WHAT DRIVES CAPITAL STRUCTURE ? EVIDENCE FROM MANUFACTURING FIRMS IN INDONESIA

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ABSTRACT

This study investigates the impact of profitability, liquidity, growth opportunity, and asset tangibility on the capital structure of manufacturing firms in Indonesia. This study employs the pecking order theory to examine data from 140 manufacturing companies listed on the Indonesia Stock Exchange from 2017 to 2024. The companies were chosen based on criteria such as having full financial statements, being listed before 2017, and not having negative equity. A total of 1,120 firm-year observations were analyzed using panel data regression with STATA. The findings indicate that profitability and liquidity have a significant negative impact on capital structure, while asset tangibility has a significant positive effect. However, growth opportunity does not have a significant effect, suggesting that expansion potential is not a primary factor in determining debt utilization among manufacturing firms. These findings support the pecking order theory and emphasize the importance of internal financial strength and asset structure in financing decisions. Companies are encouraged to maintain strong internal funding capabilities and manage debt prudently to ensure financial sustainability.

Keywords: *Capital Structure; Profitability; Liquidity; Growth Opportunity ; Asset Tangibility ; Manufacturing Sector*

Received : 30-07-2025
Revised : 19-08-2025
Approved : 20-08-2025
Published : 23-08-2025

INTRODUCTION

Capital structure remains a central issue in financial management, especially firms in capital-intensive industries like manufacturing (Harris & Raviv, 1991). A firm's balances internal and external financing sources has a direct impact on its financial health and long-term sustainability. Poor capital structure decisions can increase a firm's exposure to financial risk, especially during periods of macroeconomic instability (Ansca et al., 2017). The COVID-19 pandemic created such a period of uncertainty, disrupting supply chains, constraining production, and diminishing demand across various industries. For many manufacturing firms, this resulted in constrained liquidity, diminished profitability, and waning investor confidence (Rahmawati & Handayani, 2023). As the cost of debt increased and equity markets became unstable, companies were forced to re-evaluate their financing strategies. These challenges highlighted the necessity for a more profound comprehension of what drives capital structure decisions in Indonesia's manufacturing sector.

This study examines four firm-specific factors commonly addressed in capital structure literature: profitability, liquidity, growth opportunity, and asset tangibility (Naibaho & Kristanti, 2024). Each of these variables represents a different aspect of a firm's internal financial condition, and all have implications for the company's reliance on debt or equity financing. Profitability indicates a company's ability to generate internal earnings and is often linked to lower levels of external financing (Ghosh, 2012). Liquidity, conversely, offers insight into a firm's short-term financial adaptability and may influence its credit accessibility. The growth opportunity reflects the firm's potential for expansion, potentially resulting in heightened capital requirements and risk exposure (Titman & Wessels, 1988). Asset tangibility is particularly relevant in manufacturing firms, as tangible assets often serve as collateral that enhances access to debt markets (Rajan & Zingales, 1995). Collectively, these variables provide an extensive perspective on how internal financial attributes influence capital structure.

The study employs the pecking order theory, which suggests that firms prefer internal financing, followed by debt, with equity as a final option (Myers & Majluf, 1984). This framework possits that firms accumulate internal capital during profitable periods and utilize retained earnings to fund operations and investments prior to resorting to debt financing (Myers & Majluf, 1984). Firms will pursue external funding solely when internal resources are inadequate, evaluating the costs and risk associated with debt in comparison to equity (Myers & Majluf, 1984). This theory elucidates firms' behavior in minimizing leverage or avoiding new debt issuance during crises (Kayo & Kimura, 2011), such as the COVID -19 pandemic, despite their capital requirements. Simultaneously, access to external financing may be limited by market sentiment, thereby increasing dependence on internal funds (Campello et al., 2010). This study employs the pecking order theory to evaluate whether Indonesian manufacturing firms adhere to these financing preferences under varying economic conditions.

The manufacturing sector in Indonesia offers a substantial framework for examining these dynamics. The sector, a significant contributors to national GDP, encompasses diverse sub-industries with differing capital structures and funding requirements (World Bank, 2021). Both large-scale industrial producers and medium-sized firms, predominantly depend on long-term investment in machinery, inventory, and technology. This reliance on tangible assets necessitates that leverage-related decisions consider asset liquidity and collateral value. During the 2017–2024 period, manufacturing firms in Indonesia underwent a complete economic cycle characterized by pre-pandemic growth, pandemic-induced contraction, and post-pandemic recovery,

allowing for the observation of financing behavior across various phases (Economic Outlook for Southeast Asia, China and India 2023). These variations present an optimal opportunity to examine whether firm-specific financial indicators consistently affect capital structure, or whether their effects shift depending on the broader economic environment.

