

Determining the Optimal Capital Structure of PT. Krakatau Steel Tbk (Persero)

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ABSTRACT

Indonesia's steel industry is expected to keep growing, with the country's steel consumption projected to increase from 17.4 million tons in 2023 to 18.3 million tons in 2024, while production is expected to increase from 15.2 million tons to 15.9 million tons. However, PT Krakatau Steel Tbk, or KRAS, is one of the leading players in this sector, with big challenges ahead that it is facing and thus affecting its performance. One of the critical contributory factors is the increased volumes of steel imports, which heighten competition and have led to a significant decline in revenue. This is because the cheaper steel imports, especially those from countries like China, are contributing to putting pressure on prices and further complicating the market status quo for KRAS. This research study seeks to analyze and determine the optimal capital structure for KRAS with a focus on enhancing its financial stability and overall value. In this research author analyse and explore for the solution with external analysis using PESTLE Analysis. Based on secondary data from annual reports and relevant academic literature, the study evaluates the financial performance of KRAS from 2021 to 2023. The results showed a significant revenue decline of 35.68% from 2022 to 2023, mainly influenced by increased import competition and unstable global steel prices. Beyond this, high leverage remains a concern for KRAS, which has liabilities, even though it declined from \$3.16 billion in 2021, having reached \$2.35 billion as of 2023.

Keyword: Steel Industry, Weighted Average, Cost of Capital, Optimal Capital Structure

ABSTRAK

Industri baja Indonesia diperkirakan akan terus tumbuh, dengan konsumsi baja negara diproyeksikan meningkat dari 17,4 juta ton pada tahun 2023 menjadi 18,3 juta ton pada tahun 2024, sementara produksi diperkirakan akan meningkat dari 15,2 juta ton menjadi 15,9 juta ton. Namun, PT Krakatau Steel Tbk, atau KRAS, adalah salah satu pemain terkemuka di sektor ini, dengan tantangan besar di depan yang dihadapi dan dengan demikian mempengaruhi kinerjanya. Salah satu faktor kontributor penting adalah peningkatan volume impor baja, yang meningkatkan persaingan dan menyebabkan penurunan pendapatan yang signifikan. Ini karena impor baja yang lebih murah, terutama yang berasal dari negara-negara seperti China, berkontribusi untuk menekan harga dan semakin memperumit status quo pasar untuk KRAS. Studi penelitian ini bertujuan untuk menganalisis dan menentukan struktur permodalan yang optimal untuk KRAS dengan fokus pada peningkatan stabilitas keuangan dan nilai keseluruhannya. Dalam penelitian ini penulis menganalisis dan mengeksplorasi solusi dengan analisis eksternal menggunakan Analisis PESTLE. Berdasarkan data sekunder dari laporan tahunan dan literatur akademik yang relevan, studi ini mengevaluasi kinerja keuangan KRAS dari tahun 2021 hingga 2023. Hasil penelitian menunjukkan penurunan pendapatan yang signifikan sebesar 35,68% dari tahun 2022 hingga 2023, terutama

dipengaruhi oleh meningkatnya persaingan impor dan harga baja global yang tidak stabil. Di luar ini, *leverage* yang tinggi tetap menjadi perhatian KRAS, yang memiliki kewajiban, meskipun menurun dari \$3,16 miliar pada tahun 2021, setelah mencapai \$2,35 miliar pada tahun 2023.

Kata kunci: Industri Baja, Rata-rata Tertimbang, Biaya Modal, Struktur Modal Optimal

INTRODUCTION

The construction industry is a major pillar in Indonesia's national infrastructure development. The contribution of the construction sector to the Indonesian economy is in fourth place, as seen from the percentage of the construction sector in the Gross Domestic Product (GDP) of 10.23% in the first quarter of 2024. This sector contributes significantly supporting the construction of toll roads, airports, ports, and other strategic infrastructure projects needed to improve national competitiveness and connectivity. The need for infrastructure development creates a significant demand for the steel industry (Feng, Jian-Bai, Miao, & Song, 2017). Steel is used in the construction industry as building structures such as steel frames, bridges, and the basic needs or foundations of a building (Labaran, Mathur, & Farouq, 2021). Based on Figure 1, it shows that there is an increasing trend for steel consumption in Indonesia caused by global demand, growth in the property sector, and government infrastructure spending. (Mustajab, 2024).

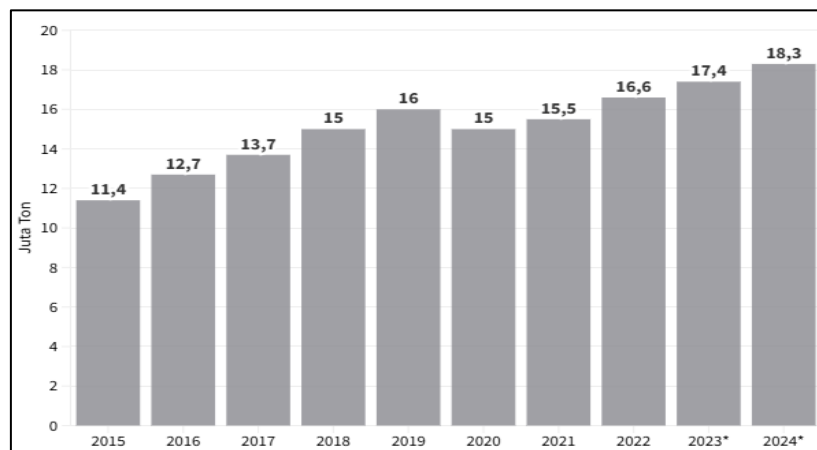


Figure 1. Projected Steel Consumption Data in Indonesia 2015-2024

Source: DataIndonesia.id

Based on data from the Central Statistics Agency (BPS), the number of iron/steel exports in 2023 will be 10.9 million tons, an increase of 11.37% from 2022 (Badan Pusat Statistik, Ekspor Besi/Baja Menurut Negara Tujuan Utama, 2012-2023, 2024). Reporting from The Indonesian Iron & Steel Industry Association or what can be called IISIA (2024) that since 2018 China has been the main steel export destination country for national steel companies. In 2023, exports to China will reach 55%, followed by Taiwan 8%, India 5%, Vietnam 4%, the Philippines 3%, and others

by 25%. In domestic use, there are several sectors that require the use of steel other than the infrastructure sector or the construction industry, namely the automotive sector and the property sector. For the property sector, the Central Statistics Agency (BPS) projects that until 2045, the average growth in household needs can reach 660 thousand per year in Indonesia. To be able to meet domestic and export needs from steel, steel production in Indonesia is projected to increase as shown in Figure 2. So, the prospects of the steel industry in Indonesia have good potential to develop.

