



Stock Valuation and Financial Performance of Nickel Mining Company in Indonesia (Case Study: PT Vale Indonesia Tbk)

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ABSTRACT: Indonesia is home to 22% of the world's nickel deposits, and its restriction on nickel ore exports since 2020 has resulted in significant changes to the supply chains of vital items such as electric vehicles and the stainless steel sector. Approximately 75% of nickel is used in the manufacturing of stainless steel, the most common use of nickel. However, nickel is also essential for the fabrication of electric vehicle (EV) battery cathodes, which are required for the shift to green energy. Current EV battery demand accounts for around 7% of worldwide output, but anticipated increases in EV demand will result in an exponential increase in nickel demand. The exponential increase in nickel demand led to volatility in global nickel prices. Volatility in global nickel prices is affecting companies that operate nickel mining businesses. PT Vale Indonesia Tbk (INCO) is listed on the Indonesia Stock Exchange as one of the nickel mining firms operating in the nickel mining business (IDX). The volatility of the global nickel price is both a breath of fresh air and a problem for the firm. INCO may also participate in and benefit from the rising worldwide demand for nickel in the foreseeable future.

The primary objective of this study is to evaluate the intrinsic value of a nickel mining company in order to assist investors in making decisions in the current market environment. Evaluation of financial performance over the last five years and projections for the next five years using absolute and relative valuation methodologies. The author suggests investors to purchase this stock using a risk-reward assessment suited to each investor's circumstances and the potential return earned. Referring to the stock valuation evaluation, investors are recommended to purchase if the price of INCO falls below the range of IDR 6,051 to IDR 6,335. When the market price is inside and above the intended range, it is not advisable for an investor to purchase INCO.

KEYWORDS: Discounted Cash Flow, INCO, Nickel, Stock Valuation, Volatility.

1. INTRODUCTION

Nickel is the primary component utilized for household applications throughout the world. In addition to its usage in producing alloys such as stainless steel, nickel has become an essential component in the lithium-ion battery cells used in the majority of electric vehicles.

On the worldwide market, nickel demand is anticipated to increase; roughly 70% of global nickel output is consumed by the stainless-steel sector, while batteries account for just 5%. Outside of China, demand is anticipated to be the key driver of global increase in terms of market size in 2022, with global demand increasing by around 7% annually from 2020 until 2025. Experts expect that by the end of the decade, the battery sector will account for around 35% of the entire demand for nickel.

According to the International Energy Agency's Global Electric Vehicle Outlook 2021, estimated amount of electric vehicles on the planet's roads will reach 10 million in 2020, a 43 percent increase from 2019. In the meanwhile, research by Bloomberg New Energy Finance projects that global sales of electric passenger vehicles would climb from 3 million in 2020 through 66 million in 2040, all without official help. Nickel is anticipated to play a significant part amidst staggering electric vehicle growth projections and revolutionary changes in the future of transportation.

Based on the Indonesia Investment Coordinating Board, Indonesia is the world's largest producer of nickel ore, which is used to make lithium batteries. In 2019, Indonesia produced 800.000 metric tons of nickel ore, accounting for 29.6% of global nickel ore output. Indonesia's nickel ore production is projected to be sustainable, given the country holds the world's biggest nickel ore resource, with 21 million metric tons. Indonesia's goal to become an electric car and battery production powerhouse is reinforced by the country's cheap manufacturing prices in Asia. In addition, strategic actions are being made to promote the growth of the national electric car sector, such as fostering the development of local battery technology. According to Presidential Regulation Number 55 for the Year



2019, which has the dual purpose of expanding the new market for battery-powered electric road cars and trying to regulate the industrial production of battery-powered electric road vehicles and components, the goal of this regulation is to expand the market for battery-powered electric road cars.

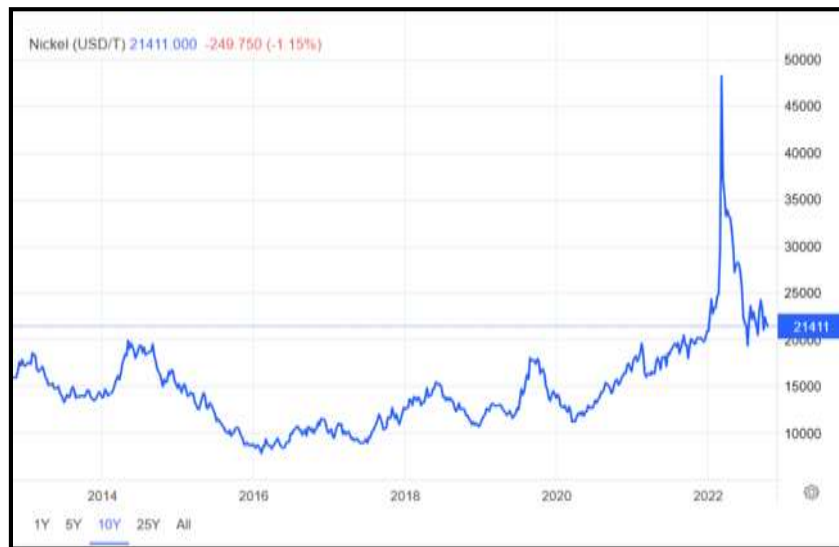


Figure 1.1.1: Global nickel price in 2012 - 2022

Sources: Tradingview.com

Indonesia is the location to 22% of the world's nickel deposits, and its embargo on nickel ore exports in 2020 has resulted in significant changes to the distribution networks of vital goods including electric vehicles and the stainless steel sector. Estimated 75% of nickel is used in the manufacturing of stainless steel, the most common application of nickel. Furthermore, nickel also was essential for the manufacture of electric vehicle (EV) battery cathodes, that are also important for the shift to green energy. Presently EV battery consumption accounts for around 7% of worldwide consumption, but anticipated rises in EV consumption will result in an increasing amount in nickel demand. Indonesia's plan to stop exporting nickel ore in 2020 is a development of its industry goal to develop downstream materials and goods for the nickel and electric vehicle battery supply chains. To attain this target, the quality of Indonesia's nickel deposits will require multiple procedure of technical process.

PT Vale Indonesia Tbk (INCO) is listed on the Indonesia Stock Exchange as a nickel mining firm. The author chose INCO as the focus of the research because it has one of the largest market capitalizations in the nickel mining sector and is one of the oldest companies in the nickel mining industry. At the end of the year 2021, its market value was approximately equivalent to USD 3.9 billion or IDR 60.36 trillion. Nickel mining activities, including nickel ore mineral extraction, nickel in matte processing, and nickel matte transactions, will continue to be the company's core activities according to the articles of association of Vale Indonesia, which state that the scope of INCO's activities in the year 2020 will include a number of different industries.

In this reserch, the author will concentrate on 3 companies that currently operate in the nickel mining sector, namely PT Vale Indonesia Tbk (INCO), PT Aneka Tambang Tbk (ANTM), and PT Timah Tbk (TINS). Based on the list, INCO became the only company that operates in the nickel mining industry. For ANTM, and TINS also operate in the nickel industry, but not as their core businesses.

2. RESEARCH DESIGN

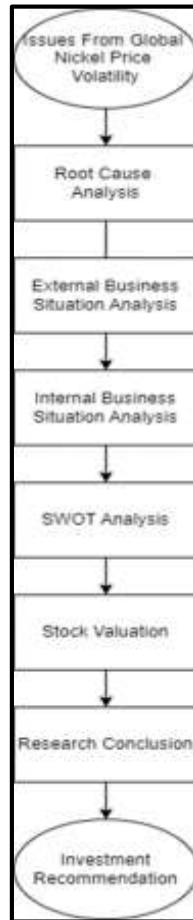


Figure 2.2.1: Global nickel price in 2012 - 2022

Sources: author analysis

The research design for this research is a framework that will methodically describe the ideas, assumptions, expectations, and theories that support and inform their interaction. The conceptual framework enables the author to present an overview of the study's variables. In this study, each important aspect, variable, and idea will be discussed in a variety of formats, such as graphs and tables, with detailed explanations based on the theories and facts discovered.

The author will first examine the nickel mining sector and the commercial difficulties that arise within it. The author will next examine the impact of external variables on the nickel mining business using macroeconomic analysis, PESTLE analysis, and Porter's Five Forces analysis methods. In addition, the company's internal examination will be conducted from financial, technological, human resource, organizational, and reputational vantage points.

After doing an internal and external study of the firm, the author will conduct a SWOT analysis in order to acquire full knowledge of the company's competitive advantage relative to other businesses in the same industry. To give investors with suggestions, the author will do an absolute valuation using discounted cash flow. The intrinsic value of a corporation is determined by converting the entire predicted future cash flow and future terminal value to present value and then dividing it by the discount rate.

