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DETERMINING OPTIMUM CAPITAL STRUCTURE (CASE STUDY: PT MMS)

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Abstract

This study analyzes the optimal capital structure for PT MMS, a high-precision steel cutting service company using EDM wire technology. From 2019 to 2024, the company operated without long-term debt, reflecting a conservative but potentially underleveraged position. Using a descriptive quantitative approach with embedded mixed methods, data were gathered from financial reports, customer surveys, and internal interviews. The analysis covered financial performance (profitability, liquidity, activity) and organizational environment (PESTEL, Porter's Five Forces, SWOT). Capital structure optimization was conducted through WACC simulations, with the cost of equity estimated via CAPM and cost of debt derived synthetically using the Damodaran approach. Results show that the optimal capital structure is 25% debt and 75% equity, achieving the lowest projected WACC of 10.105% in 2025, compared to 11.05% under a 100% equity scenario. A high Interest Coverage Ratio (ICR) of 19.21 further supports the firm's capacity to adopt debt financing. However, since the firm's ROC and ROE remain below its capital costs, moderate leverage should only be implemented once project returns improve to ensure value creation.

Keywords: ***Optimal Capital Structure, WACC, Manufacture***

INTRODUCTION

Capital structure is an important element in financial management because it affects financing efficiency, financial risk, and a company's capacity to maintain and expand its business operations. Determining the optimal capital structure, where the composition of equity and debt is optimized, helps companies achieve capital cost efficiency while maintaining long-term financial stability. This research aims to explain the mix of capital and financing sources used by companies to finance real investments (Myers, 2001). However, not all companies use debt as part of their capital structure, especially non-public companies that tend to be conservative and have limited access to capital markets. PT MMS is a high-precision steel cutting service company that uses *Electrical Discharge Machine* (EDM) wire cutting technology. During the 2019–2024 period, the company only used financing from its own capital without long-term debt. This strategy reflects caution in financial management, but at the same time indicates a potentially underleveraged position that could limit the company's growth in the future. With the majority of its clients (90%) coming from the automotive sector, the company is highly exposed to external risks such as economic fluctuations, fiscal policies, technological changes, and consumer purchasing power. This dependence is reinforced by the results of an external environment analysis covering PESTEL, Porter's Five Forces, and SWOT analysis to assess the company's position in the industry.

To understand the internal financial condition, a financial performance analysis was conducted using profitability, liquidity, and activity ratios over the past six years. Based on historical data, it was found that while the company demonstrated relatively stable performance, an evaluation of future financing strategies is still necessary, particularly in relation to expansion and modernization of fixed assets. Capital structure theory was used as a basis for the analysis in this study. Modigliani and Miller (1958) stated that "in a perfect market, the company value is unaffected by its capital structure". However, in real conditions, the tax shield benefits from interest on debt can increase the value of the company. The trade-off theory explains that a company will borrow up to the point where the tax benefits are balanced with the costs of financial distress (Myers, 2001). Meanwhile, the pecking order theory states that a company does not have a specific target capital structure but follows a preference order: internally generated funds, debt, and then equity (Myers, 1984). Based on this theoretical framework and descriptive quantitative analysis, this study aims to determine the optimal capital structure for PT MMS using the WACC simulation approach. Equity costs are calculated using the CAPM method, and debt costs are calculated synthetically

based on the Damodaran approach. This study is expected to provide strategic recommendations for more efficient and relevant financing for other precision manufacturing service companies.

LITERATURE REVIEW

Financial Performance Analysis

Financial performance is commonly evaluated using profitability, liquidity, and activity ratios. These tools reflect the company's efficiency, short-term resilience, and ability to generate profit (Brigham & Houston, 2019).

Capital Structure

Capital structure is described as the mix of debt and equity that a company uses to finance its operations (Brigham & Houston, 2019). Four main theories are used as a foundation for analyzing capital structure: the Modigliani and Miller theory (1958), trade-off theory (Myers, 2001), pecking order theory (Myers, 1984), and signaling theory (Ross, 1977). Each theory explains the relationship between funding structure, financial risk, taxes, and asymmetric information.