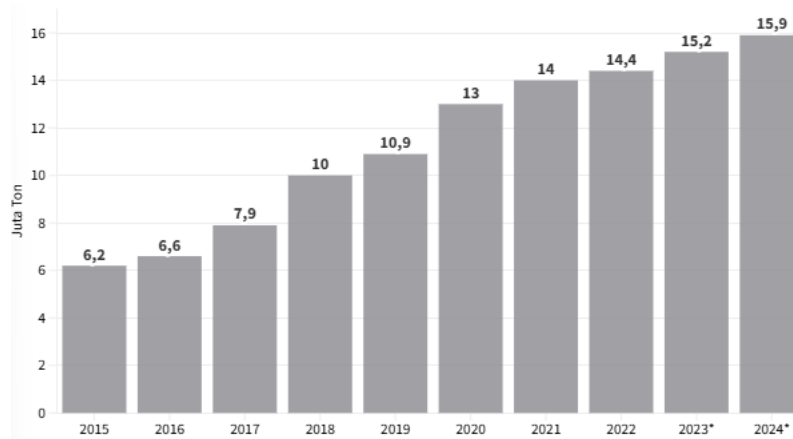


Figure 2. Projected Steel Production 2015-2024

(Source: DataIndonesia.id)

Although steel consumption and production are projected to grow, the steel sector will face several challenges, such as overcapacity, price changes, and the growth of materials that can replace steel. Figure 3 shows that there was a drastic price increase in 2021, namely 5,812 CNY per ton (Suseno, 2023), has reached its peak, prices have declined in 2022 with a low of 3,925 CNY per ton, although it has experienced several sporadic increases. Not only that, but the relatively high level of steel imports also makes steel competition even tighter in Indonesia or globally. From 2019-2023, the number of steel imports has fluctuated but tends to increase the number of imports.

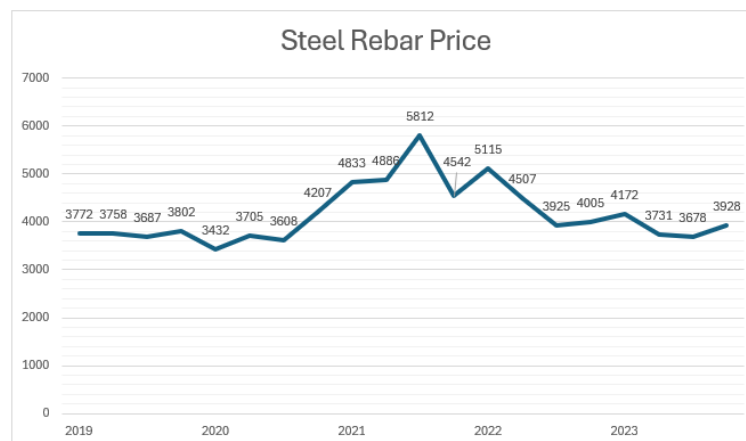


Figure 3. Steel Price Fluctuation (2019-2023)

One of the steel companies owned by Indonesia is PT Krakatau Steel (KRAS). KRAS has collaborated with PT KLN in developing infrastructure projects in IKN by supplying 1,550 MT of steel plates with SPAH specifications (Hidayat, 2023). Not only assisting in the development of IKN, KRAS also supplies pipelines for the Cirebon-Semarang Natural Gas Transmission Phase 2 project. There was a significant decrease in revenue from Krakatau Steel from 2022 to 2023 by 35.68%. The value of assets and liabilities continues to change even from 2021 to 2023 experiencing a decline in value. Figure 4 shows the decline in the company's assets, liabilities, and equity from 2021 to 2023. Assets decreased from \$3,773,676K in 2021 to \$2,849,189K in 2023, while liabilities also decreased from \$3,166,482K to \$2,352,388K, reflecting potential debt repayment. Equities experienced a gradual decline from \$587,194 thousand to \$496,801 thousand.



Figure 4. Financial Position of KRAS (2021-2023)

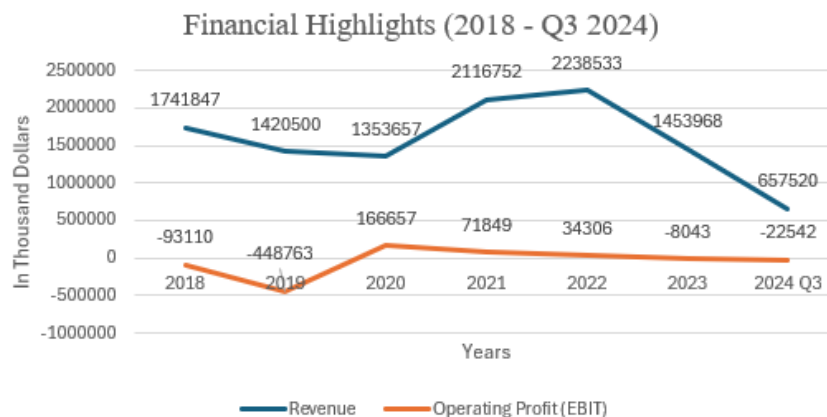


Figure 5. Financial Highlights of KRAS 2018 – Q3 2024

The level of steel imports in Indonesia can be categorized as very high. In 2023, Indonesia's total imports will reach USD 221.89 billion, with China as the largest contributor, contributing USD 62.88 billion or around 28.34% of total imports. Japan is in second place with an import value of USD 16.52 billion, contributing around 7.44%. Meanwhile, India was not included in the top three countries of origin of Indonesia's main imports that year. The significant contribution from China and

Japan shows the important role of the two countries in meeting the needs of goods in Indonesia.

Table 1. Contribution of Import

Country	2021 (in 000 ton)	2022 (in 000 ton)	2023 (in 000 ton)
China	2.518,3	2711,4	3711,1
Japan	2.383,6	2397,9	2398,6
India	1438	514,3	400,9
South Korea	936	933,9	906,4
Vietnam	552,1	584,5	687,8
Others	5.209,8	6.947,5	5.708,2
Total	13.037,8	14.089,5	13.813,0

The thing that caused the decline in assets apart from competition from imported steel and changes in steel prices was the divestment of assets to assist in debt restructuring and increase cash and production assets of Hot Strip Mill 1 (HSM 1) which had stopped in 2023 and became active again in 2024, resulting in a decrease in the contribution of operational asset value. PT Krakatau Steel has debts obtained in 2019 of Rp 32 trillion as a result of the company's accumulated debt.

METHOD

This study uses qualitative and quantitative methods. The qualitative method involves PESTLE Analysis, while the quantitative method focuses on determining the company's current WACC and optimum capital structure to identify the optimum firm value, covering the period from 2021 to 2023, Q3 2024 (current), and projections for 2025. The author collects secondary data from the company's historical records, including annual reports from the last three years (2021 to 2023), the risk-free rate, the market risk premium, as well as other relevant information about PT Krakatau Steel Tbk.

RESULT AND DISCUSSION

This chapter analyzes PT Krakatau Steel's financial challenges and key factors influencing investor decisions. It focuses on optimizing financial parameters to establish a sustainable capital structure, minimize risks, and enhance shareholder value. Strategic solutions for maintaining financial stability and improving financial performance are outlined, along with their impact on investment attractiveness. The chapter concludes with an implementation plan and justification of proposed solutions, offering clarity for current and potential investors.