Although capital structure has been thoroughly examined in both developed and developing markets, the results have often been inconsistent. Studies conducted in Malaysia, the Eurozone, and the United States have highlighted the importance of local economic and institutional contexts in shaping financing behavior (Hussain & Miras, 2015; Moradi & Paulet, 2019; Ali et al., 2021). In Indonesia, existing research has consentrated on particular sectors such as consumer goods and finance, while neglecting the wider manufacturing industry. This study aims to address the empirical gap created by these limitations by utilizing a comprehensive dataset encompassing 140 manufacturing firms over an eight-year period. This research aims to produce more generalizable insights on capital structure decisions by broadening both the scope and timeframe pf analysis. In doing so, it reexamines fundamental theoretical assumptions and evaluates their relevance within the Indonesian context.

This study ultimately aims to understand how internal financial characteristics specifically profitability, liquidity, growth opportunity, and asset tangibility influence capital structure in Indonesian manufacturing firms. Using panel data regression over 1,120 firm-year observations from 2017 to 2024, indicates that profitability and liquidity are significantly negatively related to capital structure, whereas asset tangibility exerts a significant positive effect. Meanwhile, growth opportunity does not show a significant eefect, indicating that expansion potential alone does not invariably result in increased leverage. These finding support the pecking order theory and indicate a prudent strategy by manufacturing firms in mitigating financial risk. The study enhances academic literature and practical decision-making by offering evidence-based insights to inform financial planning and optimize capital structure in Indonesia's dynamic manufacturing sector.

LITERATURE REVIEW

Pecking Order Theory

The pecking order theory, introduced by Myers and Majluf (1984), provides the central theoretical foundation for this research. The theory posits that companies prioritize internal financing over external sources when meeting their funding needs (Frank & Goyal, 2003). Retained earnings are considered the most desirable source of capital because they do not require repayment and do not dilute ownership (Brealey et al., 2020). When internal funds are insufficient, firms prefer debt financing over equity issuance, as debt typically preserves ownership control, although it increases financial obligations. Equity financing, on the other hand, may expose the company to market mispricing and inevitably dilutes the ownership stake of existing shareholders (Brealey et al., 2020). This hierarchical preference reflects the firm's attempt to minimize the cost of capital while controlling financial risk.

In the manufacturing sector, the application of pecking order theory is particularly relevant. Manufacturing firms are often capital-intensive, requiring substantial investments in machinery, equipment, and production facilities (Rajput & Jhunjhunwala, 2019). When profitability is strong, these firms can rely on retained earnings to finance expansion and modernization, thereby avoiding the risks associated with external financing (Titman et al., 2017). However, during periods of economic

slowdown or when large-scale expansion is needed, debt financing may become necessary. The choice between internal and external funding thus reflects not only financial performance but also strategic priorities and prevailing market conditions (Brealey et. al, 2020).

The theory also underscores the trade-offs between cost, risk, and control. While debt may be less dilutive than equity, it increases fixed repayment obligations, which can strain cash flow during downturns (Brealey et. al, 2020). Equity financing provides repayment flexibility but comes at the expense of ownership dilution and potential undervaluation in volatile markets (Brealey et. al, 2020). For manufacturing firms operating in competitive and cyclical industries, these trade-offs become more pronounced, requiring careful financing decisions that balance short-term liquidity with long-term sustainability (Frank & Goyal, 2009).

By applying the pecking order theory in the context of Indonesian manufacturing firms, this study aims to assess whether the sector's capital structure decisions follow the hierarchical preferences outlined by the theory. The analysis spans 2017 to 2024, capturing pre-pandemic, pandemic, and post-pandemic conditions, offering a comprehensive view of financing behavior in various economic climates.

Capital Structure

Capital structure refers to the composition of a firm's financing, specifically the proportion of debt and equity used to fund its assets and operations (Brealey et. al, 2020). An optimal capital structure can enhance shareholder value by balancing the benefits and costs of debt and equity. Debt offers tax advantages through the deductibility of interest payments and can magnify returns on equity through leverage (Brealey et. al, 2020). However, excessive debt increases financial risk and the probability of bankruptcy. Equity financing, while avoiding fixed repayment obligations, may be more costly in terms of required returns and ownership dilution.