Cost of Capital

The cost of capital consists of the cost of equity and the cost of debt. The cost of equity is calculated using the Capital Asset Pricing Model (CAPM) approach, which considers the risk-free rate, beta, and market risk premium (Gitman & Zutter, 2015). Meanwhile, debt costs are calculated using Damodaran's synthetic approach, using the interest coverage ratio to determine the risk spread, and then indirectly estimating the cost of debt.

Optimum Capital Structure

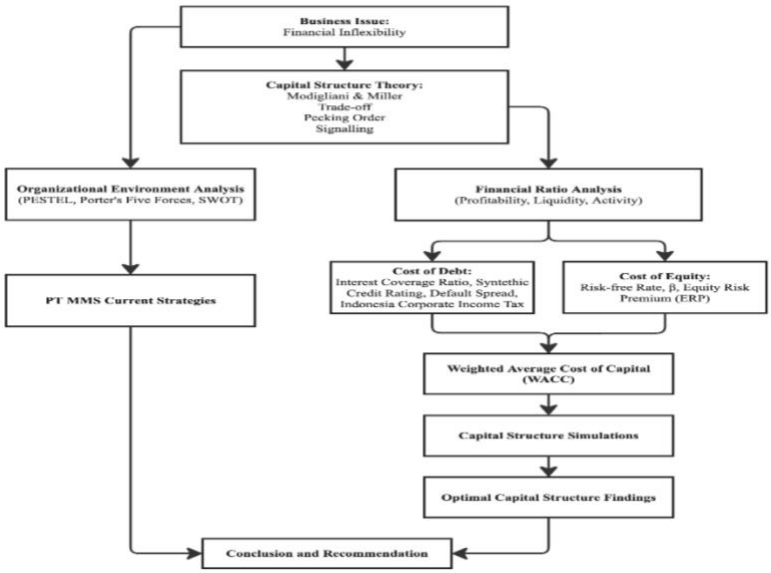
Capital structure simulation is calculated by finding the Weighted Average Cost of Capital (WACC) from various combinations of debt and equity proportions. The structure that produces the lowest WACC is considered the optimal capital structure because it reflects the lowest financing costs and the highest company value (Brigham & Houston, 2019).

Organizational Environment Analysis

In assessing the organizational environment, this study used several frameworks, such as PESTEL Analysis to evaluate political, economic, social, technological, environmental, and legal factors (Bouzid, 2020), as well as Porter's Five Forces to analyze the level of industry competition (Porter, 2008). And SWOT analysis is employed to identify the company's internal strengths and weaknesses, as well as external opportunities and threats.

Although many previous studies have focused on large or public companies, there is still limited research discussing private companies that underutilize debt, such as PT MMS. In addition, the application of a synthetic debt cost approach integrated with environmental analysis has not been extensively explored. This study contributes by combining financial simulations (WACC and capital structure) with strategic insights to support financing decisions in expansion.

METHOD



This research uses a quantitative-descriptive approach by analyzing historical financial data of PT MMS for the period 2019 to 2024 and conducting financial projections for 2025 to determine the optimal capital structure. PT

MMS is a steel cutting service company focused on the automotive sector and has no long-term debt. For Damodaran's synthetic approach was used to calculate the company's cost of capital.

Primary data was obtained through structured interviews with the owner and internal team to understand the company's financial and operational policies. Additionally, a customer satisfaction survey based on the Likert scale was conducted to obtain insights into perceptions of service performance. Secondary data includes the company's financial statements for the period 2019–2024, the Prime Lending Rate (SBDK) data, and capital market information such as unlevered beta and equity risk premium obtained from Damodaran (2023). Other supporting data, such as employment conditions, were obtained from the Central Bureau of Statistics (BPS).

