

Metal and Mineral Mining Firm's Equity Valuation in Indonesia Stock Exchange

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Abstract: The purpose of this research is to estimate the intrinsic values of the shares on the metal and mineral mining companies listed in IDX 2018 using Discounted Cash Flow - Free Cash Flow to Firm method and verifies the results with the relative valuation - PER and PBV methods. The sample of this research is the dominant industry players ANTM, INCO, and TINS. The valuation baseline was the analysis of the financial statements of those companies in the period 2013-2017 which was considered as the reference for the projection years 2018-2022. This research involved three scenarios namely pessimistic, moderate and optimistic, and the reference market price was on January 2, 2018. The analysis concluded that using DCF-FCFF the stock's price of ANTM was undervalued in all scenarios, while INCO and TINS were overvalued in all scenarios. The PER and PBV analysis found that all evaluated stocks within the industry range that mean the valuation result is correct. Hence, the conclusion of this research is to buy ANTM stocks and to sell INCO and TINS stocks.

1 INTRODUCTION

Investing in the capital market, especially stocks, has a high risk considering the characteristics of these financial instruments are high-risk and high-returns (Damodaran, 2006). Fundamental analysis is considered as one of the easiest ways to evaluate a company before investing. The main objective of the fundamental analysis is to examine the actual value of the company today by predicting future profits and risks to calculate the intrinsic value of a company's stock (Baresa et al., 2013).

Nickel price is predicted to experience a stronger trend in 2018. The main contributor to the positive trend is the increasing demand for battery raw materials. China's battery imports grew 26.88% year-on-year in the first quarter of 2018 (Haffiyan, 2018). Meanwhile, strengthening of the tin price is flat due to slowing sales of electronic goods, especially smartphones (Haffiyan, 2018). The projections for world smart telephone shipments from 2015 to 2022 are expected to be gentler (Atwal et al., 2018). However, Indonesia's tin and nickel export trend are still growing positively in the year from 2016 to mid-2018 (Pusat Data dan Informasi Kementerian Perdagangan, 2018).

Nickel and tin price trend could influence the stock price fluctuations and the level of risk and return in this industry. However, the researchers would not explore that hypothesis further. That symptom had brought the researchers to discover the stock trend in Metal and Mineral Sub-Sector in Indonesia.

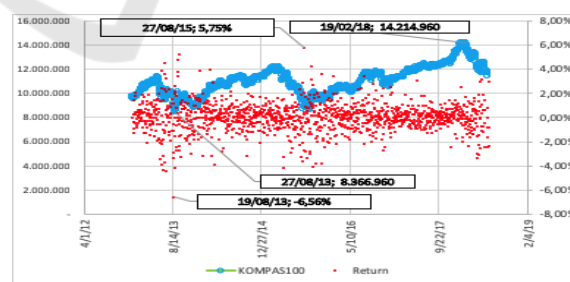


Figure 1: KOMPAS100 index trend and the risk/return January 2013 - June 2018

The stock price fluctuations and the level of risk and return in this sub-sector are shown in the initial analysis of the stock prices of the three sampled companies, ANTM, INCO, and TINS. The three companies were selected based on three purposive sampling criteria, namely, listed on the Indonesia Stock Exchange (BEI) mining sector - metal and

mineral mining sub-sector, listed on the KOMPAS100 index on the Indonesia Stock Exchange (IDX), and never suspended and actively transacted in The IDX is at least up to June-2018 Shares up to June 2018.

Based on Figure 1, we can see that in the period January 2013 to June 2018, overall the KOMPAS100 Index showed a positive growth trend. The highest KOMPAS100 index value occurred on February 19, 2018, at the value of 14,214,960, and the lowest value occurred on August 27, 2013, at the value of 8,366,960.

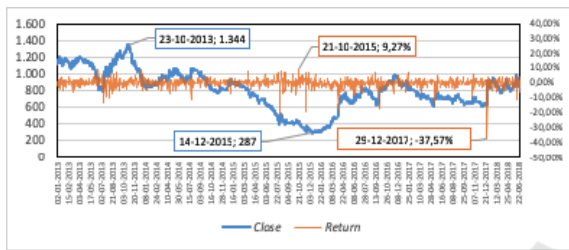


Figure 2: ANTM stock prices trend and the risk/return January 2013 - June 2018 (processed)

Further, in the same graph on the second axis, we can see other critical information, namely the risk and returns figure. From the chart, there were several high yield points, which occurred on August 27, 2015, at 5.7%, and the lowest yields that occurred on August 19, 2013, amounted to -6.5%. This phenomenon shows that a positive trend in stock price performance is not enough for us to decide an investment, risk and returns factors also need to be becoming another critical considerations of an investment.