The discount rate is derived from the Weighted Average of Cost Capital (WACC), the proportionate accumulation of the cost of equity and the cost of debt. In order to gain more thorough findings from the obtained intrinsic value results, the author will do sensitivity analysis in order to examine additional possibilities that will change in the range of numbers, depending on model-related aspects.

3. EXTERNAL ANALYSIS

External analysis is the evaluation of the competitive scenario, market landscape, dynamics, and historical background from the company's industrial surroundings. External analysis comprises substantial macroeconomic, worldwide, political, social, demographic, and technological research. The primary purpose of external analysis aims for identify the opportunities and threats which may influence the sales and profits, development, and fluctuation of a market or industry group. Through macroeconomic analysis, PESTEL analysis, and Porter's Five Forces analysis, this study would examine the external environment within the company.

A. Macroeconomics Analysis

Three primary economic performance indicators as well as its underlying reasons are the focus of macroeconomics. These variables comprise real national income growth rate, inflation rate, and unemployment rate (Irvine and Curtis, 2017). Gross domestic product (GDP) represents the total monetary or market value of all finished goods and services created inside a nation's boundaries during a specific time period. Like a broad gauge of the economic condition of a nation, gross domestic product may be considered as a scorecard.

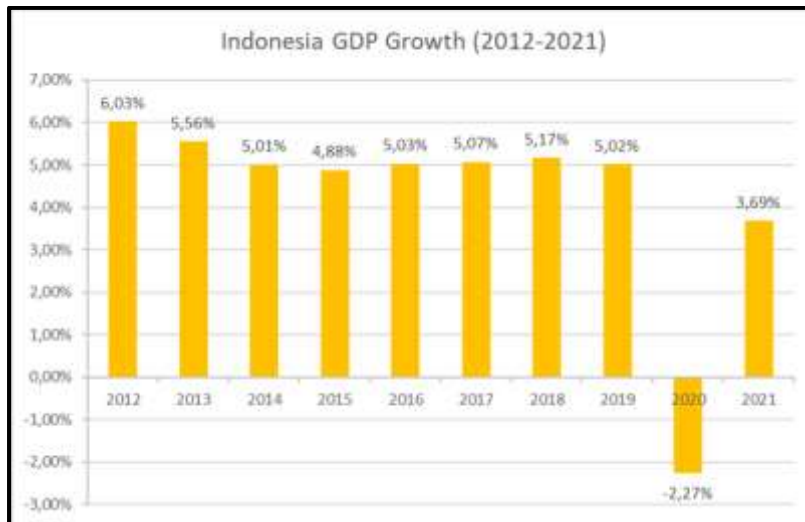


Figure 3.3.1: GDP Growth of Indonesia in 2012 - 2022

Sources: Indonesia Central Bureau of Statistics

According to Figure 3.1, the Indonesian economy has already grown by 3.69% in 2021. GDP realization has increased compared to 2020 when it fell to minus 2.27%, the second worst since the 1998 crisis. The economic downturn in Indonesia is comparable to that of a variety of trading affiliates whose economic growth in 2020 was also negative. In 2021, however, with the government and society better prepared to deal with the effects of COVID-19, Indonesia's GDP is already expanding, with contributions from sectors as diverse as manufacturing (19.25%), agriculture (13.28%, including forestry and fisheries), wholesale and retail (12.97%), construction (10.44%), and many more.

Inflation is the widespread and persistent growth in the prices of products as well as services during a specific time period. Inflation arises from pressures on the supply side, the demand side, and inflation expectations. The devaluation of the currency rate, the effect of foreign inflation, particularly in trade partnership nations, a growth of government-regulated commodity prices, and unfavorable supply disruptions caused by natural catastrophes or transportation disruptions can all generate cost-push inflation.

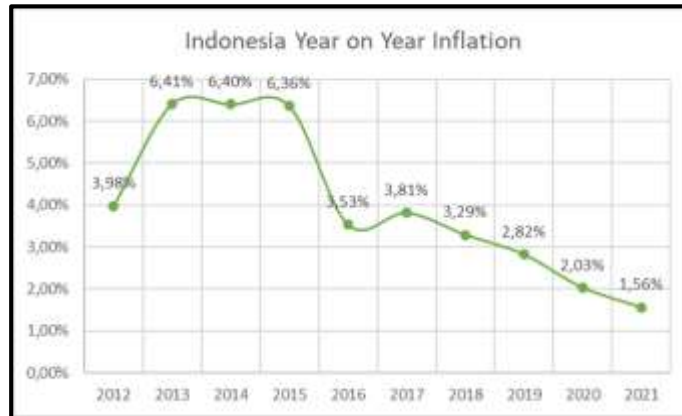


Figure 3.2: Indonesia Year on Year Inflation

Sources: World Bank

While global inflation rises in 2021, Indonesia's inflation rate will stay moderate and stable. The inflation rate in Indonesia remains below the target range of 3.0±1% in 2021. The inflation rate for 2021 was 1.56% YoY, a reduction from the CPI inflation rate for 2020 of 2.03% YoY. Low inflation in 2021 is impacted by low domestic demand due to the COVID-19 pandemic, sufficient supply, and policy coordination between Bank Indonesia as well as the central and regional governments involved in preserving price stability. In order to keep inflation within the target range of 3.0±1% in 2022, Bank Indonesia will preserve price equilibrium and strengthen policy cooperation between the government on both the central and regional levels.

The unemployment rate indicates what portion of the labor force is jobless. This represents an observable or measurable factor that varies in reaction to the economic, financial, or business variable to which it is tied, i.e., it rises or falls in response to changing economic conditions instead of forecasting those. As the economy is in bad condition and jobs are small in number, a rise in the unemployment rate may be predicted. Unemployment is expected to reduce as the economy develops at a solid pace and jobs become accessible.

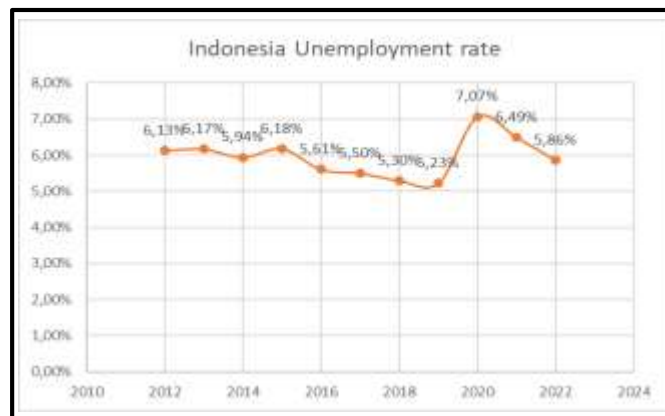


Figure 3.3: Unemployment Rate in Indonesia

Sources: Indonesia Central Bureau of Statistics

The open unemployment rate (TPT) in Indonesia decreased from 6.49 percent in August 2021 to 5.86 percent in August 2022. As Employment conditions are improving in tandem with the economic recovery. The number of jobless in Indonesia declined from 9.1 million in August 2021 to 8.42 million in August 2022, according to the BPS. Recent declines in TPT have been uniform by gender and area. The TPT among men decreased to 5.93% in August 2022 from 6.74% in August 2021, while the TPT among women decreased to 5.75% from 6.14%. Regionally, the TPT fell from 8.32% to 7.74% in urban regions and from 4.12% to 3.43% in rural areas.



B. PESTEL Analysis

A company's external environment consists of all factors that may affect its capacity to gain and retain a competitiveness. By analyzing features of the external environment, strategic leaders may mitigate risks and capitalize on opportunities. Evaluation of the origin or presence of external factors is a popular way for examining their impact on a business.

1. Politic

Indonesia is the location to 22% of the world's nickel deposits. Furthermore started in 2020, Indonesia will cease exporting nickel ore according to its industrial program to create nickel and EV battery supply chain downstream materials and goods. In 2014, Indonesia utilized a similar export prohibition to produce nickel products with additional value for the stainless steel supply chain. This industrial regulation aims to strengthen the sector while also attempting to emulate its success in the market for electric car batteries.

In November of 2019, the European Union submitted a protest with the WTO stating that Indonesian trade limitations on natural resources negatively impacted their stainless steel industry. Indonesia has banned the export of nickel ore beginning in 2020. Through its decision, the WTO panel determined that neither the embargo on nickel exports as well as a demand that entire nickel ore being manufactured domestically in Indonesia not in accordance with international trade laws. Prior to limiting ore exports to entice foreign investors to develop nickel smelters and downstream industries onshore, Indonesia seemed to be one of the leading exporters of nickel in the world. China was a key investor source.