Financial performance analysis was conducted by calculating profitability, liquidity, and activity ratios to assess the company's internal condition. Equity cost (Re) is calculated using the Capital Asset Pricing Model (CAPM), which includes the risk-free rate, industry beta, and equity risk premium. The CAPM formulation as follows:

$$Re = Rf + \beta \times (Rm - Rf)$$

Meanwhile, debt cost (Rd) is calculated synthetically using the Interest Coverage Ratio (ICR) to determine the synthetic credit rating, which is then linked to the default spread and adjusted for corporate income tax rates. The after-tax cost of debt formula is calculated as follows:

$$r_i = r_d \times (1 - T)$$

These two components of the cost of capital are combined based on the proportion of the capital structure to obtain the Weighted Average Cost of Capital (WACC). The WACC formula is calculated as follows:

$$WACC = \left(\frac{E}{V}\ x\ Re\right) + \left(\frac{D}{V}\ x\ Rd\ x\ (1 - Tc)\right)$$

Simulations are conducted on various capital structure scenarios with debt proportions ranging from 0% to 100% to identify the structure that produces the lowest WACC as the optimal capital structure. Strategic analysis is also conducted using the PESTEL framework, Porter's Five Forces, and SWOT to evaluate the external and internal business environment, and to strengthen the interpretation of simulation results in the context of long-term financing decisions.

RESULTS AND DISCUSSION

PESTEL

- **Political**: The Indonesian government is promoting industrial revitalization through the Making Indonesia 4.0 program, including support for the metal and automotive sectors. However, PT MMS's dependence on imported materials such as copper wire makes it vulnerable to changes in import policies and exchange rate fluctuations.
- **Economic**: The decline in automotive exports in 2024 indicates external pressure on demand for PT MMS's services. However, the potential for investment and logistics efficiency due to lower fuel prices remains an opportunity, provided it is supported by tax incentives.
- **Social**: The availability of vocational school graduates around Cibitung–Cikarang presents a potential pool of ready-to-work labor. Additionally, customer expectations for precision, work ethics, and timeliness are increasing, which PT MMS must continue to maintain.
- **Technological**: The latest EDM technology offers high efficiency and digital integration, although PT MMS still uses older-generation machines. Modernization is needed to keep pace with the demands of the automotive and electronics industries, which are increasingly automated.
- **Environmental**: PT MMS faces energy efficiency and metal waste management challenges, despite its small scale of operations. Ministry of Environment and Forestry Regulation No. 5/2021 and ESG trends are beginning to influence procurement policies of major automotive companies.
- **Legal**: Compliance with occupational safety and health (K3) regulations and tax laws is crucial for maintaining the eligibility of large projects. PT MMS also needs to consider Law No. 7 of 2021 and other legal certifications to increase credibility in the eyes of its industrial clients.

Porter's Five Forces

- **Threat of New Entrants:** Barriers to entry are moderate due to high initial capital and technical expertise, but regulations are still loose, so new competitors may still emerge if they have sufficient connections and capital.
- **Bargaining Power of Suppliers:** Suppliers have high bargaining power since PT MMS has only one major supplier with competitive prices. Import alternatives are inefficient due to large minimum orders.

- **Bargaining Power of Buyers:** Customers are satisfied with quality and service, but are very sensitive to price increases. Dependence on large customers creates risk if relationships are disrupted.
- **Threat of Substitutes**: Technologies such as CNC and laser cannot replace the precision of EDM, especially for small and complex objects. The threat of substitution is very low.
- **Industry Rivalry**: There are only a few direct competitors and customer loyalty is high, making competition low. There is no price war, and companies focus more on flexibility and service accuracy.

SWOT Analysis

- **Strengths:** Strategic location, service flexibility, and good cutting quality supported by a loyal workforce. Customer satisfaction scores are also high, reflecting operational excellence.
- **Weaknesses:** The management system is still manual, production capacity is limited, and machinery is outdated. Dependence on customer demand also disrupts production efficiency.
- **Opportunities:** Reduced competition post-COVID, potential expansion into non-automotive sectors, and opportunities for digitalizing management systems open up growth prospects. Customer satisfaction can also be leveraged for long-term contracts.
- **Threats:** Raw material prices are dependent on the USD exchange rate, the risk of client payment delays, and the small business scale make PT MMS less competitive compared to larger companies offering both services and raw materials.