In the Indonesian manufacturing sector, capital structure management is particularly complex due to varying capital needs across industries, exposure to global supply chains, and sensitivity to macroeconomic conditions such as interest rate movements, exchange rate volatility, and inflation. Firms with high asset tangibility often have easier access to debt financing, as tangible assets provide collateral security to lenders. In contrast, firms with fewer tangible assets may rely more heavily on equity or internal funding sources (Rajan & Zingales, 1995). These dynamics highlight the strategic importance of maintaining a capital structure that supports both operational needs and long-term competitiveness.

This research adopts the debt-to-asset ratio (DAR) as the proxy for capital structure, calculated by dividing total liabilities by total assets (Frank & Goyal, 2009). The DAR offers a straightforward and widely used measure of leverage, enabling consistent comparisons across firms and over time (Frank & Goyal, 2009).

Determinants Of Capital Structure

Profitability

Profitability reflects a firm's ability to generate earnings relative to its resources and is a key determinant of financing decisions (Titman & Wessels, 1988). Consistent with the pecking order theory, firms with higher profitability are more likely to use retained earnings to fund operations and investments, reducing their reliance on debt (Frank & Goyal, 2003). In manufacturing, profitability enables self-financing of costly projects such as capacity expansion or technological upgrades. This research uses return on assets

(ROA) as the measure of profitability, capturing the efficiency of asset utilization in generating profits. Prior studies, including those by Saif-Alyousfi et al. (2020), have found a significant negative relationship between profitability and leverage.

Liquidity

Liquidity indicates a firm's ability to meet short-term obligations and maintain operational stability (Gitman & Zutter, 2015). A strong liquidity position reduces the need for external borrowing and enhances the firm's ability to negotiate favorable credit terms (Ross et al., 2019). The current ratio, calculated by dividing current assets by current liabilities, is used in this study to measure liquidity (Brigham & Ehrhardt, 2017). In manufacturing, liquidity ensures smooth procurement of raw materials, timely payment to suppliers, and the flexibility to respond to market opportunities (Tauringana & Afrifa, 2013). Previous research, such as Buana et al. (2024), supports the notion that higher liquidity is associated with lower leverage.

Growth Opportunity

Growth opportunity refers to the potential for a firm to expand its operations and increase future earnings (Myers, 1977). Firms with promising growth prospects may require additional capital to finance expansion, which could lead to higher leverage if internal funds are insufficient. However, evidence from emerging markets suggests that firms may adopt a cautious approach, avoiding excessive debt to protect financial stability (Deesomsak et al, 2004). This study uses the price-to-earnings (P/E) ratio as the proxy for growth opportunity, reflecting investor expectations about future performance (Ross et al., 2019).

Asset Tangibility

Asset tangibility measures the proportion of physical, long-term assets a firm holds, such as land, buildings, and machinery (Rajan & Zingales, 1995). Higher tangibility increases borrowing capacity, as these assets can serve as collateral. In the manufacturing sector, asset tangibility is generally high, which may facilitate access to debt financing (Deesomsak et al., 2004). This study measures asset tangibility as the ratio of net fixed assets to total assets (Ross et al., 2019).

Hypothesis Development

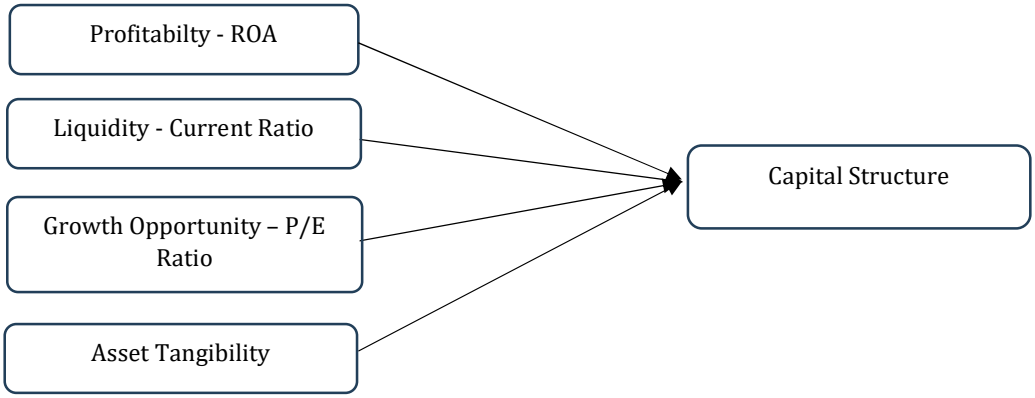
Drawing from the literature, the following hypotheses are proposed:

H1: Profitability has a negative effect on capital structure in manufacturing firms.
H2: Liquidity has a negative effect on capital structure in manufacturing firms.
H3: Growth opportunity has a positive effect on capital structure in manufacturing firms.
H4: Asset tangibility has a positive effect on capital structure in manufacturing firms.

These hypotheses are grounded in the pecking order theory and informed by empirical evidence from previous studies. The relationships will be tested using panel data from Indonesian manufacturing firms over the 2017–2024 period, capturing shifts in financing behavior before, during, and after the COVID-19 pandemic.

Research Framework

The framework of this study is shown in the Figure 1.



Source : Constructed for this study, 2025

Figure 1
Framework

METHOD

This study employs a quantitative correlational design, utilizing panel data that combines cross-sectional and time-series observations (Baltagi, 2005). The data used are secondary data, sourced from the Indonesian Stock Exchange (IDX) and compiled through the Refinitiv financial database, accessible through Petra Christian University's Business and Finance Data Center. The dataset includes annual financial statement recapitulations for the selected companies, which were subsequently processed and transformed into the variables required for analysis based on established formulas.

The population of this research consists of all manufacturing firms listed on the IDX. A purposive sampling method was applied using the following criteria: (1) the company conducted its initial public offering (IPO) prior to 2017, (2) complete and consistent annual financial statements are available for the period 2017–2024, and (3) the company maintained positive equity throughout the observation period. These criteria ensure that the selected firms reflect the financial conditions of stable and operationally active manufacturing companies. The final sample consists of firms that meet these requirements, producing a balanced panel dataset covering eight years of observations.

Data analysis began with descriptive statistics to summarize key characteristics of each variable, including the minimum, maximum, mean, and standard deviation. This step provides an overview of the distribution and tendencies of the variables before further statistical testing. Panel data regression analysis was conducted using STATA software. Three estimation models were considered: the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM) (Baltagi, 2005). Model selection followed a structured approach: the Chow test was used to choose between CEM and FEM, the Hausman test to choose between FEM and REM, and the Lagrange Multiplier test to choose between CEM and REM. The CEM was estimated using Ordinary Least Squares (OLS), FEM using OLS with Least Square Dummy Variables (LSDV), and REM using Generalized Least Squares (GLS) (Baltagi, 2005). When the selected model was either CEM or FEM, classical assumption tests, such as multicollinearity,

heteroskedasticity, and autocorrelation tests, were performed to ensure model validity, whereas REM estimation did not require these tests (Gujarati & Porter, 2009).

The multiple regression equation applied in this research is formulated as follows:

$$DAR = \propto + \beta_1 ROA + \beta_2 CR + \beta_3 PER + \beta_4 TANG + \varepsilon$$

Where:
α = Constant
$\beta_1, \beta_2, \beta_3, \beta_4$ = Regression coefficients
DAR = Debt-to-Assets Ratio (proxy for capital structure)
ROA = Return on Assets (profitability)
CR = Current Ratio (liquidity)
PER = Price-to-Earnings Ratio (growth opportunity)
TANG = Tangibility (asset tangibility)
ε = Error term

Hypothesis testing was based on the sign and magnitude of the regression coefficients, as well as their statistical significance. A variable was considered significant if the *t*-statistic exceeded ±1.96 or if the *p*-value was less than 0.05 (Gujarati & Porter, 2009). The direction of influence was determined by the sign of the coefficient, indicating whether the independent variable had a positive or negative impact on capital structure. These results provide empirical insights into the determinants of capital structure among manufacturing firms in Indonesia.

RESULTS AND DISCUSSION

Descriptive Statistics

Descriptive statistics in Table 1 provide an overview of the characteristics of the variables used in this study (Hair et al., 2019). This preliminary analysis allows for a better understanding of the data distribution and informs subsequent inferential statistical tests. Furthermore, it ensures that the dataset meets the basic assumptions required for panel data regression analysis (Gujarati & Porter, 2009).