2. Economic

According to the latest World Economic Prospects research from the World Bank, the Russian assault in Ukraine significantly worsened the effects of the COVID-19 outbreak on the world economy, which is entering what potentially become a longer period of slower growth and increasing inflation. This increases the possibility of crisis, which could harm both low - income and middle-income nations. The international economy is expected to decline from 5.7% in 2021 towards 2.9% in 2022, and that is significantly less relatively the 4.1% estimated in January. In 2023 through 2024, growth is expected to remain at this level since the momentary effects of the situation in Ukraine on economic activity, investment, and commerce, the fall in suppressed demand, as well as the elimination of monetary and fiscal policies assistance. This year, as a result of the damage inflicted by the pandemic and the war, the per income per capita across developing nations will be around 5% below its prior pandemic tendency.

After a strong rebound of 6.5% in 2021, the IMF report for October 2022 anticipates that growth in Asia and the Pacific would decline to 4.0% in 2022 and rise to 4.3% in 2023 due to the unpredictable worldwide situation. The inflation rate has exceeded the bulk of reserve bank targets; however, its climax is expected to come in late 2022. When those effects of the pandemic begin to dissipate, the area will face new challenges from tightening global financial conditions and a predicted decline in foreign demand. Even though Asia remains a comparative bright spot in a lackluster global economy, Asia is anticipated to expand at a rate considerably lower below the average rate of 5.5% during the preceding two decades. When inflation rises and idle equipment is used, regulatory assistance is gradually withdrawn; however, monetary policy must be prepared to tighten more quickly unless the rise in core inflation appears to be particularly persistent. Therefore, interventions to mitigate worldwide hunger and energy crises should be accurate, short, and budget neutral to handle the region's escalating public debt levels.

3. Social

Indonesia has approximately 279 million population, putting Indonesia as fourth highest populated nation on earth. Indonesia accounts for 3.51% of the global population. Around 56.10% of the entire Indonesian population resides in Java Island, according to the 2020 Indonesian census, followed by Sumatra Island with 21.68% and others. West Java (for more approximately 48 million residents) is the most populated province in Indonesia, whereas West Papua in the far east is the lowest populated (home to around 1.1 million people). Indonesia is host to hundreds of unique ethnicities and cultures, resulting in an ethnically diverse population. Consequently, greater than half majority of country people may be classified into two primary ethnic groups. These two groups make up 41% of the overall population (Javanese) and 15% of the entire population (Sundanese) respectively. Both tribes are from Java, the most populated island in Indonesia, that also was home to over 60% of the nation's overall population.

Indonesia is one of the nations with the most promising automobile sales potential, given its present population size. Numerous international vehicle manufacturers and merchants have established operations in Indonesia. Additionally, this has a good effect on



the development of electric car products. As of September 2022, a presidential directive in Indonesia urges the acceleration of the use of electric vehicles, with all government vehicles being electric. The government thinks that widespread usage of electric vehicles would be one of the means through which Indonesia may reach zero emissions by 2060. In addition, Indonesia has set the ambitious target of achieving a 25% market share for electric vehicles in Indonesia by 2030. With these electric vehicles, national investment will also increase.

4. Technology

Indonesia's technological advancements have accelerated as a result of the COVID-19 pandemic. The COVID-19 problem has brought about years of change in the business practices of enterprises across all industries in the region. The recruiting and training of employees is one of these areas. Prior to the COVID-19 pandemic, this was performed offline; however, it is now conducted online. This is done to ensure the company's continued competitiveness in the industry.

In addition, the nickel mining sector has witnessed technological advancements such as HPAL (high pressure acid leaching) technology. HPAL technology is required to refine limonite nickel ore and saprolite nickel ore into nickel class 1 products. As a nickel class 1 product, it can be refined into the primary components of electric vehicle batteries. In addition, this technique has the potential to boost yearly production in the nickel mining business.

5. Environmental

Environmental analysis in the nickel mining business comprises analyzing the possible environmental implications of mining activities and creating mitigation or prevention strategies. Environmental effects of nickel mining include air and water pollution, deforestation, habitat damage, and the emission of greenhouse gases. Assessing the possible consequences of mining on water resources is a crucial component of environmental studies in the nickel mining sector. The discharge of pollutants into water bodies as a result of nickel mining can have detrimental effects on aquatic ecosystems and the health of surrounding communities. In this instance, environmental analysis may involve determining the chance that water will be polluted and devising methods to prevent or mitigate the pollution, such as implementing best management practices and water treatment systems.

Another important aspect of environmental in the nickel mining business is the evaluation of the mine's possible effects on air quality. The mining of nickel can contribute to air pollution through the production of dust and other particulates, as well as greenhouse gases. In this instance, environmental analysis may involve determining the chance of air pollution and devising methods to decrease or eliminate it, such as implementing dust control measures and emission-reduction technology.

6. Legal

All business operations in Indonesia are governed by the country's laws and regulations. The following rules and regulations relate to companies operating in the mining sector, particularly nickel mining:

- a. Article 33 of the 1945 Constitution of the Republic of Indonesia declares that industries of production that are vital to the nation and influence the lives of the people are subject to governmental control. The land, the waterways, as well as the natural resources inside must be administered by the state and utilized for the greater welfare of the citizens.
- b. UU No. 3/2020, The regulations set the way for a number of reforms, including those concerning the determination of mining regions, the centralization of power, and the licensing of mining firms, among others. Given the developments and their possible consequences, mining businesses may soon be required to review their licences, company structures, and operational procedures to guarantee complete compliance with the law.
- c. UU No. 11/2020, The purpose of the Omnibus Law is to boost the convenience of conducting company in Indonesia, which includes the simplification of licensing procedures, the simplification of acquiring land procedures, the formalization of economic zones, the provision of additional rewards for free trade zones, and the modification of the labor law.
- d. PP No. 96/2021, The policy sets the basis the execution of mineral and coal mining business activities.



C. Porter's Five Forces Analysis

The industry environment affects the firm's competitive strength and its ability to generate better than average profits more effectively than the general environment does. The economic profit of a sector is defined by Porter's five forces model of competition: risks posed by new entrants, product or service alternatives, the bargaining power of both suppliers and customers, and the degree of rivalry (Hitt, 2009). Recognizing the competitive forces and their root causes would give a framework for anticipating and shaping contest (and success) in the long term. It is essential for a business's strategy to resist over competitive pressures and influence them to its advantage (Porter, 2008).

1. Threats of New Entrants

The threat posed by new entrants in the nickel mining industry can vary based on a number of variables, including the amount of capital necessary to join the market, the supply of resources, the regulatory environment, and the presence of existing enterprises with proven competitive advantages. The amount of cash necessary to enter a market is a crucial aspect that might determine the threat of new entrants. Exploration, development, and production in the nickel mining business may be costly and capital-intensive. This can make it challenging for new entrants to obtain the money required to enter the market, particularly if a company lacks a history of success in the field.

Another aspect that might influence the threat posed by new entrants is the supply of resources. The cost of transporting the ore to processing facilities can be substantial, as nickel resources are frequently located in distant or difficult-to-reach areas. In addition, the quality of the ore can vary greatly, with ore of greater quality being more valuable and simpler to process. New entrants may lack access to high-quality ore resources or be unable to pay the expense of transporting lower-quality ore if this is the case. Additionally, the regulatory environment might impact the threat of new entrants in the nickel mining business. Governments may put stringent restrictions on the mining business, such as environmental protection, safety, and labor practices laws. These regulations can increase the cost of operating a mine, making it more difficult for new enterprises to compete with those who have already implemented regulatory guidelines. Consequently, the threat posed by new entrants is low.

2. Bargaining Power of Buyers

The bargaining power of buyers in the nickel mining business refers to their capacity to negotiate advantageous terms with sellers on the market. Several variables can impact the bargaining power of buyers in the nickel mining industry, including the amount and size of buyers, the availability of alternatives, the relevance of the product to the buyer, and the capacity of the buyer to transfer to a new supplier.

Considering the market concentration of consumers is one method for analyzing the negotiating power of buyers in the nickel mining business. If there are few major purchasers in the market, they may have more negotiating power than if there were many small buyers. Due to their size and significance to the seller, large purchasers are more likely to be able to negotiate better terms with sellers.

The availability of replacements for the product is another issue that might affect the negotiating position of purchasers in the nickel mining industry. If there are several viable alternatives, purchasers may be more inclined to move to a new source if they are dissatisfied with the conditions supplied by a certain vendor. Conversely, if there are few alternatives, purchasers may have less negotiating leverage since they are more reliant on the product and may be ready to accept less favorable conditions in order to continue receiving it. Therefore, the Buyers' Bargaining Power is high.

3. Bargaining Powers of Suppliers

In the nickel mining industry in Indonesia, a supplier's capacity to bargain can be influenced by a couple of things. The availability of raw materials is an issue that might impact the bargaining position of suppliers. If there are several suppliers of raw materials, such as nickel ore, then the negotiating power of any provider is likely to be limited. Conversely, if there are few suppliers of raw materials, they may have greater negotiating leverage.