Financial Performance

Profitability Ratios

The profitability analysis shows significant fluctuations during 2019–2024. Both Return on Assets (ROA) and Return on Equity (ROE) were negative in 2019 and 2021, indicating major losses. However, post-pandemic recovery led to improvements, with ROA reaching 7.76% and ROE at 8.41% in 2024. Net Profit Margin (NPM) also followed a similar trend, signalling improved cost control and operational efficiency over time.

Table 1. Profitability Ratio

	2019	2020	2021	2022	2023	2024
ROA	-6,55%	0,55%	-21,56%	2,77%	3,17%	7,76%
ROE	-6,85%	0,63%	-23,39%	3,02%	3,30%	8,41%
NPM	-4,93%	0,61%	-23,23%	2,13%	2,68%	6,69%

Liquidity Ratios

PT MMS maintained strong liquidity throughout the six-year period. The current ratio remained high, reaching a peak of 23.13 in 2023, while the quick ratio ranged between 8.01 and 21.31, indicating minimal dependence on inventory. The cash ratio also showed strong cash positions, particularly in 2019 and 2023. These figures suggest excellent short-term solvency, though also reflect idle assets that could be better utilized for short-term investments or operational expansion.

Table 2. Liquidity Ratios

	2019	2020	2021	2022	2023	2024
Current Ratio	22,41	8,53	10,73	11,92	23,13	13,02
Quick Ratio	20,98	8,01	9,74	11,06	21,31	12,18
Cash Ratio	11,05	3,57	4,85	6,42	13,50	4,06

Activity Ratio (Total Asset Turnover – TATO)

The TATO ratio indicates how effectively the company utilizes its assets to generate revenue. PT MMS achieved the highest TATO in 2019 and 2022, suggesting efficient asset use. The ratio dropped below 1 during 2020 and 2021 due to the COVID-19 impact but rebounded afterward. Overall, PT MMS has room to further optimize asset utilization to maintain steady revenue growth.

Table 3. Activity Ratio

	2019	2020	2021	2022	2023	2024
Total Assets Turnover	1,33	0,91	0,93	1,30	1,18	1,16

Historical Capital Structure of PT MMS

During the period of 2019–2024, PT MMS operated with a fully equity-based capital structure, without utilizing long-term or interest-bearing debt. All liabilities recorded were short-term and non-interest-bearing, such as trade payables and taxes. This reflects a conservative financing policy aimed at minimizing financial risk.

However, the absence of debt resulted in a lack of tax benefits and potential inefficiencies in the company's capital cost structure. To evaluate whether a more balanced financing strategy would yield better results, this study conducted a capital structure simulation based on historical financial data. The simulation calculated cost of equity using the CAPM method and synthetic beta from peer companies, while cost of debt was estimated using the synthetic approach by Damodaran, based on interest coverage ratios (ICR) and benchmark the prime lending rates (*Suku Bunga Dasar Kredit* or SBDK) from Indonesian state-owned banks. To support the calculation, the following variable data were collected:

Table 4. The Variable Data Required

Variable	2019	2020	2021	2022	2023	2024
Risk Free Rate	7,10%	6,10%	6,38%	6,92%	6,49%	7,03%
Equity Risk Premium (ERP)	7,08%	6,56%	6,12%	9,23%	7,38%	6,44%
Marginal Tax Rate	25%	22%	22%	22%	22%	22%
Unlevered Beta	0,532	0,701	0,704	0,677	0,725	0,713

Additionally, SBDK data was used to proxy the base interest rate in estimating synthetic cost of debt:

Table 5. SBDK

Bank Name	2019	2020	2021	2022	2023	2024
PT BANK RAKYAT INDONESIA (PERSERO), Tbk	9,95%	9,95%	8,00%	8,00%	8,00%	8,50%
PT BANK MANDIRI (PERSERO), Tbk	9,95%	9,85%	8,00%	8,05%	8,05%	8,50%
PT BANK NEGARA INDONESIA (PERSERO), Tbk	9,95%	9,64%	8,00%	8,00%	8,05%	8,80%
PT BANK TABUNGAN NEGARA (PERSERO), Tbk	11,00%	9,90%	8,00%	8,00%	8,05%	8,76%
Average SBDK Corporation per Year	**10,21%**	**9,84%**	**8,00%**	**8,01%**	**8,04%**	**8,64%**