Table 1
Descriptive Statistics

Variable	N	Minimum	Maximum	Mean	Std. Deviation
DAR (Debt to Assets Ratio)	720	0.120	0.765	0.452	0.138
ROA (Return on Assets)	720	-0.085	0.245	0.076	0.061
CR (Current Ratio)	720	0.750	5.320	2.145	1.032
PER (Price-to-Earnings Ratio)	720	4.20	38.50	15.73	7.482
TANG (Tangibility)	720	0.120	0.720	0.415	0.154

Source :Data analyzed, 2025

The dependent variable, Debt to Assets Ratio (DAR), has a minimum value of 0.120 and a maximum value of 0.765, with a mean of 0.452 and a standard deviation of 0.138. This indicates that, on average, manufacturing companies in Indonesia finance around 45.2% of their assets with debt, with moderate variation among firms.

The independent variable Return on Assets (ROA) ranges from -0.085 to 0.245, with a mean of 0.076 and a standard deviation of 0.061. This shows that, on average, the

profitability of manufacturing companies is relatively modest, and some firms even experienced negative returns during the observation period.

The Current Ratio (CR) has a minimum value of 0.750 and a maximum of 5.320, with a mean of 2.145 and a standard deviation of 1.032. This suggests that most firms are capable of meeting their short-term obligations, though there is considerable variation in liquidity levels.

The Price-to-Earnings Ratio (PER), which reflects growth opportunities, varies from 4.20 to 38.50, with an average of 15.73 and a standard deviation of 7.482. This indicates that while some companies are valued modestly, others have high market expectations for future growth.

Lastly, Tangibility (TANG) ranges from 0.120 to 0.720, with an average value of 0.415 and a standard deviation of 0.154. This implies that, on average, about 41.5% of the assets of manufacturing companies are in the form of fixed assets, providing potential collateral for debt financing.

Model Selection Tests

To determine the most appropriate panel data estimation technique, three diagnostic tests were conducted sequentially. The Chow test yielded a *p*-value < 0.05, indicating that the Fixed Effect Model (FEM) was preferable to the Common Effect Model (CEM) (Gujarati & Porter, 2009). Subsequently, the Hausman test produced a *p*-value of 0.032, suggesting that FEM was more suitable than the Random Effect Model (REM). Given these results, the FEM was selected as the optimal model for regression analysis. Before running the regression, classical assumption tests were applied to ensure model reliability. The variance inflation factor (VIF) for all independent variables was below 5, indicating no multicollinearity issues (Hair et al., 2019). The Breusch-Pagan test for heteroskedasticity yielded a *p*-value above 0.05, confirming homoskedastic residuals (Wooldridge, 2013). The Durbin-Watson statistic was close to 2, indicating no serious autocorrelation problem (Wooldridge, 2013). These diagnostic results confirm that the FEM provides unbiased and consistent estimators for this study.

Regression Results

Regression used to examine the relationship between one or more independent variables and a dependent variable. In this study, regression is employed to analyze the effects of profitability, liquidity, growth opportunity, and asset tangibility on the capital structure of manufacturing firms (Gujarati & Porter, 2009; Wooldridge, 2013). The main purposes are to determine the direction and strength of relationships, predict the dependent variable, control for other influencing factors, and test the research hypotheses.

Table 2
Regression Results – Fixed Effect Model

Variable	Coefficient	Std. Error	t-Statistic	p-Value	Significance
Constant	0.512	0.034	15.06	0.000	***
ROA	-0.284	0.051	-5.57	0.000	***
CR	-0.062	0.014	-4.43	0.000	***
PER	0.008	0.003	2.67	0.008	**
TANG	0.193	0.047	4.11	0.000	***
R-squared	0.412				
Adj R-squared	0.405				
F-Stat	62.34	(p=0.000)			
Dependen Var	DAR				

*** p< 0.01, ** p<0.05, * p<0.1
Source :Data analyzed, 2025

The regression analysis in Table 2 shows the relationship between profitability (ROA), liquidity (CR), growth opportunity (PER), and asset tangibility (TANG) on capital structure (DAR) for manufacturing companies in Indonesia during 2017–2024. The selected model based on the Chow and Hausman tests is the Fixed Effect Model, which is appropriate for capturing firm-specific characteristics that remain constant over time.

The results indicate that ROA has a coefficient of -0.284, significant at the 1% level (p = 0.000). This negative and significant relationship implies that more profitable firms tend to reduce their debt levels, in line with the pecking order theory, as they prefer to use internal funds rather than external debt financing.