The amount of diversity between the raw materials supplied by a supplier is another element that might impact its bargaining strength. If the raw materials supplied by multiple suppliers are highly similar, then it may be simpler for customers to move between providers, which can weaken the negotiating position of each particular supplier. Conversely, if the raw materials supplied by



various suppliers are considerably different, it may be more difficult for customers to transfer providers, which can strengthen the negotiating power of each supplier.

The amount of competition within the nickel mining business in Indonesia may also impact the negotiating strength of suppliers. In order to secure business, suppliers may be more prepared to accept lower pricing if there is significant rivalry among them. Conversely, suppliers may be able to negotiate higher rates for their raw materials if there is less competition among them. Thus, the Bargaining Power of suppliers is moderate.

4. Threat of Substitute Product

The threat of substitute products in Indonesia's nickel mining sector refers to the possibility of other minerals or goods being utilized in lieu of nickel. If the demand for nickel drops owing to the availability of replacements, the profitability and sustainability of the nickel mining sector in Indonesia may be jeopardized. Several potential alternatives for nickel might have an effect on Indonesia's nickel mining sector. For instance, stainless steel is frequently substituted for nickel in applications such as the manufacture of kitchen appliances and automobile components. Stainless steel is less costly than nickel and has comparable qualities, making it a desirable choice for some producers.

Other possible nickel alternatives include aluminum and copper, which may be utilized in the manufacturing of electrical wire and cable, as well as the construction of numerous types of equipment. In addition, advancements in technology and materials science may result in the creation of new materials that might serve as nickel alternatives in specific applications. In general, the threat of substitute products in the nickel mining business in Indonesia is an essential consideration for firms operating in this area to concern. In order to stay competitive and profitable, it is essential for these businesses to watch market trends for prospective replacements and modify their business strategy appropriately. As a result, the Threat from Substitutes for this Product is Medium.

5. Rivalry Among Competitor

In recent years, the nickel mining business in Indonesia has seen a variety of obstacles, such as growing rivalry among corporations and alterations in government policies and laws. Multiple domestic and foreign enterprises operating within the country contribute to the industry's level of competition. The mining sector has attracted a number of major companies, notably PT. Vale Indonesia Tbk, PT Timah Tbk, and PT Aneka Tambang Tbk. Indonesia is the world's largest producer of nickel. In this extremely competitive environment, many businesses have attempted to expand their operations and enhance their market share.

In addition to rivalry from other firms, the nickel mining sector in Indonesia has also had to contend with shifting government rules and policies. The Indonesian government has introduced a variety of steps to control the industry, including stronger environmental rules and mandates for businesses to sell assets unrelated to mining. In an effort to adapt to the new regulatory environment, these developments have intensified competitiveness amongst businesses. Overall, the competitiveness in Indonesia's nickel mining business may be contributed to several variables, including the presence of both domestic and international enterprises in the country, the evolution of government laws and regulations, and the ambition to increase market share and profit. Therefore, competition among competitors is high.

4. INTERNAL ANALYSIS

A. Company Management Overview

After 54 years in operation in Indonesia, PT Vale Indonesia Tbk has grown one among the country's largest mineral mining corporations, with a long-term commitment towards contribute to Indonesia's growth in an environmentally and socially responsible manner. In addition, as one of the largest operators of integrated nickel mining operations, PT Vale Indonesia Tbk is unwaveringly dedicated to adopting sustainable mining practices and converting natural resources for greater good in order to promote sustainable development. INCO determined, based on its Annual Report, that because nickel is a component of the response to global climate challenges, this should guarantee that nickel goods are mined and refined using sustainable development practices.

PT. Vale Indonesia Tbk conducts Nickel ore mining activities at chosen locations in Sorowako, East Luwu Regency, South Sulawesi, based on exploration and geological data. The mining operations of PT. Vale Indonesia Tbk are categorized as open-pit mining, that include excavators extracting soil layers carrying high nickel ore and refining it at filtering facilities. Each year, PT. Vale Indonesia



Tbk restricts the area of its mining operations in order to lessen their repercussions on the environment. A variety of infrastructure, such as mining routes, industrial equipment, docks, gasoline stations, gasoline pipes, and gasoline storage facilities, facilitate mining operations.

B. Financial Ratio Analysis

Financial ratio analysis is a method used to evaluate the financial performance and status of a business. It involves analyzing financial data from a company's financial statements to identify patterns and correlations that could be utilized to analyze the organization's financial condition and performance. The liquidity, activity, solvency, profitability, and marketability of a company's financial performance may be measured using financial ratios. In this subsection, the financial ratio of PT. Vale Indonesia Tbk (INCO) will be compared to that of its rivals in the nickel mining industry in Indonesia, which are PT Aneka Tambang Tbk (ANTM) and PT Timah Tbk (TINS).

1) Liquidity Ratio

The following are the liquidity ratios. According to Gitman (2015), a company's liquidity is defined by its capacity to honor its maturing short-term obligations. Liquidity refers to a company's overall financial condition or its capability to pay its bills efficiently. Due to the fact that low or declining liquidity is a frequent precursor to financial crisis and bankruptcy, these ratios may indicate cash flow concerns and likely business failure. The liquidity ratio would offer a summary of the company's capacity to fulfill its short-term debts. Analysis of liquidity ratios includes the current ratio and the quick ratio.



Figure 4.3: Current Ratio Comparison of INCO to Competitors

Sources: Author Analysis

From the figure 4.3, it can be concluded that INCO current ratio continue to grow from 2018 to 2021. Even at the end of 2021, INCO's current ratio almost reach 5. It implies that INCO's obligations due within a year are significantly lower than its assets. On this basis, it is safe to assume that INCO's finances are healthy, as indicated by its current ratio. Furthermore, when compared to its competitors, INCO's financial situation, when viewed through the current ratio, is still the best compared to its competitors. INCO is the only company that, in the last 4 years, had a ratio value above average. Moreover, both competitors' current ratio growth has fluctuated over the last four years.



Figure 4.4: Quick Ratio Comparison of INCO to Competitors

Sources: Author Analysis

According to Figure 4.4, It demonstrates that INCO is still better to its rival in this ratio. It also indicates that INCO's current assets, excluding inventory, are sufficient to cover its short-term obligations. The other competitors, ANTM and TINS, have always had a below-average fast ratio for the past four years. In addition, TINS' quick ratio has never exceeded 1.0 in the past four years. The activity ratio can be done in several ways, for example inventory periods, collection periods, and total assets turnover.

2) Activity Ratio

Activity ratios represent the pace at which specific assets are converted towards sales or cash, together with inflows and outflows (Gitman, 2015). To some perspective, activity ratios evaluate the effectiveness about a company's business throughout multiple aspects, including as inventory control, payments, and collections. Inventory, accounts receivable, and accounts payable represent three among the key important existing items that may be evaluated using a number of ratios. Additionally, the efficiency of the usage of total assets may be examined.



Figure 4.5: Inventory Periods Comparison of INCO to Competitors

Sources: Author Analysis

According to figure 4.5, INCO did not become the leading company since its inventory periods were similar and often above average in the industry. Furthermore, ANTM becomes the most efficient corporation when compared to its competitors thanks to its low inventory periods. Furthermore, due to long inventory periods, TINS has become the least efficient company. Overall, INCO should do a buy budgeting exercise to verify that they are stocking enough to enhance sales while avoiding capital waste and needless risks.



Figure 4.6: Collection Periods Comparison of INCO to Competitors

Sources: Author Analysis

According to figure 4.6, INCO's performance at collecting payments from clients is standard to below-average. The figure also demonstrates that, only in 2020, out of the previous four years, did INCO's collecting period come close to that of its rivals. Furthermore, as compared to its competitors, ANTM has the industry's shortest collection time. Additionally, these situations may have an impact on INCO's business operations.



Figure 4.7: Total Asset Turnover Comparison of INCO to Competitors

Sources: Author Analysis

Based on the figure 4.7, When compared to its competitors, INCO's performance in generating income from its assets was inefficient. On the other hand, both of its competitors' asset turnover is greater than the industry average, demonstrating that both competitors are efficient in producing sales or income from their asset base. This circumstance develops as a result of INCO's hydroelectric facilities, which enhance the dependability of the nickel processing industry's electrical energy source. Furthermore, plants and machinery utilized in nickel processing accounted for more than half of INCO's assets.

3) Solvency Ratio

Potential company creditors commonly evaluate a company's solvency ratio as a key indicator of its ability to repay its long-term loan commitments. A solvency ratio is an assessment of a company's financial condition that determines whether its cash flow is adequate to meet its long-term obligations. A negative ratio will indicate a company's potential inability to pay its obligations completely. The degree of debt indicates how much the company relies on borrowed capital to generate profits (Gitman, 2015). Solvency ratio carried out using debt to equity ratio and debt to assets ratio.