Analysis

External Analysis

At this stage, external analysis is conducted using the PESTLE framework to identify external factors that may impact the company's sustainability. The analysis is summarized in Table 2.

Table 2. External Analysis with PESTLE

Factor	Description
Political	<p>1. Political stability that can support the investment climate and heavy industry operations. According to the World Bank's Political Stability Index, Indonesia scored -0.42 in 2022 (on a scale from -2.5 to +2.5, where higher values indicate greater stability), showing moderate political risks. In the absence of political stability, investors will be hesitant to make investments (Agustian, 2021).</p> <p>2. The Indonesian government adopts a strategic policy framework to strengthen the domestic steel industry by regulating steel imports through measures such as import restrictions, anti-dumping tariffs, and the enforcement of local content requirements (TKDN). This initiative aims to reduce reliance on foreign steel, enhance national production competitiveness, and support local manufacturers in the global market (muc, 2022).</p> <p>3. Entering the first semester of 2024, the achievements of the P3DN program show a significant increase, especially after the implementation of Business Matching in Bali in March 2024. This event succeeded in encouraging commitments to purchase domestic products for the procurement of government goods and services amounting to IDR 1,428.25 trillion, an increase from IDR 1,157.47 trillion in 2023. (Waluyo, 2024)</p>
Economic	<p>1. Inflation in destination countries affects iron/steel exports (Bil22). If the inflation of the destination country increases by 1%, then Indonesia's iron and steel exports to the destination country will decrease by 68.74 million US\$.</p> <p>2. National steel demand grew in line with economic growth with a CAGR of around 5.4 percent. In 2021 after Covid-19, domestic steel demand reached 15.5 million tons, grew to 16.6 million tons in 2022, and rose to 17.5 million tons in 2023 (TEMPO, 2024).</p>
Social	<p>Indonesia's urbanization rate will increase to 220 million people in urban areas. (Safitri & Pradipta, 2023). Data from BPS (2023)</p>

Factor	Description
	states that Indonesia's urbanization rate is projected to reach 220 million people by 2045, with 70% of the population living in urban areas. A study from the World Steel Association shows that urbanization is driving steel consumption for infrastructure, housing, and vehicles.
Technology	The application of technology in the steel production process allows for increased efficiency and reduced costs. According to the World Steel Association (2023), the use of Electric Arc Furnace technology can reduce energy consumption by up to 30% compared to Blast-Furnace.
Environmental	As global regulations on carbon emissions become stricter, industries worldwide are required to adopt cleaner production methods. One of the key international policies affecting the steel industry is the European Union's initiative to impose additional carbon taxes on imported steel that does not meet environmental standards. This means that Indonesian steel exporters must start considering low-emission technologies to remain competitive in the global market. While this policy presents challenges, it also opens opportunities for companies that invest in eco-friendly steel production , which could attract environmentally conscious buyers and financial incentives for sustainable development.
Legal	<ol style="list-style-type: none"> 1. The Indonesian government enforces legal measures to regulate the steel industry through specific trade and investment policies. These include Ministry of Trade Regulation No. 36 of 2023, which imposes import restrictions on certain steel products to protect domestic manufacturers, and Ministry of Industry Regulation No. 4 of 2021, which mandates local content requirements (TKDN) for steel production. 2. The Indonesian government enforces anti-dumping duties on imported steel products through PMK No. 15/PMK.010/2022, which aims to protect domestic steel manufacturers by imposing tariffs on Hot Rolled Coil (HRC) Alloy from China. 3. Presidential Regulation Number 16 of 2018 concerning Procurement of Government Goods/Services

From the PESTLE analysis, it can be concluded that the steel industry in Indonesia has strong growth potential, supported by government policies, increasing demand, and technological advancements. The Indonesian government's strategic policies, including import restrictions, local content requirements (TKDN), and anti-dumping tariffs (PMK No. 15/PMK.010/2022), have contributed to domestic steel

industry growth by reducing reliance on imported steel (Kemenkeu, 2022). As a result, Indonesia's steel consumption reached 17.5 million tons in 2023, growing from 15.5 million tons in 2021 with a Compound Annual Growth Rate (CAGR) of 5.4% (TEMPO, 2024).

On the technological side, the adoption of Electric Arc Furnace (EAF) in modern steel production reduces energy consumption by 30% compared to traditional blast furnaces, enhancing efficiency and lowering production costs (World Steel Association, 2023). However, environmental factors such as the Carbon Border Adjustment Mechanism (CBAM) from the European Union, which will take effect in 2026, could challenge Indonesia's steel exports unless companies shift towards low-carbon steel production. With robust government support, rising domestic demand, and ongoing technological advancements, the Indonesian steel industry is positioned for continued growth.

Krakatau Steel's Financial Ratio

The company's financial performance showed a significant decline from 2021 to Q3 2024, with Return on Asset (ROA) declining from 1.90% in 2021 to negative -0.82% in Q3 2024, reflecting the company's inability to generate profits from its assets. Return on Equity (ROE) also experienced a sharp decline from 12.24% in 2021 to -6.97% in Q3 2024, which indicates losses for shareholders due to a decrease in profitability and a possible increase in financial burdens. Nonetheless, the Gross Profit Margin (GPM) was relatively stable and even increased from 7.77% in 2023 to 9.78% in Q3 2024, indicating that the company is still able to manage production efficiency and cost of goods sold. However, despite the improved gross margin, overall profitability remained low.

Table 3. Profitability Ratios of Krakatau Steel

Profitability Ratios	2021	2022	2023	Q3 2024
Return on Asset	1,90%	1,08%	-0,28%	-0,82%
Return on Equity	12,24%	6,21%	-1,62%	-6,97%
Gross Profit Margin	9,54%	9,04%	7,77%	9,78%

The company's Current Ratio experienced a significant decline from 0.654 in 2021 to 0.263 in Q3 2024, indicating the company's ability to meet its short-term obligations. With the ratio continuing to decline, from 0.447 in 2022 to 0.311 in 2023, and finally to 0.263 in Q3 2024, the company faces an increasingly large liquidity risk, where its current assets are much smaller compared to its liabilities. This trend can indicate problems in current asset management or an increase in short-term liabilities that are not balanced with asset growth. If these conditions continue, the company may need to seek additional funding, improve operational efficiency, or restructure its obligations to ensure the continuity of its operations.

Table 4. Liquidity Ratio of Krakatau Steel

Year	Q3 2024	2023	2022	2021
Current Ratio	0,263	0,311	0,447	0,654

The company's Debt to Equity Ratio (DER) has shown a fluctuating trend but tends to increase, starting at 5.427 in 2021, slightly decreasing to 4.723 in 2022, then rising slightly to 4.735 in 2023, and surging dramatically to 7.513 in Q3 2024. The significant increase in 2024 indicates that the company is becoming more reliant on debt financing rather than equity, which can heighten financial risk if not balanced with stable revenue growth. A high DER suggests a substantial debt burden, which can impact the company's profitability due to rising interest expenses and debt repayment obligations.