Although data from 2019 to 2024 was collected, this research focuses primarily on the last three years (2022–2024). Since the company's financial conditions during 2019–2021 were highly volatile and significantly impacted by the COVID-19 pandemic, as reflected in the large fluctuations in profitability and operating performance. Starting in 2022, PT MMS experienced relative financial stabilization, making it a more accurate basis for simulating capital structure scenarios.

The simulation calculated Cost of Equity using the CAPM approach with synthetic beta derived from peer companies, while the Cost of Debt was estimated using the synthetic rating method proposed by Damodaran, based on the company's EBITDA and Interest Coverage Ratio (ICR), then benchmarked to default spreads. The Weighted Average Cost of Capital (WACC) was then computed across multiple debt-to-equity compositions to determine the optimal structure for each year. The following results:

Table 6. Recap of PT MMS's Optimal Capital Structure for 2022-2024

Year	Debt	Equity	Equity	Cost of Equity	ICR	Rating	Cost of Debt	WACC
2022	25%	75%	1.055.751.071	14,79%	4,354	Baa2/BBB	6,60%	12,74%
2023	15%	85%	1.333.744.362	12,33%	4,783	A3/A-	6,01%	11,38%
2024	25%	75%	1.284.871.911	12,81%	4,565	A3/A-	6,43%	11,22%

In 2022, the optimal capital structure was achieved with a combination of 25% debt and 75% equity, producing the lowest WACC of 12.74%. This composition reflected a balance between moderate financial leverage and a healthy Interest Coverage Ratio (ICR), indicating the company's ability to introduce debt without elevating financial risk. In 2023, the simulation results showed a slight shift in the most efficient capital structure to 15% debt and 85% equity, resulting in a reduced WACC of 11.38%—the lowest among all tested combinations that year. Despite the lower debt portion, the company maintained a strong ICR and a favorable synthetic credit rating, which contributed to a competitive cost of debt.

By 2024, the optimal structure reverted to 25% debt and 75% equity, with the lowest WACC recorded at 11.22%. This consistency across years highlights the reliability of moderate leverage in enhancing cost efficiency while maintaining financial prudence. The sustained strength of the company's ICR and low risk premiums further affirm PT MMS's capacity to support a measured level of debt in its capital structure.

Projecting Capital Structure of PT MMS for 2025

After determining the optimal structure for 2022–2024, this study continues by projecting the capital structure for 2025. The projection uses historical growth trends to estimate equity and asset values, while the debt value is derived residually. Cost of equity is calculated using the CAPM method, while the synthetic cost of debt is estimated based on the company's projected EBITDA and the 2025 average prime lending rate (SBDK) of 8.58%.