Figure 4.8: Debt to Equity Ratio Comparison of INCO to Competitors
Sources: Author Analysis

INCO's debt-to-equity ratio performance over the previous four years has been pretty strong since its debt-to-equity ratio was the lowest among its rivals. It implies that the entire debt held by the firm is less than the total equity held. Furthermore, it proves that INCO's financial situation is funded by the company's own profits. Additionally, INCO's debt-to-equity ratio have remained relatively stable over the past four years.

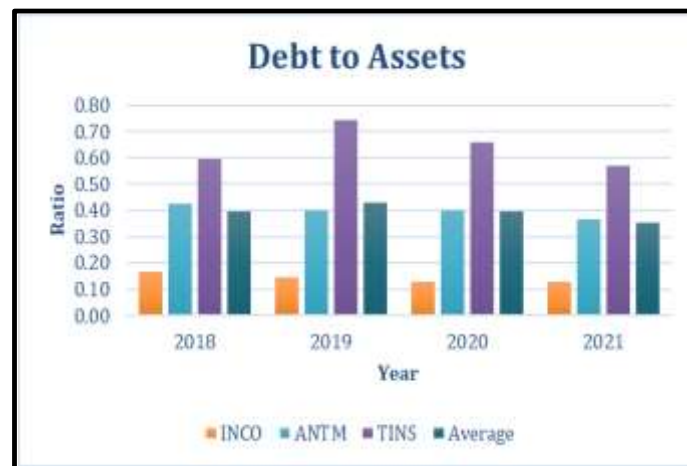


Figure 4.9: Debt to Assets Ratio Comparison of INCO to Competitors
Sources: Author Analysis

Existing conditions in the debt-to-assets ratio were quite similar to those in the debt-to-equity ratio, indicating that INCOs outperformed other rivals. It also shows that INCO has a low amount of liabilities in comparison to assets and is thought to have low leverage. Furthermore, it demonstrates that INCO chose to prioritize acquiring capital by issuing shares to investors above obtaining a loan from a bank. According to the figure 4.9, in 2020 and 2021 only 13% of INCO’s assets are financed through debt.

4) Profitability Ratio

Profitability ratios are a category among financial indicators intended for analyze a company's capability to generate earnings over time relative to its income, operating expenditures, balance sheet assets, or shareholders' equity through a single snapshot of information. Profitability ratios are similar to efficiency ratios, that measure how well a company uses its own resources to create money. According to Gitman (2015), these parameters enable experts to evaluate a company's profitability in relation to a particular level of revenue, a particular number of assets, and their owners' capital. The profitability ratio would be done using several analysis, namely gross profit margin, operating profit margin, net profit margin, return on assets, and return on equity.



Figure 4.10: Gross Profit Margin Comparison of INCO to Competitors

Sources: Author Analysis

According to Figure 4.10, it demonstrates the company’s efficiency in turning revenue into gross profit margin. As we can see that INCO’s gross profit margin since 2018 experiencing positive growth until 2021. Furthermore, only in 2018 was INCO’s gross profit margin below the industry average. Moreover, in 2021, company’s that operating in the nickel mining industry have significant growth in gross profit margin when it compared to prior year.



Figure 4.10: Operating Profit Margin Comparison of INCO to Competitors

Sources: Author Analysis

For the last four years, INCO has outperformed its competitor in terms of operating profit margin. It can be seen that INCO's operating profit margin ratio for the last 4 years was above the industry average. In addition, INCO's operating profit margin has had good development since 2018 and already improve significantly in 2021. It indicates that INCO is already efficient in managing expenses to maximize profitability in this case.



Figure 4.11: Net Profit Margin Comparison of INCO to Competitors

Sources: Author Analysis

INCO's net profit margin ratio was comparable to its operating profit margin ratio. From Figure 4.11, it shows that INCO's performance in net profit margin was beyond that of its competitors. Moreover, since 2019, INCO's net profit margin has experienced positive growth. While the other competitor experienced positive growth in the same year, INCO's net profit margin increased dramatically to 17.39% in 2021. This circumstance implies that INCO is more efficient than its competitor in generating net profit from revenue.

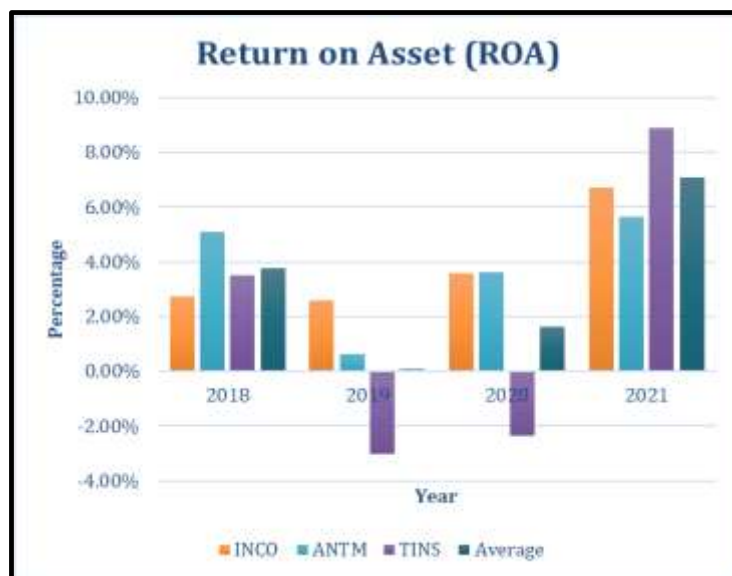


Figure 4.12: Return on Asset Comparison of INCO to Competitors

Sources: Author Analysis

In terms of return on assets ratio, INCO's position was quite average. Based on Figure 4.12, it demonstrates that for the last 4 years, INCO's return on assets has experienced positive growth. Furthermore, INCO's return on assets has always exceeded 2.5 over the



last four years. However, in 2021, when INCO's competitors have significant growth in return on assets, INCO comes in second place behind TINS with a 2.17% difference.



Figure 4.13: Return on Equity Comparison of INCO to Competitors
Sources: Author Analysis

Regarding the return on equity ratio, INCO’s performance was mediocre. That’s because, in 2018, INCO was in last place when compared to its competitors. However, in 2019-2020, INCO’s come in second place above TINS due to TINS' negative net profit. In addition, INCO comes in last compared to its competitor in 2021. Furthermore, the INCO graph has been gradually rising in the last 4 years, except in 2019, where there was a slight decrease.

5) *Marketability Ratio*

Market ratios relate the market value of a firm, as defined as their present stock price, to a variety of accounting figures (Gitman,2015). The metrics reflect how market participants assess the firm's risk and return performance. It often reflect, on a general basis, the common stockholders' assessment over all elements in the company's past performance as well as predicted potential performance. The marketability ratio is calculated using earnings per share and the price-to-earnings ratio.

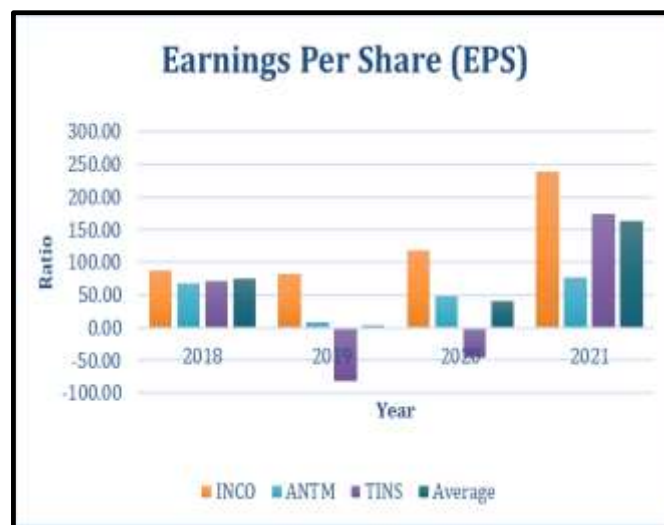


Figure 4.14: Earnings per Share Comparison of INCO to Competitors
Sources: Author Analysis



INCO has been the company with the greatest earnings per share compared to its rivals for the past four years. Therefore, INCO's earnings per share are always above the industry average. Over the past four years, the outstanding number of INCO shares has remained constant at 9,936,338,720. In addition, in 2021, INCO's earnings per share almost doubled from the previous year. Even though INCO's nickel matte production decreased by around 8.55% compared to the previous year, the increase in world nickel prices made INCO more profitable than the previous year.



Figure 4.15: Price to Earnings Comparison of INCO to Competitors
Sources: Author Analysis

Figure 4.15 shows the price to earnings ratio of INCO and its competitors. It demonstrates that INCO price to earnings ratio have decreased quite steadily every year following the increase in net profit since 2018. On the other hand, price to earnings ratio of ANTM were increased significantly due to small profit for that year. Alternatively, TINS had negative price to earnings ratio because in 2019 and 2020 its net profit were negative. This condition happens due to pandemic COVID-19 that affect its business operations.