Table 5. Solvency Ratio of Krakatau Steel

Year	Q3 2024	2023	2022	2021
DER	7,513	4,735	4,723	5,427

Historical Cost of Capital and Optimum Capital Structure

In the calculation of the optimal capital structure, several assumptions are used. The value of the risk-free rate and market risk premium is obtained by the market risk premium and the Damodaran country risk premium, the use of Beta for each year at the same value taken from Pefindo. The tax rate used is obtained by Damodaran's marginal tax rate by country. The following are the assumptions used for 2021-2023:

Table 6. Data Needed for Analysis

Item	2021	2022	2023	Source
Risk Premium	6,56%	6,12%	9,23%	Damodaran Country Risk Premium
Risk Free Rate	6,40%	7,01%	6,61%	Indonesia Market Risk Premia
Levered Beta	1,83	1,67	1,75	Pefindo
Tax	22%	22%	22%	Indonesia Regulation on Corporate Tax rate

The weighted average cost of capital method will be used to determine the cost of capital. This will help in acquiring the firm's capital structure. In turn, that will lead to determining the general value of the firm. The first step in calculating WACC is finding the firm's cost of equity. The three-year cost of equity is as follow:

Table 7. Cost of Equity for Actual Capital Structure 2021-2023

Cost of Equity	2021	2022	2023
Risk Free Rate	6,40%	7,01%	6,61%
Risk Premium	6,56%	6,12	9,23

Levered Beta	1,83	1,67	1,75
Tax Rate	22%	22%	22%
Cost of Equity (Re)	18,43%	17,23%	22,73%

From 2021 to 2023, the Cost of Equity (Re) showed an upward trend, rising from 18.43% in 2021 to 22.73% in 2023, driven primarily by an increase in the Risk-Free Rate and a sharp rise in the Risk Premium. The Risk-Free Rate fluctuated, climbing from 6.40% in 2021 to 7.01% in 2022 before falling to 6.61% in 2023. Meanwhile, the Risk Premium dropped from 6.56% in 2021 to 6.12% in 2022, then surged significantly to 9.23% in 2023, reflecting heightened market risk and investor return expectations.

After calculating the Cost of Equity, the next step is to determine the Interest Coverage Ratio (ICR) before calculating the Cost of Debt. The ICR is obtained by dividing EBIT by Interest Expense to derive the Credit Spread. Below is the Cost of Debt calculation:

Table 8. Cost of Debt for Actual Capital Structure 2021-2023

Cost of Debt	2021	2022	2023
Risk Free Rate	6,40	7,01	6,61
Credit Spread	17%	17%	20%
Pre-Tax Cost of Debt	23,40%	24,01%	26,61%
Cost of Debt	18,25%	18,73%	20,76%

After determining the Cost of Equity (Re) and Cost of Debt (Rd), the WACC calculation can be performed. Krakatau Steel's debt costs in 2022 were higher than its equity costs, underscoring the company's reliance on debt-based financing. This reliance is primarily due to financial restructuring efforts undertaken to address a substantial debt burden predating 2021, including loan rescheduling and bond issuance. Moreover, the post-pandemic economic recovery has brought challenges such as fluctuations in steel demand, rising raw material prices, and global supply chain disruptions, further straining the company's profitability. While government infrastructure projects provide some support to the steel industry, Krakatau Steel continues to face considerable financial pressure, necessitating ongoing efforts to secure additional funding through debt. The following are the calculations of the WACC from 2021 to 2023:

Table 9. WACC and Value of the Firm 2021-2023

WACC	2021	2022	2023
Weighted of Debt	0,84	0,83	0,83
Weighted of Equity	0,16	0,17	0,17
Cost of Debt	18,25%	18,73%	20,76%
Cost of Equity	18,43%	17,23%	22,73%

WACC	18,18%	18,47%	21,10%
EBIT (in thousand Dollars)	71.849	34.306	-8.043
Tax	22%	22%	22%
Value of the Firm (Thousand Dollar)	308.254,68	144.911,45	-29.731,19

As per the analysis, ratios of WACC (Weighted Average Cost of Capital) and firm value indicate that there has been an incremental rise in capital costs over the observed period alongside a marginal decline in company valuation from 2021 to 2023. WACC has increased from 18,18% in 2021 to 21,10% in 2023. A simultaneous increase in both Cost of Debt (from 18,25% to 20,76%) and Cost of Equity (from 18,43% to 22,73%) shows that borrowing has become expensive, and investors demand higher returns owing to perceived risks.

Consequently, firm value decreased substantially from 308,254,68 thousand USD (with using formula from equation 2.5) in the year 2021 to 144,91,451 thousand USD in the year 2022 to go highly negative with a figure of -29.731,19 in 2023, signifying financial distress. From the annual report of Krakatau Steel 2023, stated that the drastic fall in 2023 is attributed mainly to operational challenges and significant disruption in the production of Hot Strip Mill (HSM) of Krakatau Steel (KRAS). These production and operational disturbances result in a decreased output, lowered revenue, and higher operational costs-straining the financial position further. Increased WACC tends to decrease firm valuations, which means that expected returns are not enough to cover capital costs.

The essence of capital structure is the recalculate weight of average cost capital by means of change from debt to equity. Debt modifications can be made by means of 1%, 5%, or 10% block and more, to see the effect of the company's total capital cost. This paper increases the debt ratio by 5 percent intervals, starting from using the 1 percent debt instead of the 0 percent debt since PT Krakatau Steel (KRAS) is one of the capital-intensive industries in which debt financing plays a very important role in the overall financial structure of the company. The following is the calculation of the Optimal Capital Structure of PT Krakatau Steel for 2021 with Interest Expense and Firm Value in thousand USD:

Table 10. WACC and Firm Value of Capital Structure 2021

Debt	Equity	Rd	Re	WACC	Firm Value
1%	99%	5,45%	8,10%	8,075%	694.013,23
5%	95%	5,82%	8,14%	8,022%	698.615,91
10%	90%	6,35%	8,19%	8,003%	700.267,64
15%	85%	7,81%	8,24%	8,177%	685.388,36
20%	80%	11,63%	8,30%	8,969%	624.844,34
25%	75%	11,63%	8,37%	9,188%	609.952,30
30%	70%	11,63%	8,46%	9,407%	595.753,59

Debt	Equity	Rd	Re	WACC	Firm Value
35%	65%	14,18%	8,55%	10,519%	532.789,85
40%	60%	18,25%	8,66%	12,494%	448.560,83
45%	55%	18,25%	8,78%	13,044%	429.644,04
50%	50%	18,25%	8,94%	13,594%	412.258,21
55%	45%	18,25%	9,13%	14,144%	396.224,71
60%	40%	18,25%	9,36%	14,694%	381.391,67
65%	35%	18,25%	9,66%	15,244%	367.629,13
70%	30%	18,25%	10,07%	15,794%	354.825,25
75%	25%	18,25%	10,63%	16,344%	342.883,22
80%	20%	18,25%	11,47%	16,894%	331.718,86
85%	15%	18,25%	12,88%	17,445%	321.258,60
90%	10%	18,25%	15,70%	17,995%	311.437,88
95%	5%	18,25%	24,16%	18,545%	302.199,77
99%	1%	18,25%	91,79%	18,985%	295.194,74

PT Krakatau Steel's ideal capital structure for 2021 is observed at 10% debt with 90% equity, which achieves the lowest WACC at 8,003% and value maximized at 700,267.64. Thus, at this level, the company obtains the most efficient financing balance while minimizing capital costs. However, any increase in debt beyond 10% will result in an increase in WACC due to interest expenses incurred and more risk perception by investors, thus reducing the firm's value. The optimum capital structure graph against the firm value is presented below.

