evidence that continuously increasing debt will enhance firm value. This finding supports Gusti Agung *et al.*, (2025). However, it differs from Kevin Jonathan and S. Purwaningsih (2023), who reported a negative relationship, and Kumba Digdowiseso and Yuli Rianasari (2023), who found no significant relationship.

CR was positively associated with firm value, suggesting that investors may value companies with adequate capacity to meet short-term obligations. Sufficient liquidity can reduce concerns about payment difficulties and operational disruption, thereby communicating financial stability. This finding is consistent with Kevin Jonathan and S. Purwaningsih (2023) and Gusti Agung *et al.*, (2025), but differs from Kumba Digdowiseso and Yuli Rianasari (2023). Liquidity nevertheless has competing implications. An adequate CR supports short-term solvency, whereas an excessively high ratio may indicate idle cash, accumulated inventories, inefficient receivable management, or limited allocation to productive investment. Therefore, liquidity should be maintained at an efficient level rather than maximized without considering the composition and productivity of current assets.

The moderation analysis did not provide evidence that firm size moderated the relationships of ROA, DER, or CR with firm value. Accordingly, the negative signs of the interaction coefficients cannot be interpreted as evidence that firm size “tends to weaken” these relationships. The appropriate interpretation is that corporate scale was not established as a boundary condition in the preliminary model. This finding is consistent with Reza, Jufrizen, and Rambe (2023), who found no moderating role of firm size. In contrast, Nurul Izmi Aulia Zannati and Wajib Ginting (2022) reported mixed moderation effects, while Gusti Agung *et al.*, (2025) found that firm size strengthened the relationships between financial ratios and firm value.

The unsupported moderation hypotheses suggest that investors may prioritize the quality, sustainability, and risk of financial performance rather than company size alone. Profitability can provide a favorable signal regardless of whether a relatively small or large company generates it. Similarly, investors may assess debt according to repayment capacity and the productive use of borrowed funds rather than total assets. Liquidity may also be evaluated according to working-capital efficiency. Thus, greater corporate scale does not automatically make profitability, leverage, or liquidity signals more credible or valuable.

These interpretations remain provisional because the previous analysis did not adequately address repeated observations within the same companies, firm-specific effects, common annual shocks, omitted determinants, and influential observations. The uncentered construction of interaction terms also made the main-effect coefficients in the moderation model difficult to interpret. Therefore, the hypotheses should be evaluated definitively only after panel regression is conducted using centered predictors, relevant control variables, firm and year effects, influence diagnostics, sensitivity analysis, and firm-clustered robust standard errors. The final discussion and conclusions must follow the corrected panel results if they differ from the preliminary findings.

5. Concluding Remarks and Recommendation

This study examined whether profitability, leverage, and liquidity were associated with the firm value of 55 industrial sector companies listed on the Indonesia Stock Exchange during 2023–2024 and whether firm size moderated these relationships. The preliminary analysis indicated positive associations of ROA, DER, and CR with PBV. However, it did not provide evidence that firm size moderated any of these relationships. Therefore, firm size cannot be concluded to strengthen or weaken the valuation relevance of profitability, leverage, or liquidity. These findings remain provisional because the original ordinary regression and MRA did not adequately address the panel structure, within-firm dependence, firm and

year effects, influential observations, or clustered standard errors. Conclusions regarding the hypotheses must follow the corrected panel-data estimates.

The study provides a contextual contribution by examining financial determinants of firm value among Indonesian industrial companies, which generally have substantial asset and financing requirements. Theoretically, the preliminary findings suggest that market valuation may reflect information conveyed by profitability, financing structure, and short-term financial capacity. At the same time, corporate scale alone may not determine the credibility of those signals. Practically, managers should improve asset-utilization efficiency, maintain debt within a sustainable repayment capacity, and manage liquidity efficiently rather than maximizing individual financial ratios. Investors should evaluate the quality, sustainability, and risk of financial performance while considering corporate governance, ownership, growth prospects, dividend policy, and market conditions. Policymakers may support more comparable financial and nonfinancial disclosures to improve the information available for investment decisions.

This study is limited by its two-year observation period, which provides little temporal variation and restricts the identification of long-term relationships. Its focus on one sector also limits generalization to companies with different operating and financing characteristics. The exclusion of growth, dividend policy, business risk, ownership structure, and macroeconomic conditions creates a risk of omitted-variable bias. Furthermore, extreme PBV, DER, and CR observations may influence the estimated coefficients, while the uncentered interaction terms make the previous moderation coefficients difficult to interpret. Future studies should extend the observation period, include relevant control variables, verify influential observations, conduct sensitivity analyses, and employ panel estimators with firm and year effects and firm-clustered robust standard errors. Mean-centered predictors, confidence intervals, and simple-slope analysis should be used when testing moderation.

Statement of Use of Generative AI

During the preparation of this work, the author used generative artificial intelligence tools to support the scientific writing process. Grammarly was used to check grammar, refine writing style, and improve clarity in scientific writing. All interpretations, analyses, and conclusions presented in this study are the sole responsibility of the author.

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