5. SWOT ANALYSIS

SWOT analysis is a model for analyzing a company's competitive environment and formulating their business plan. SWOT analysis evaluates internal and external factors, as well as existing and upcoming possibilities. This research utilized SWOT analysis to help investors comprehend INCO's current situation.

Table-5.1: PT. Vale Indonesia Tbk SWOT Analysis

Strength	Weakness	Opportunities	Threat
<ul style="list-style-type: none"> The client channel of INCO is established in a long-term contract with certain shareholders. INCO has solid financial performance. INCO has good supporting facilities. 	<ul style="list-style-type: none"> INCO is dependent on a long term contract. INCO's product line has not expanded since its establishment. INCO have subsidiaries that dependent on INCO performance 	<ul style="list-style-type: none"> Low risk of new entrants in an existing industry Indonesia Downstream nickel processing Global Demand for Electric Vehicle 	<ul style="list-style-type: none"> INCO's mining operations depend on global fuel prices INCO's business operations dependent on foreign exchange rates. Government regulations have



<ul style="list-style-type: none"> INCO has experience in the nickel mining industry 		<ul style="list-style-type: none"> Doing partnership to adopt new technology 	an influence on INCO's business operations.
-----------------------------------------------------------------------------------------------------	--	---------------------------------------------------------------------------------------------	---------------------------------------------

6. PIOTROSKI F-SCORE

For further information regarding the company's that operating in the nickel mining industry in Indonesia, the author decided to provide with Piotroski F-Score analysis. Piotroski F-Score analysis was done for providing rough idea regarding financial condition of Nickel mining company in Indonesia.

Table-6.1: Summary of Piotroski F-Score

<i>Piotroski F-Score Breakdown.</i>	<i>PT. Vale Indonesia Tbk (INCO)</i>	<i>PT. Aneka Tambang Tbk (ANTM)</i>	<i>PT Timah Tbk (TINS)</i>
Profitability			
ROA	1	1	1
CFO	1	1	1
ΔROA	1	1	1
ACCRUAL	1	1	1
Leverage, Liquidity, Source of Funds			
ΔLEVER	0	0	1
ΔLIQUID	1	1	1
EQ_OFFER	1	1	1
Operating Efficiency			
ΔMARGIN	1	1	1
ΔTURN	1	1	1
TOTAL SCORE	8	8	9

According to the standard performance evaluation based on the Piotroski F-Score method, TINS ranks first with a score of 9. In contrast, INCO and ANTM each obtained a score of 8 since their long-term debt increased over the previous year. The majority of nickel mining businesses have a solid fundamental evaluation. Comparing INCO and its competitors in the nickel mining business, their fundamental performance ratings are comparable. Each firm has a value differential of 1. Thus, it can be assumed that the average company in the nickel mining industry still belongs to the group of healthy corporations. This is proved by a high F-Score value.



7. VALUATION CALCULATION

A. Relative Valuation Model

According to the standard performance evaluation based on the Piotroski F-Score method, TINS ranks first with a score of 9. In contrast, INCO and ANTM each obtained a score of 8 since their long-term debt increased over the previous year. The majority of nickel mining businesses have a solid fundamental evaluation. Comparing INCO and its competitors in the nickel mining business, their fundamental performance ratings are comparable. Each firm has a value differential of 1. Thus, it can be assumed that the average company in the nickel mining industry still belongs to the group of healthy corporations. This is proved by a high F-Score value.

1) Price to Earnings Method

Typically, the price-to-earnings (P/E) ratio usually utilized for determine the value of the owners' shares. The price-to-earnings ratio reflects at what price investors are willing to pay each dollar of earnings. This ratio demonstrates the level of investor optimism over the company's future performance.

Table-7.1: Price to Earnings Method

<i>Companies</i>	<i>Historical Data 2018</i>	<i>Historical Data 2019</i>	<i>Historical Data 2020</i>	<i>Historical Data 2021</i>	<i>Forecasted Period 2022</i>
PT. Vale Indonesia Tbk (INCO)	53.77	56.68	61.49	30.72	26.64
PT. Aneka Tambang Tbk (ANTM)	33.05	278.92	47.04	29.04	
PT Timah Tbk (TINS)	20.39	17.73	31.82	8.32	
PT. Vale Indonesia Tbk (INCO) Target Price/Share (IDR)					6,050.562

According to Table 7.1, INCO's PER value has been far above the average of its rivals over the last four years, with the exception of 2019, when ANTM's PER value has significantly increased. However, for the past four years, TINS PER value has always been below the industry average. In addition, the projected PER for 2022 indicates that INCO's PER is 17.40% higher than the average of nickel mining companies in 2021. Consequently, the target price calculated using PER is IDR 6,051 per share.

2) Price to Book Value (PBV) Method

Price to Book Value (PBV) is a ratio that helps investors determine the intrinsic value of a company, allowing them to determine if the present price is reasonable. If a firm's PBV is less than 1, the market price of the company is undervalued, and investors should consider purchasing. The PBV of INCO is consistently lower than the average PBV of its competitors in the nickel mining business. Nonetheless, there is a downward target price of 2.03% based on the projected PBV on the projected income statement and balance sheet for 2022, and the target price/share of INCO is IDR 7,230/share.

Table-7.2: Price to Book Value Method

<i>Companies</i>	<i>Historical Data 2018</i>	<i>Historical Data 2019</i>	<i>Historical Data 2020</i>	<i>Historical Data 2021</i>	<i>Forecasted Period 2022</i>
PT. Vale Indonesia Tbk (INCO)	1.73	1.68	1.61	1.51	1.98
PT. Aneka Tambang Tbk (ANTM)	2.93	2.98	2.84	2.59	
PT Timah Tbk (TINS)	1.76	2.06	2.19	1.72	
PT. Vale Indonesia Tbk (INCO) Target Price/Share (IDR)					7,229.97



3) *EV/EBITDA Method*

Using a firm's potential to produce operational income or cash flow from operations, the Enterprise Value to Earnings Before Interest, Taxes, Depreciation, and Amortization (EV/EBITDA) ratio determines if a company has a high or low cost. A small EV/EBITDA ratio indicates that the stock price of the firm is relatively acceptable. The high or low EV/EBITDA ratio is determined by comparing it with the EV/EBITDA ratios from comparable companies in the same industry or field.

Table-7.3: EV/EBITDA Method

<i>Companies</i>	<i>Historical Data 2018</i>	<i>Historical Data 2019</i>	<i>Historical Data 2020</i>	<i>Historical Data 2021</i>	<i>Forecasted Period 2022</i>
PT. Vale Indonesia Tbk (INCO)	9.63	11.03	12.64	7.82	9.14
PT. Aneka Tambang Tbk (ANTM)	8.36	12.49	17.31	10.69	
PT Timah Tbk (TINS)	9.11	21.66	17.10	5.47	
PT. Vale Indonesia Tbk (INCO) Target Price/Share (IDR)					6,275.47

Table 7.3 demonstrates that INCO's EV/EBITDA figure was frequently below average. In reality, the EV/EBITDA ratio changes for all firms in the nickel mining industry. INCO has a delta of -14.33% compared to the industry average in 2021 when predicting outcomes for 2022, resulting in a forecasted share price of IDR 6,275 in 2022.

B. Absolute Valuation Model

The absolute valuation methodology typically utilized to assess the intrinsic value for particular asset which could be evaluated to the asset's market price (Damodaran, 2012). In stock valuation, the absolute valuation model is considered a fundamental analysis. The author of this research calculates the intrinsic value of INCO using the discounted cash flow method to evaluate if the stock price of INCO on the market is undervalued or overvalued. Prospective INCO investors can now determine whether to invest in INCO based on these results.

1) *Financial Statement Projection*

The basis of discounted cash flow calculation is the company's future financial statement projections. In this final project, the author will forecast the income statement and balance sheet for the next five years. The income statement is a financial summary that displays the profitability of a business over a specific time frame. It is necessary to forecast the company's future income statement in order to calculate discounted cash flows. This research's assumptions are derived from historical revenues from the five prior years. Table 7.4 shows the assumptions used for future growth calculations.