CR also shows a negative and significant relationship with DAR, with a coefficient of -0.062 (p = 0.000). This suggests that firms with higher liquidity are less dependent on debt financing, as they have sufficient short-term assets to meet operational needs.

In contrast, PER has a positive and significant coefficient of 0.008 (p = 0.008). This indicates that firms with greater growth opportunities tend to increase their debt levels to finance expansion projects and operational growth. The significance of PER highlights the role of market expectations in influencing financing decisions.

TANG displays a positive and significant relationship with DAR, with a coefficient of 0.193 (p = 0.000). This suggests that firms with higher asset tangibility are more likely to use debt financing, as fixed assets can serve as collateral to secure loans.

The model's R-squared value of 0.412 indicates that approximately 41.2% of the variation in capital structure can be explained by the four independent variables. The F-statistic (62.34, p = 0.000) confirms that the model is statistically significant, meaning the independent variables collectively have a meaningful impact on the capital structure of manufacturing firms in Indonesia.

The Effect of Profitability and Liquidity on Capital Structure

The negative relationship between profitability and capital structure aligns with the pecking order theory, which posits that firms prefer to use internal funds generated from earnings before resorting to debt financing. Manufacturing firms with higher ROA are likely to finance operations and investments internally, thereby reducing leverage levels. This finding is consistent with studies by Saif-Alyousfi et al. (2020) and Putri & Basuki (2020), which documented similar patterns in other emerging markets. Likewise, the negative impact of liquidity on capital structure suggests that firms with abundant liquid

assets can meet their short-term obligations without relying on external debt. This implies that maintaining a strong liquidity position not only supports operational stability but also reduces the financial risk associated with high leverage. The combined effect of profitability and liquidity underscores the importance of internal financial health in shaping debt policy decisions in Indonesia's manufacturing sector.

The Effect of Growth Opportunity on Capital Structure

The coefficient for growth opportunity, proxied by PER, is positive but statistically insignificant, indicating that market expectations of firm growth do not translate into higher leverage. One plausible explanation is that manufacturing firms in Indonesia may prefer equity or retained earnings over debt when financing growth initiatives, especially in an environment of fluctuating interest rates. Another possibility is that growth expectations are already priced into equity valuations, thereby reducing the perceived need for additional debt financing. This finding diverges from the results of Amin et al. (2023) and Ariani & Wiagustini (2017), who reported a significant positive relationship in other contexts. It also highlights the complexity of financing behavior in emerging markets, where external funding decisions are influenced not only by growth prospects but also by macroeconomic stability, investor sentiment, and firm-specific risk assessments.

The Effect of Asset Tangibility on Capital Structure

The positive and significant relationship between asset tangibility and capital structure supports the collateral hypothesis, which states that firms with more tangible assets have greater access to debt financing. Tangible assets, such as property, plant, and equipment, can be pledged as collateral, thereby reducing lender risk and enabling firms to secure larger or more favorable loan terms. This is particularly relevant in Indonesia, where manufacturing operations are typically asset-intensive, requiring substantial investment in machinery and production facilities. The finding aligns with the work of Kjellman & Hansen (1995) and Ali et al. (2021), who found that asset tangibility is a key determinant of leverage in capital-intensive industries. However, the implication for managers is twofold: while tangible assets facilitate access to debt, they also increase the fixed cost burden of operations, which must be carefully managed to avoid over-leverage.

CONCLUSION AND SUGGESTION

This study concludes that profitability and liquidity have a significant negative effect on capital structure, indicating that more profitable and liquid manufacturing companies in Indonesia tend to rely less on debt financing and prefer internal funding sources. Growth opportunity has a significant positive effect, suggesting that firms with higher market expectations are more inclined to use debt to finance expansion and development. Asset tangibility also shows a significant positive effect, confirming that companies with greater fixed assets tend to utilize them as collateral to secure loans.

These findings align with the pecking order theory, highlighting that internal funds are prioritized before seeking external financing. From a managerial perspective, maintaining optimal profitability and liquidity is essential to reducing financial risk, while growth and asset management should be strategically balanced to avoid over-leverage. Future research is suggested to include macroeconomic variables, such as interest rates and inflation, to provide a more comprehensive understanding of capital structure

determinants. Additionally, expanding the sample to other sectors may enhance the generalizability of the results across different industries in Indonesia.

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