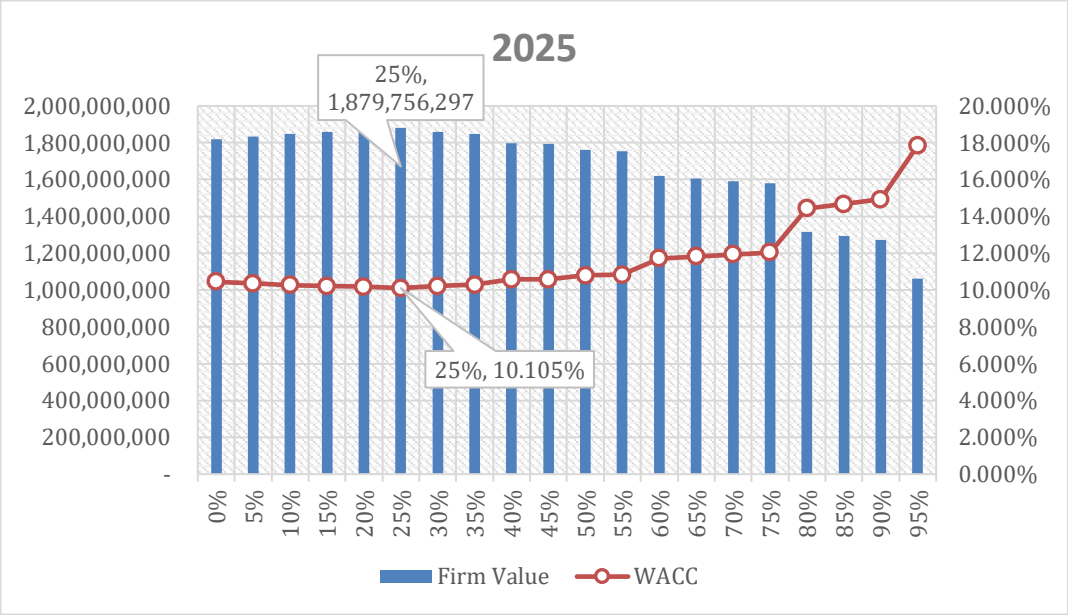
Table 7. The Variable Data Required

Variable	2025
Risk Free Rate	6,809%
Equity Risk Premium (ERP)	6,87%
Marginal Tax Rate	22%
Unlevered Beta	0,529
Levered Beta	0,666
Average SBDK	8,58%
Asset (In Rupiah)	1.919.234.339,04
Equity (In Rupiah)	1.803.951.461,81
Debt (In Rupiah)	115.282.877,23
EBITDA 2025 (In Rupiah)	189.954.302,33

Table 8. The Actual Optimum Capital Calculation for Projection

ICR for Cost of Debt	
EBITDA (In Rupiah)	189.954.302,33
Interest Expense	9.888.389
Interest Coverage Ratio (ICR)	**19,210**
Credit Rating	Aaa/AAA
Default Spread	0,45%
Cost of Debt	
Risk Free Rate (Rf)	6,809%
Default Spread	0,450%
Cost of Debt - Before Tax	**7,259%**
Marginal Tax Rate	22%
Cost of Debt - After Tax	**5,761%**
Cost of Equity	**2025**
Risk Free Rate (Rf)	6,81%
Levered Beta	0,67
Equity Risk Premium (ERP)	6,87%
Cost of Equity	**11,39%**
Weighted Average Cost of Capital	
Equity	1.803.951.462
Debt	115.282.877
E/V	94%
D/V	6%
Cost of Equity	11,39%
Cost of Debt	5,76%
Weighted Average Cost of Capital (WACC)	**11,05%**

Based on the results, the company's actual capital structure for 2025 would be 94% equity and 6% debt, generating a WACC of 11.05%, which is slightly more efficient than the previous year's optimal WACC of 11.22% and Interest Coverage Ratio (ICR) for this combination is 19.21 (low risk). A further simulation shows that the optimal capital structure in 2025 is also 25% debt and 75% equity, producing the lowest WACC of 10,105% and a maximum firm value of IDR 1,879,756,297. And the cost of capital chart for 2025 as follows:



CONCLUSION

This study aims to determine the optimal capital structure of PT MMS by analyzing the company's financial performance and simulating various debt-to-equity ratio scenarios using a synthetic approach. Historically, the company has implemented a fully equity-financed model, which ensures low financial risk but results in relatively high capital costs. Simulations for the 2022–2024 period consistently identify a debt-to-equity ratio of 25% and 75% as the most efficient structure, yielding the lowest WACC across all years tested. This moderate leverage enhances capital efficiency while maintaining prudent financial risk, supported by consistently high interest coverage ratios (ICR). Projections for 2025 confirm these findings, with the same structure yielding the lowest WACC of 10.105% and the highest firm value. However, based on Damodaran's framework, the company's Return on Capital (ROC) and Return on Equity (ROE) remain below its WACC and equity cost. In such conditions, leverage may not be creating value, and distributing equity surplus to shareholders may be a more appropriate option. Therefore, while 25% debt remains the optimal structure in theory, its implementation must align with improvements in project profitability in the future to ensure long-term financial sustainability.

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