Table-7.4: Assumption for Income Statement Projection

<i>Account</i>	<i>Forecast 2022</i>	<i>Forecast 2023</i>	<i>Forecast 2024</i>	<i>Forecast 2025</i>	<i>Forecast 2026</i>	<i>Remarks</i>
Revenue	11.2%	11.2%	11.2%	11.2%	11.2%	Historical Average
Cost of Revenue	-63.9%	-63.9%	-63.9%	-63.9%	-63.9%	Percentage of Revenue
G&A Expenses	1.29%	1.19%	1.13%	1.00%	1.01%	5 Years Moving Average
Other Expenses	2.03%	2.00%	2.01%	1.96%	1.83%	5 Years Moving Average
D&A Expenses	17.91%	17.47%	17.65%	17.80%	17.47%	5 Years Moving Average



Other Income	0.53%	0.63%	0.56%	0.58%	0.51%	5 Years Moving Average
Finance Income	0.50%	0.51%	0.50%	0.48%	0.45%	5 Years Moving Average
Interest Expenses	0.53%	0.73%	0.62%	0.57%	0.59%	5 Years Moving Average
Tax Expenses	22.00%	22.00%	22.00%	22.00%	22.00%	Corporate Tax Rate

Table 7.4 demonstrates the growth rate utilized for income statement projections. The revenue projection is based on the average five-year revenue growth of the company. Due to shifting worldwide nickel prices and external factors that might influence global nickel prices, the author employs the historical average. The author thus considers this average to be the most acceptable assumption. While dissimilar from revenue, INCO's cost of revenue increase over the following five years is measured from comparing the company's expected cost of revenue to the company's 2021 revenue. The fact that the author utilized a portion of the revenue generated in 2021 as a result of shifting fuel prices, which the company cannot fully control, suggests that the company lowered fuel consumption expenses by implementing a number of efficiency improvement efforts. Lastly, for other accounts utilizing a 5-year moving average, the percentage difference between the median and the moving average is minor owing to the growth assumptions reached when using the previous 5-year average.

The author forecasts the entire income statement prediction after gathering the necessary growth value. The projection outcomes for the projected income statement are shown in the Table 7.5.

Table-7.5: PT. Vale Indonesia Tbk Income Statement Projection

<i>Account (In Thousand USD)</i>	<i>Historical Data 2021</i>	<i>Forecast Period 2022</i>	<i>Forecast Period 2023</i>	<i>Forecast Period 2024</i>	<i>Forecast Period 2025</i>	<i>Forecast Period 2026</i>
Net Sales	953,174	1,064,070	1,156,441	1,280,026	1,458,083	1,621,798
Cost of Goods Sold	(560,504)	(695,137)	(741,923)	(808,250)	(916,518)	(1,035,862)
Gross Profit	392,670	368,933	414,518	471,776	541,565	585,936
G&A Expenses	(4,204)	(13,736)	(13,747)	(14,444)	(14,624)	(16,387)
Other Expenses	(10,750)	(21,590)	(23,179)	(25,784)	(28,644)	(29,646)
Depreciation & Amortization	(157,306)	(190,617)	(202,068)	(225,910)	(259,510)	(283,288)
Other Income	2,614	5,654	7,244	7,113	8,505	8,339
Total Operating Profit	223,024	148,644	182,768	212,751	247,292	264,954
Finance Income	2,714	5,327	5,932	6,379	6,944	7,372
Interest Expenses	(5,093)	(7,725)	(7,206)	(7,335)	(8,567)	(9,874)
EBIT	220,645	146,245	181,494	211,795	245,669	262,453
Tax Expenses	(54,848)	(32,174)	(39,929)	(46,595)	(54,047)	(57,740)
Net Profit	165,797	114,071	141,565	165,200	191,622	204,713



The financial state of a corporation is represented through their balance sheet. The balance sheet provides an essential part of the accounting report. Prior to obtaining an absolute valuation employing a discounted cash flow approach, it is required, as with the income statement, to examine a projected balance sheet. The author's assumptions are likewise based on five years of historical data for projecting the balance sheet projection. After completing the assumptions on the variables to be utilized, the balance sheet projections for the coming years are generated. The projected results for the balance sheet are shown in the Table 7.6.

Table-7.6: PT.Vale Indonesia Tbk Balance Sheet Projection

<i>Account (In Thousand USD)</i>	<i>Historical Data 2021</i>	<i>Forecast Period 2022</i>	<i>Forecast Period 2023</i>	<i>Forecast Period 2024</i>	<i>Forecast Period 2025</i>	<i>Forecast Period 2026</i>
Cash	508,327	433,846	471,508	521,896	594,494	661,245
Account Receivables	101,987	145,994	158,668	175,624	200,055	222,517
Inventories	162,023	199,050	209,272	234,539	265,422	292,986
Prepaid Taxes and Payment Advances	64,239	114,327	124,252	137,530	156,661	174,251
Total Current Asset	836,576	893,217	963,699	1,069,590	1,216,632	1,350,998
Other non Current Asset	117,289	187,563	201,567	222,604	242,039	263,874
Fixed Asset	1,518,963	1,996,749	2,170,086	2,401,997	2,736,124	3,043,339
Total Non Current Asset	1,636,252	2,184,313	2,371,653	2,624,600	2,978,164	3,307,213
Total Asset	2,472,828	3,077,529	3,335,353	3,694,190	4,194,795	4,658,212
Account Payables	122,244	132,541	144,047	159,441	181,620	202,012
Accruals	19,842	24,892	27,053	29,944	34,109	37,939
Taxes Payable	1,973	2,495	2,711	3,001	3,419	3,802
Short Term Debt	21,664	81,610	88,695	98,174	111,830	124,386
Current Portion of LT.Debt	2,707	6,395	6,950	7,693	8,763	9,747
Total Current Liability	168,430	247,934	269,457	298,253	339,741	377,887
Long-Term Debt	149,937	196,385	213,433	236,242	269,104	299,320
Total Liabilities	318,367	444,319	482,890	534,495	608,845	677,207
Common Stock	414,173	554,742	593,563	659,393	737,846	813,113



Retained Earnings	1,740,288	2,078,469	2,258,900	2,500,302	2,848,104	3,167,892
Total Equity	2,154,461	2,633,211	2,852,463	3,159,695	3,585,950	3,981,005
Total Liability & Equity	2,472,828	3,077,530	3,335,352	3,694,190	4,194,795	4,658,212
Balance Check	0	0	0	0	0	0

2) *Discount Rate Calculations*

The discount rate is the interest rate frequently utilized to assess the current value of future cash flows from an investment. According to the time value of money theory, future cash flows must be discounted since future income will be less valuable than present money. Therefore, there will be an inverse relationship involving the net present value and discount rate. The discount rate increases as the net present value decreases, and vice versa. The author analyzes the discount rate using the weighted average cost of capital (WACC).

Prior to computing the WACC value, various calculation variables must be identified. Before calculating the WACC, it is required to determine the cost of debt and the cost of equity. The data and variables required to calculate the WACC value are shown in Table 7.7. Furthermore, calculating the WACC is possible using data gathered from a variety of sources. In the analysis of this research, the cost of debt is determined first, following by the cost of equity as well as WACC calculation.

Table-7.7: Required Variables for Discount Rate Calculation

No	Variables	Value	Remark	Source
1	Beta Stock (β)	1.327%	Pefindo 30 June 2022	Pefindo
2	Tax Rate	22%	Corporate Tax Rate	INCO Financial Statement
3	Company Default Spread	0.67%	INCO Interest Coverage	Damodaran
4	Risk Free Rate	6.89%	Indonesia 10Y Government bond	phei.co.id
5	Country Default Spread	1.88%	Government Sovereignty	Damodaran
6	Equity Risk Premium	6.12%	Equity Risk Premium (Jan 2022)	Damodaran
7	Country Risk Premium	1.62%	Country Risk Premium (Jan 2022)	Damodaran

In the discounted cash flow (DCF) method, the cost of debt is the discount rate used to calculate the present value of a company's future loan payments. This rate is used in the discounted cash flow approach to determine the present value of a company's expected debt payments. The cost of debt is an essential element of the DCF method, since it reflects the risk associated with a company's debt. Larger levels of debt and/or lower credit scores typically result in a higher cost of debt, as investors want a higher return rate to compensate for the increased likelihood of default. Thus, the calculation of the cost of debt in this research can be seen below:

$$\text{Cost of Debt} = \text{Risk Free Rate} + \text{Country Default Spread} + \text{Company Default Spread}$$

$$\text{Cost of Debt} = 6.89\% + 1.88\% + 0.67\%$$

$$\text{Cost of Debt} = 9.44\%$$

The cost of equity represents the needed rate of return for shareholders to contribute in a company. It is a significant input in the discounted cash flow (DCF) method used to assess the intrinsic value of an investment. In the DCF method, the cost of equity is the



discount rate employed to determine the present value of future cash flows. It symbolizes the risk associated with the investment and the value of time. Consequently, the calculation of the cost of equity in this research is presented below:

$$\text{Cost of Equity} = \text{Risk Free Rate} + (\beta \times \text{Equity Risk Premium})$$

$$\text{Cost of Equity} = 6.89\% + (1.327 \times 6.12\%)$$

$$\text{Cost of Equity} = 15.01\%$$

The weighted average cost of capital (WACC) is a financial indicator that reflects the average cost of all invested capital in a firm, including debt and equity. It is utilized as a discount rate in discounted cash flow (DCF) analysis, which refers to a method for determining the true value of an investment or project by predicting the projected future cash flows and discounting them back to their present value using the WACC. Table 7.8 Provide the required variable for the WACC calculation. Furthermore, Below Table 7.8, the following WACC computation may be found