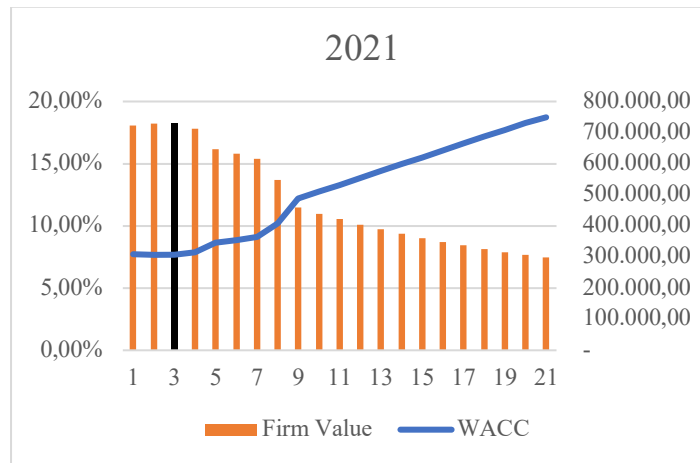


Figure 6. Optimum WACC & Firm Value 2021

The optimum capital structure and firm value from 2021 to 2023 can be analyzed, except for 2023, as the firm value in that year was negative. Due to this, the author excluded the calculation for 2023. Meanwhile, the summary of the optimum capital structure graph against firm value for the year 2022 is presented below.

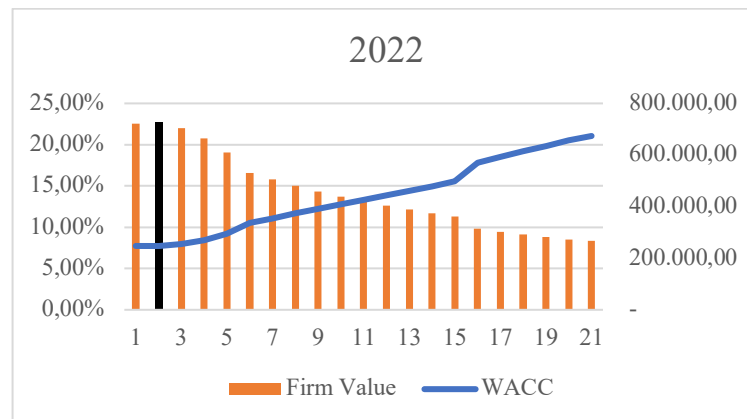


Figure 7. Optimum WACC & Firm Value 2022

The following is a recapitulation calculation of the simulation of the calculation of the actual, optimum WACC, and company value from the last 3 years from 2021 to 2023:

Table 11. Recap of Actual WACC & Firm Value 2021-2023

Year	2021	2022	2023
Actual Capital Structure	84%	83%	83%
WACC	18,18%	18,47%	21,10%
Firm Value (in thousand USD)	308.254,68	144.911,45	-29.731,19
Optimal Capital Structure	10%	5%	1%
WACC	8,003%	8,056%	8,244%
Firm Value (in thousand USD)	700.267,64	695.685,19	679.769,33

In the calculation of the 2023 WACC Actual, the firm value cannot be determined because the EBIT in 2023 has a value below 0 or negative value. The difference between the actual and optimal WACC of PT Krakatau Steel (KRAS) come from a mix of external and internal factors that affect its capital structure, cost of capital, and overall firm value. A significant issue is KRAS's high leverage, with its debt ratio consistently exceeding 83% from 2021 to 2023, despite the optimal capital structure suggesting it should be below 10%. This elevated leverage drives up the cost of debt (Rd) due to higher interest expenses, and it also increases the cost of equity (Re) as investors perceive greater financial risk. The actual WACC climbing from 18.18% in 2021 to 21.10% in 2023, which is significantly above the optimal WACC with range from 8,003% in 2021 to 8,244% in 2023.

Current Cost of Capital (Q3 2024) and Optimum Capital Structure

With the same flow, the author performs calculations for the Current WACC from Q3 2024 which starts by calculating the actual Cost of Equity and Cost of Debt. The following are the assumptions used:

Table 12. Data for Actual Capital Structure Q3 2024

Item	Q3 2024	Source
Risk Premium	7,38%	Damodaran Country Risk Premium
Risk Free Rate	6,78%	Indonesia Market Risk Premia
Beta	1,28	Pefindo
Tax	22%	Indonesia Regulation on Corporate Tax rate

The following is the calculation of the actual Cost of Equity and Cost of Debt Q3 2024:

Table 13. Actual Cost of Equity Q3 2024

Cost of Equity	Q3 2024
Risk Free Rate	6,78%
Risk Premium	7,38%
Levered Beta	1,08
Marginal Tax	22%
Cost of Equity (Re)	14,72%

Table 14. Actual Cost of Debt Q3 2024

Cost of Debt	Q3 2024
EBIT (In thousand Dollar)	-22.542
Interest Expense (In thousand Dollar)	90.995
ICR	-0,247
Credit Spread	20%
Pretax Cost of Debt	26,78%
Cost of Debt (Rd)	20,89%

According to data from Q3 2024, PT Krakatau Steel (KRAS) is facing increased financial challenges compared to 2023. This is evident from its negative Interest Coverage Ratio (ICR) of -0.247, which is a result of a negative EBIT of -22,542 thousand dollars, while interest expenses have climbed to 90,995 thousand dollars. In 2023, the actual Cost of Debt (Rd) was 20.76%, and the actual Cost of Equity (Re) was 18.42%. However, in 2024, KRAS's financial situation has worsened, with the Cost of Debt rising to 20.89%, now surpassing the Cost of Equity, which has dropped to 16.23%. This trend suggests that KRAS's debt is becoming less efficient, as indicated by the credit spread increasing to 20% with "D" as the score of the credit

rating, highlighting the high-risk nature of the company's debt financing. Next is to calculate the value of WACC and Value of the Firm in Q3 2024:

Table 15. Actual WACC and Firm Value of the Firm Q3 2024

Weight of Debt	0,88
Weight of Equity	0,12
Cost of Debt	20,89%
Cost of Equity	14,72%
WACC	20,16%
EBIT (In thousand dollar)	-22.542
Tax	22%
Value of the Firm	-87.198,96

After working on the current capital structure for the year 2024 (Q3), we move to the calculation to find the optimum capital structure of PT Krakatau Steel. Although the EBIT value in Q3 2024 has a negative value, the Cost of Debt can be found according to the use of Damoran's spread rating, which is "D" as shown in 6.