Table-7.8: Required Variables for WACC Calculation

<i>Variables</i>	<i>Value</i>
INCO's Debt (USD)	318,367,000
INCO's Equity (USD)	2,154,461,000
INCO's Total Debt and Equity (USD)	2,472,828,000
Weight of Debt	12.87%
Weight of Equity	87.13%

$$\text{WACC} = [(\text{Weighted of Equity} \times \text{Cost of Equity}) + (\text{Weight of Debt} \times \text{Cost of Debt})] \times (1 - \text{Tax Rate})$$

$$\text{WACC} = [(87.13\% \times 15.01\%) + (12.87\% \times 9.44\%)] \times (1 - 22\%)$$

$$\text{WACC} = (14.29\%) \times (78\%)$$

$$\text{WACC} = 11.15\%$$

3) *Discounted Cash Flow*

The objective of the Discounted Cash Flow (DCF) technique of absolute valuation is to determine the intrinsic value of a firm. The DCF approach employs future cash flows that are predicted based on the company's historical data and estimations of future events and scenarios. Indirectly, DCF will assist investors and potential investors in determining if a company's market price is undervalued or overvalued.

The assumptions that will be utilized to do the discounted cash flow analysis are displayed in Table 7.9. The author determines the growth rate assumption for this research based on the average growth of the global nickel industry and the growth of the nickel industry in Indonesia. In addition to the previously mentioned calculation data and INCO's past financial information, the author established the remaining assumptions.

Table-7.9: Assumption Used for DCF Calculations

<i>Assumption</i>	
Tax Rate	22%
Discount Rate	11.15%
Growth Rate	6.75%
EV/EBITDA Multiple	7.8x



Transaction Date	31/12/2021
Fiscal Year End	31/12/2022
Current Price	USD 0.47 / IDR 7,325
Shares Outstanding	9,936,338,720
Debt (USD)	318,367,000
Cash (USD)	508,327,000
Capex (USD)	173,000,000

The projection of INCO's financial statements for the next years is established on the company's five-year financial history. Then, free cash flow to the firm (FCFF) becomes one of the main important factors in DCF analysis. The FCFF will describe the condition and quantity of available cash flow from operational operations. FCFF is possible by projecting financial projections previously. Since FCFF needs values from EBIT, depreciation and amortization, working capital, and capital expenditures, which numbers are taken from the financial statement forecast, these values must be derived from the financial statement projection.

Discounted Cash Flow (in USD)	Entry	2022	2023	2024	2025	2026	Exit
Date	31/12/2021	30/06/2022	30/06/2023	30/06/2024	30/06/2025	30/06/2026	30/06/2026
Time Periods		0	1	2	3	4	
EBIT		146,245,000	181,494,000	211,765,000	245,669,000	262,453,000	
Less: Cash Taxes		32,173,900	39,928,680	46,588,300	54,047,180	57,739,660	
Plus: D&A		190,617,000	202,068,000	225,910,000	259,591,000	283,288,000	
Less: Capex		180,097,000	195,731,410	216,648,630	246,785,340	274,464,650	
Less: Changes in NWC		(70,737,000)	(11,390,000)	(26,830,000)	(33,134,000)	(29,634,000)	
Unlevered FCF		195,328,100	159,291,910	201,268,070	237,561,480	243,170,690	
(Entry)/Exit	(4,480,119,198)						5,083,673,578
Transaction CF		97,664,050	159,291,910	201,268,070	237,561,480	243,170,690	5,083,673,578
Transaction CF	(4,480,119,198)	97,664,050	159,291,910	201,268,070	237,561,480	243,170,690	5,083,673,578

Figure 7.1: Free Cash Flow to Firm of PT. Vale Indonesia Tbk

Sources: Author Analysis

Figure 7.1 demonstrates that, assuming discounted cash flow for five years beginning in 2022–2026, the terminal value comes based on the earlier mentioned assumptions utilizing the Free Cash Flow to Firm that INCO will get is around 5 billion USD. After calculating free cash flow to the company, the author must calculate free cash flow to equity. This step is essential for comparing the company's present market value towards its intrinsic value, which in this situation is INCO. Free cash flow to equity is attained by determining the enterprise's market value. In this analysis, the price per share of INCO is assumed to be IDR 7,325 per share. The author evaluates its enterprise value of intrinsic value by measuring the NPV of the cash flow created by the FCFF results in Figure 7.1, which is added to the assumption of cash on hand and deducted from the assumption of company's debts.

Intrinsic Value		Market Value	
Enterprise Value	3,858,191,865	Market Cap	4,670,079,198
Plus: Cash	508,327,000	Plus: Debt	318,367,000
Less: Debt	318,367,000	Less: Cash	508,327,000
Equity Value	4,048,151,865	Enterprise Value	4,480,119,198
Equity Value/Share	\$ 0.41	Equity Value/Share	\$ 0.47
Equity Value/Share	Rp 6,349	Equity Value/Share	Rp 7,325



Rate of Return		
Target Price Upside	-13%	
Internal Rate of Return (IRR)	7%	
Market Value vs Intrinsic Value		
Market Value	\$ 0.47	Rp 7,325
Upside	\$ (0.06)	Rp (975.48)
Intrinsic Value	\$ 0.41	Rp 6,349

Figure 7.2: Intrinsic Value and Market Value Calculations of PT. Vale Indonesia Tbk
Sources: Author Analysis

Based on Figure 7.2, the discounted cash flow approach finishes with the measurement of the company's intrinsic value. The measurement is performed by combining the company's cash to its enterprise value, then deducting the company's debt. Based on author findings, each INCO share has an intrinsic value of IDR 6,349. Through DCF calculations, the market value assumption for INCO is IDR 7,325 per share, while the intrinsic value of INCO is IDR 6,349 per share. This indicates a downside of IDR 975 per share, or approximately -13% of the present stock price. Moreover, according to the technique, INCO's internal rate of return has been assessed to be 7%.

8. CONCLUSION

Several conclusions can be drawn from the analysis results of PT. Vale Indonesia Tbk's external and internal business environments:

1. **PT. Vale Indonesia Tbk (INCO) has strong financial performance**, according to the author's findings. Piotroski's F-Score analysis also shows that INCO has a similar score compared to its competitors, with an F-Score of 8. INCO also experienced positive growth in the last four years. During that time, the company was able to maintain its profitability despite the volatility of global nickel prices. During this time period, the company's ROA, ROE, and EPS consistently experienced growth in a positive way. Additionally, throughout this time period, INCO had less debt than its competitor, revealing that INCO did not rely on debt to operate its businesses.
2. The most influential determinant on financial performance, which in turn affects stock prices, is revenue. In addition, nickel matte sales account for the majority of INCO's revenue in 2021. It suggests that **INCO's income is reliant on the global nickel price**. In addition, INCO's share price is affected by how the corporation manages its assets and liabilities. The approach in which INCO manages assets, such as capital expenditures (Capex), manages working capital, and generates cash or cash equivalents has a significant impact on the determination of its intrinsic value. In estimating enterprise value, debt and cash management also play a significant part in determining the company's intrinsic or fair value.

Based on several valuation method which has been done, different result that shows how much the intrinsic value of INCO were obtained. The latest reference price that used on the calculation were IDR 7,325 per share. The results can be seen as follow:

1. Following the **Discounted Cash Flow (DCF)** approach of absolute valuation, each share of INCO is worth **IDR 6,349**. Using this approach, the INCO price is **overvalued by 13.3%** compared to its reference price.
2. Following the **Price to Earning Ratio (PER)** approach of absolute valuation, each share of INCO is worth **IDR 6,051**. Using this approach, the INCO price is **overvalued by 17.4%** compared to its reference price.
3. Following the **Price to Book Value (PBV)** approach of relative valuation, each share of INCO is worth **IDR 7,230**. Using this approach, the INCO price is **overvalued by 2%** compared to its reference price.
4. Following the **EV/EBITDA approach** of relative valuation, each share of INCO is worth **IDR 6,275**. Using this approach, the INCO price is **overvalued by 14.3%** compared to its reference price.

In each calculation technique, different assumptions and methods provide distinct outcomes. For example, under the approach technique employing PER, investors simply value the company's profitability. Nevertheless, it is obvious that INCO is overvalued compared to its reference values by the end of 2022. According to the findings that have been obtained, investors are feasible to invest in INCO if the market price is below target price within the range of the calculations that have been done. The price target for INCO is between IDR 6,051 and IDR 6,349



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