Table 16. Optimal WACC and Firm Value Q3 2024

Debt	Equity	Rd	Re	WACC	Firm Value
1%	99%	20,76%	7,82%	7,950%	704.910,27
5%	95%	20,76%	7,86%	8,500%	659.304,22
10%	90%	20,76%	7,90%	9,188%	609.974,32
15%	85%	20,76%	7,95%	9,875%	567.512,39
20%	80%	20,76%	8,01%	10,562%	530.577,49
25%	75%	20,76%	8,08%	11,250%	498.156,42
30%	70%	20,76%	8,16%	11,937%	469.469,37
35%	65%	20,76%	8,25%	12,625%	443.906,40
40%	60%	20,76%	8,35%	13,312%	420.983,51
45%	55%	20,76%	8,47%	14,000%	400.311,80
50%	50%	20,76%	8,62%	14,687%	381.575,18
55%	45%	20,76%	8,80%	15,375%	364.514,07
60%	40%	20,76%	9,02%	16,062%	348.913,35
65%	35%	20,76%	9,31%	16,749%	334.593,20
70%	30%	20,76%	9,69%	17,437%	321.402,17
75%	25%	20,76%	10,23%	18,124%	309.211,78
80%	20%	20,76%	11,04%	18,812%	297.912,33
85%	15%	20,76%	12,38%	19,499%	287.409,59
90%	10%	20,76%	15,06%	20,187%	277.622,17
95%	5%	20,76%	23,12%	20,874%	268.479,40
99%	1%	20,76%	87,56%	21,424%	261.587,63

With conditions in Q3 2024 which have negative EBIT and worsen from 2023, the optimal capital structure of PT Krakatau Steel is between 1% to 5% with a WACC value of 7.950% and a value of the firm of 704.910,27 in thousand USD as shown in Figure 8. The Graph of Cost of Capital is presented below:

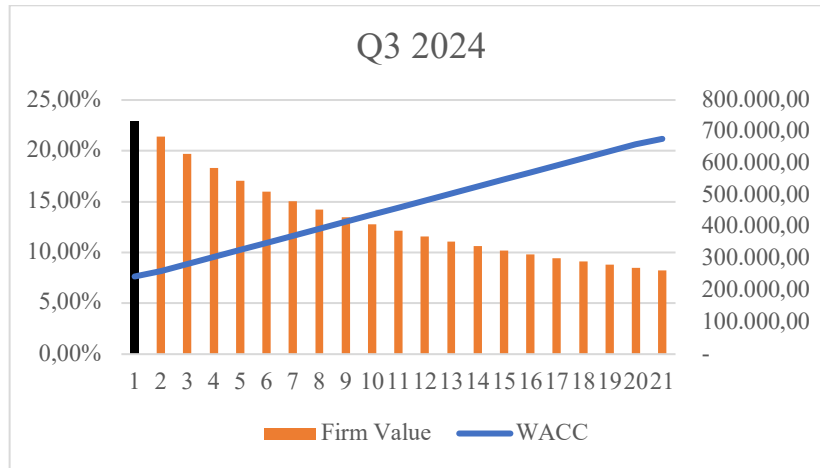


Figure 8. Graph of Optimal WACC and Firm Value

The following is a recap of the current capital structure and optimal capital structure for Q3 2024.

Table 17. Recap of Actual and Optimum Capital Structure Q3 2024

Year	Q3 2024	Year	Q3 2024
Current Capital Structure	88%	Optimum Capital Structure	1%
WACC	20,16%	WACC	7,950%
Firm Value	-87.198,96	Firm Value	704.910,27

KRAS’s current capital structure, which consists of 88% debt, is not sustainable and results in an excessively high WACC and a significantly negative firm value. The analysis indicates that reducing the debt ratio to around 1% would optimize WACC and enhance firm value. It is essential to undertake immediate capital restructuring measures, such as reducing debt, refinancing, or issuing equity, to avert further financial decline and achieve a more optimal capital structure.

Projecting Cost of Capital and Optimum Capital Structure

As explained before, this analysis will also include a future projection of the cost of capital and the optimal capital structure for 2025. The focus will be on determining the best possible condition for 2025, as the outlook for 2024 is already less favorable. Historical data serves as a reference to set the key assumptions for the 2025 projection. The risk-free rate, risk premium, and beta are based on the growth rate from the past 3 years and using Q3 of 2024. Likewise, debt and equity are determined by their growth over the last 3 years and using Q3 of 2024. However, for EBIT, the highest growth rate in the past 10 years will be considered since EBIT has

been extremely fluctuate in the last 7 years due to the financial impact since 2017 as in Figure 9:

Year	2014	2015	2016	2017	2018
Gross Profit	41.331	- 36.432	155.226	219.000	159.000
EBIT	- 70.444	- 183.549	4.390	- 637.148	- 93.110
Year	2019	2020	2021	2022	2023
Gross Profit	17.000	139.000	202.021	202.468	112.907
EBIT	- 448.763	166.657	71.849	34.306	- 8.043

Figure 9. The Recapitulation of Gross Profit and EBIT of Krakatau Steel

The assumed data for the projection will be presented below:

Table 18. Data for Projection of Optimum Capital Structure 2025

Item	Value	Description
Tax Rate	22,00%	
Risk Premium	2,85%	Author's Analysis
Risk Free Rate	6,44%	Author's Analysis
Beta KRAS	1,24	Author's Analysis
Total Asset	2.674.660,67	In thousand dollars
Total Debt	2.272.589,16	In thousand dollars
Total Equity	402.071,51	In thousand dollars

By using the data used as an assumption to calculate the 2025 projection, it results in an EBIT value of 45,269.15 thousand dollars and an ICR value of 0.26 with a rating of "C" so that it can be determined that the credit spread used for 2025 is 17%. The projections made to determine the optimal capital structure in 2025 only use "best" conditions. This is because the company's financial condition fluctuates extremely. The following is a calculation of the Cost of Debt and Cost of Equity for the 2025 project:

Table 19. Projection of Cost of Equity and Cost of Debt for 2025

Cost of Equity	2025 F	ICR	2025 F	Cost of Debt	2025 F
Risk-Free Rate	6,44%	EBIT	45.269,15	Risk Free Rate	6,44%
Risk Premium	2,85%	Interest Expense	173.853,07	Credit Spread	17%
Levered Beta	1,24	ICR	0,26	Pre-Tax Cost of Debt	23,44%
Marginal Tax	22%	Rating	C	Marginal Tax	22%
Cost of Equity	9,97%	Spread	17%	Cost of debt	18,28%

The Cost of Equity value from the 2025 projection has a smaller value than the Cost of Equity value in Q3 2024. The value of Interest Expense is obtained from the interest rate of 7.65% of the total debt. The credit spread value is better from 20% in Q3 2024 to 17% for credit spread in the 2025 projection.

The composition of the optimal capital structure for the company, based on data analysis, is 5% debt and 95% equity, where the firm value reaches its peak at 487,438.62 thousand dollars, with the WACC at its lowest level of 7.244%. This means that at a low level of debt, the company can minimize its cost of capital and maximize its firm value. However, when debt exceeds 10%, the firm's value begins to decline, indicating that additional debt does not contribute significantly to financial gains.

Table 20. Projection of Optimum WACC and Firm Value 2025

Debt	Equity	Rd	Re	WACC	Firm Value
1%	99%	5,48%	7,26%	7,243%	487.482,05
5%	95%	5,86%	7,29%	7,217%	489.286,53
10%	90%	6,75%	7,33%	7,267%	485.863,13
15%	85%	9,11%	7,37%	7,628%	462.876,91
20%	80%	11,66%	7,41%	8,263%	427.323,67
25%	75%	11,66%	7,47%	8,515%	414.672,86
30%	70%	14,21%	7,53%	9,532%	370.420,25
35%	65%	18,28%	7,60%	11,337%	311.455,37
40%	60%	18,28%	7,68%	11,920%	296.217,45
45%	55%	18,28%	7,77%	12,503%	282.401,00
50%	50%	18,28%	7,89%	13,087%	269.816,00
55%	45%	18,28%	8,03%	13,670%	258.304,83
60%	40%	18,28%	8,21%	14,253%	247.735,67
65%	35%	18,28%	8,44%	14,836%	237.997,44
70%	30%	18,28%	8,74%	15,419%	228.995,85
75%	25%	18,28%	9,16%	16,003%	220.650,36
80%	20%	18,28%	9,80%	16,586%	212.891,77
85%	15%	18,28%	10,86%	17,169%	205.660,27
90%	10%	18,28%	12,98%	17,752%	198.903,90
95%	5%	18,28%	19,34%	18,335%	192.577,34
99%	1%	18,28%	70,21%	18,802%	187.798,67

When debt surpasses 20%, the cost of debt (Rd) increases to 11.66%, implying a higher financial risk due to increased interest expenses. Additionally, the cost of equity (Re) rises sharply once the debt level exceeds 40% of total capitalization, as investors demand a higher return due to the increased risk associated with the company. Consequently, WACC rises steeply, meaning that a higher proportion of debt in the capital structure makes the cost of capital more expensive. Beyond a debt level of 30%, the firm value declines significantly. As observed, it drops to its lowest point at a debt level of 99%, amounting to 187,582.79, indicating that such a high debt level negatively impacts the firm's value. Moreover, an excessively high leverage ratio threatens profitability and financial stability, thereby reducing the company's ability to operate efficiently and sustain its long-term business continuity.

Business Solution

Through the calculation of the actual capital structure, it is known that KRAS is in an overleveraged condition. This is because the actual value of debt is greater than optimal, in actual conditions in 2021 the weight of debt is at 84% with 16% equity while the optimal calculation made by the author for 2021 is 10% debt and 90% equity. With a large production target in 2025 by reactivating HSMs that were previously inactive in the company's poor financial condition, several company strategies are needed to reduce the company's burden such as Equity for Debt Swap, selling assets, and restructuring.

CONCLUSION

Based on financial projections for 2025, Krakatau Steel's financial health is expected to improve compared to Q3 2024 under optimal conditions. This assumption is based on PESTLE analysis and optimal capital structure evaluation, which indicate promising prospects for investment in KRAS.

From a political standpoint, the Indonesian government supports the domestic steel industry through import restrictions, anti-dumping tariffs, and local content requirements (TKDN). The P3DN program secured IDR 1,428.25 trillion in domestic product purchases in 2024, up from IDR 1,157.47 trillion in 2023 (Waluya, 2024), strengthening the national steel industry. Economically, steel demand has grown at a CAGR of 5.4%, with domestic consumption rising from 15.5 million tons in 2021 to 17.5 million tons in 2023 (TEMPO, 2024). However, inflation in export markets could reduce exports by 68.74 million USD for every 1% increase in inflation (Billah, 2022), requiring close monitoring of external conditions. Social factors also support growth, with Indonesia's urbanization projected to reach 220 million people by 2045, increasing demand for steel in infrastructure, housing, and vehicles (Safitri & Pradipta, 2023). Despite these positive trends, risks such as political instability (Political Stability Index: -0.42 in 2022), exchange rate fluctuations, and environmental regulations need to be considered (Agustian, 2021).

The optimal capital structure of PT Krakatau Steel Tbk, based on the historical data of the past three years, the current condition in Q3 2024, and the projection for 2025, reveals that the company has excess debt, resulting in a significant gap between the actual calculation and the optimal capital structure.

The strategy to optimize the capital structure and maximize company value lies in generating a positive EBIT. The negative EBIT observed in 2023 through Q3 2024 has resulted in a negative company value, which may reduce investor interest. To address this, the company must implement a strategy to reduce debt and improve performance, ensuring the EBIT value becomes positive.

KRAS has the potential to offer debt-to-equity swaps to either creditors or strategic investors. That will reduce high-interest burdens emanating from long-term

debt and reduce the chance of default by making operational cash flow more growth-oriented. Additionally, lower leverage would improve its financial health and increase market confidence. To implement this, KRAS can negotiate with banks or bondholders for part of the debt to be converted into preferred shares. It also will seek strategic investors willing to take equity ownership in exchange for debt repayment and conduct a private placement or rights issue to strengthen the capital structure and reduce reliance on high-interest debt.

Further, KRAS may sell non-productive assets or non-core businesses to generate fresh funds for debt repayment. This step will contribute much to the overall debt reduction, fasten the improvement in the balance sheet, and efficiency by reduction of maintenance cost for underutilized assets. Implementation of this strategy can be performed by selling land or properties not optimally used, divestiture or selling unprofitable business units still commanding market value, and utilization of cash flow from asset sales directly paying off high-interest loans. Moreover, the company needs to renegotiate debt restructuring with its creditors: KRAS needs to extend loan tenure to alleviate the short-term payment pressure, lower interest rates to lighten up the interest expenses that burden EBIT and restructure the payment schedule to fit the company's cash flow capacity. This can be realized through communication with banks and bondholders for more flexible payment terms, requests for refinancing at more attractive interest rates, and government support or industry incentives that would lessen the financial burden on the company.

REFERENCE

- Agustina, L., ETTY, & Murwaningsari. (2022). The Influence of Corporate Social Responsibility (CSR) and Cost of Debt on Corporate Financial Performance during the Covid-19 Pandemic with Political Connections as a Moderating Variable. *ACCRUALS*, 15-30.
- Ardalan, K. (2017). Capital Structure Theory: Reconsidered. *Research in International Business and Finance*, 696-710.
- Badan Pusat Statistik. (2024, July 25). *Ekspor Besi/Baja Menurut Negara Tujuan Utama, 2012-2023*. Retrieved from Badan Pusat Statistik: <https://www.bps.go.id/id/statistics-table/1/MjAzMyMx/ekspor-besi-baja-menurut-negara-tujuan-utama--2012-2023.html>
- Badan Pusat Statistik. (2024, March 13). *Impor Besi dan Baja Menurut Negara Asal Utama, 2017-2023*. Retrieved from Badan Pusat Statistik: <https://www.bps.go.id/id/statistics-table/1/MTA0NyMx/impor-pipa-besi-dan-baja-menurut-negara-asal-utama-2000-2018.html>

- Billah, S. S. (2022). ANALISIS DAYA SAING DAN FAKTOR-FAKTOR YANG MEMENGARUHI EKSPOR KOMODITI BESI DAN BAJA INDONESIA DI PASAR INTERNASIONAL TAHUN 2012-2020. *Universitas Muhammadiyah Surakarta*.
- BPS. (2024). *Indikator Konstruksi Triwulan 1-2024*. Jakarta: BPS.
- Dr.Bahri, Dr.Nashir, & Eka. (2022). *Manajemen Keuangan Perusahaan Teori & Aplikasi*. Maksaar: Unhas Press.
- Feng, C., Jian-Bai, Miao, & Song, Y. (2017). Energy efficiency in China's iron and steel industry: Evidence and. *Journal of Cleaner Production*, 837-845.
- Firmansyah, Norisanti, & Deni. (2022). AnalisisCapital Asset Pricing Model (CAPM) Dan Earning Per Share(EPS) Dalam Pengambilan Keputusan Investasi Saham Pada Masa Covid-19. *Management Studies and Entrepreneurship Journal*, 296-304.
- Heliola, S., Dwi, F. S., & W, I. (2020). Pengaruh Struktur Modal Terhadap Kinerja Perusahaan pada 50 Leading Companies in Market Capitalization di Bursa Efek Indonesia Tahun 2013-2018. *Jurnal Riset Akuntansi dan Keuangan*, 151-158.
- Hendrayanti, S. (2024). *Manajemen Keuangan Lanjutan*. Pekalongan: NEM.
- Hidayat, K. (2023, June 22). *Krakatau Steel (KRAS) Suplai Baja untuk Pembangunan Istana Kepresidenan IKN*. Retrieved from Kontan.co.id: [https://industri.kontan.co.id/news/krakatau-steel-kras-suplai-baja-untuk-pembangunan-istana-kepresidenan-ikn#:~:text=KONTAN.CO.ID%20%2D%20JAKARTA,Kamis%20\(22/6\)](https://industri.kontan.co.id/news/krakatau-steel-kras-suplai-baja-untuk-pembangunan-istana-kepresidenan-ikn#:~:text=KONTAN.CO.ID%20%2D%20JAKARTA,Kamis%20(22/6)).
- IISAIA. (2024, January 03). *Proyeksi Kinerja Baja Nasional 2024*. Retrieved from The Indonesian iron & Steel Industry Association: <https://iisia.or.id/news/proyeksi-kinerja-baja-nasional-2024>
- Krakatau Steel. (2020). *Annual Report Krakatau Steel 2019*. Jakarta: Krakatau Steel.
- Krakatau Steel. (2021). *Annual Report Krakatau Steel 2020*. Jakarta: Krakatau Steel.
- Krakatau Steel. (2022). *Annual Report Krakatau Steel 2021*. Jakarta: Krakatau Steel.
- Krakatau Steel. (2023). *Annual Report Krakatau Steel 2022*. Jakarta: Krakatau Steel.
- Krakatau Steel. (2024). *Annual Report Krakatau Steel 2023*. Jakarta: Krakatau Steel.
- Labaran, Mathur, & Farouq. (2021). The carbon footprint of construction industry: A review of direct . *Journal of Sustainable Construction Materials and Technologies*, 101-105.

- Ludfi, R. (2022). Analisis Tingkat Kesehatan Pt. Krakatau Steel (Persero) Tbk Tahun 2017-2020 Dari Aspek Keuangan Berdasarkan Surat Keputusan Menteri Bumn Nomor: Kep-100/Mbu/2002. *Jurnal Econominia*, 958-974.
- Ma'rifat, E. (2023). *Optimal Capital Structure Analysis of PT Midi Utama Tbk*. Bandung: Institut Teknologi Bandung.
- Masan, S. S., Dyah, S., & Sopian. (2024). Pengaruh Ukuran Perusahaan dan Financial Leverage Terhadap Cost of Equity. *EKOMA*, 46-57.
- Mustajab, R. (2024, January 9). *Data Proyeksi Konsumsi Baja Indonesia (2015-2024)*. Retrieved from DataIndonesia.id: <https://dataindonesia.id/industri-perdagangan/detail/data-proyeksi-konsumsi-baja-indonesia-20152024>
- Nurdifa, A. R. (2023, November 08). *IISIA Beberkan Sinyal Permintaan Baja Global Masuki Fase Pemulihan*. Retrieved from Bisnis.com: https://ekonomi.bisnis.com/read/20231108/257/1712430/iisia-beberkan-sinyal-permintaan-baja-global-masuki-fase-pemulihan?utm_source=chatgpt.com
- Nurhayati, S. (2017). Peranan Manajemen Keuangan Dalam Suatu Perusahaan. *JBMA*, 85-94.
- Safitri, I. K., & Pradipta, K. (2023, August 17). *Urbanisasi dalam Gambar*. Retrieved from Interaktif: https://interaktif.tempo.co/proyek/urbanisasi-dalam-gambar/?utm_source=chatgpt.com
- Saputri, E., Widiyati, S., & Theresia. (2023). Analisis Struktur Modal Optimal Dalam Rangka Meningkatkan Nilai Perusahaan. *Keunis*, 131-137.
- Satrio, U. (2022). *Optimal Capital Structure Analysis of PT Krakatau Steel Tbk*. Bandung: Institut Teknologi Bandung.
- Sawir, A. (2004). *Kebijakan Pendanaan dan Restrukturisasi Perusahaan*. Jakarta: Gramedia.
- Suseno, M. (2023). *Asesmen Performa Finansial Dan Valuasi Pt Krakatau Steel, Tbk Periode 2018-2022*. ITB.
- Waluyo, D. (2024, July 24). *Jurus Tingkatkan Kandungan Lokal Manufaktur Nasional*. Retrieved from INDONESIA.GO.ID: <https://indonesia.go.id/kategori/editorial/8460/jurus-tingkatkan-kandungan-lokal-manufaktur-nasional?lang=1>