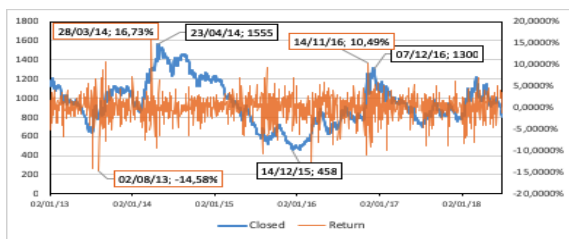


Figure 3: INCO stock prices trend and the risk/return January 2013 - June 2018 (processed)

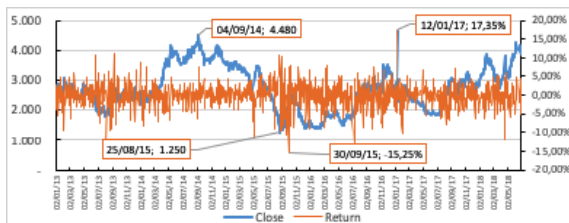


Figure 4: TINS stock prices trend and the risk/return January 2013 - June 2018 (processed)

In Figure 2, we can see that in the period of January 2013 to June 2018, the trend of the ANTM's shares tended to stagnate and decline until December 2017, but raised by around 50-100 points in the period January to June 2018. The lowest value was IDR 287 on December 14, 2015, and the highest value was IDR 1,344 occurred on October 23, 2013. Likewise, the rate of return, the highest occurred at the value of 9.27% on October 21, 2015, and the lowest occurred at the value of -37.57% on December 29, 2017.

In Figure 3, we can see that in the period January 2013 to June 2018, the INCO share's value also tended to be stagnant, but raised quite well in the last two years. The lowest value was IDR 1,250 on August 25, 2015, and the highest value was IDR 4,480 occurred on September 4, 2014. The second peak value occurred again at the value of IDR 4,250 on June 6, 2018. The rate of return, the highest occurred at the value of 17.35% on January 12, 2017, and the lowest occurred at the value of -15.25% on September 30, 2015.

In Figure 4, we can also see that in the period January 2013 to June 2018, the trend of TINS shares also tended to be stagnant, but experienced significant fluctuations in the last two years. The lowest value was IDR 458 on December 14, 2015, and the highest value of IDR 1,555 occurred on April 23, 2015. The second peak value occurred again at the price of IDR 1,300 on December 7, 2016. The highest return occurred at 16,73% on 28 March 2014, and the lowest occurred at -14.58% on 2 August 2013.

Based on the phenomenon mentioned earlier, the goal of this research is to analyze the intrinsic value of the stock prices of companies in the Metal and Mineral Mining Sub Sector listed in the KOMPAS100 Index on the Indonesia Stock Exchange in 2018, then to provide the recommendations to the investor whether these shares are worth buying, selling or holding after comparing the value of shares in the market with the intrinsic value obtained from this research.

2 LITERATURE REVIEW

2.1 Valuation Theory

In general, there are four approaches for valuing an asset (Damodaran, 2006).

a. Asset-Based Valuation

We estimate the current asset value owned by a company that is worthy of appreciation with this method (Damodaran, 2006). Furthermore, we can reveal two techniques in this method, namely using valuation when an asset needs to be liquidated now (liquidation value), or when we have to replicate or

replace the asset (replicate/replacement value) (Damodaran, 2006).

b. Discounted Cash Flow Valuation

In discounted cash flow (DCF) valuation, the value of an asset is the present value of the expected cash flows on assets, discounted at a rate that reflects the risk of these cash flows (Damodaran, 2006).

c. The Relative Valuation

Valuation of assets using relative valuation is the purpose of valuing an asset based on the similarity of the asset valued in the market (Damodaran, 2006). There are two primary consequences in relative valuation. First, when we will do a valuation using this method, the price of an asset must be standardized first. General practice is by converting it to multiples of frequently used variables, such as earnings, book value, or revenue. Second, looking for similar assets to compare (Damodaran, 2006).

d. Contingent Claim Valuation

In a contingent claim valuation (CCV), the option price model is used to assess an asset. A contingent claim or option is an asset that is paid only in certain contingency conditions, for example in the mechanism of a call option in the condition of the underlying asset more penetrating the agreed value, or put option mechanism if less than the agreed value (Damodaran, 2006).

With these valuation methods, we can estimate an intrinsic price, then, compared to the market price. If the intrinsic price is higher than the market price, that is mean the current market price is in an undervalued position, so it is worth buying. If the intrinsic price obtained is lower than the market price, then the stock price is in an overvalued position, so the stock should be sold. Moreover, if the intrinsic price is the same as the market price, then the stock price is in the position of fair-valued, so it is recommended to hold the stock (Damodaran, 2006).

Relative valuation is used to validate the DCF valuation results. The valuation results using this method must be compared between one company and another. One of the most popular approach in relative valuation is price earnings ratio (PER) (Aljifri and Ahmad, 2018). Before deciding to invest, it is necessary to know whether the PER value of a company is above or below the industry average. If it is smaller, then the PER value of the company is in an undervalued, so it is worth buying. Conversely, if it is higher than the industry average, then the stock is in an overvalued position, so it is worth selling. If the PER is equal to the value of the industry, then the stock is in a position fair-valued, and the shares should be held (Damodaran, 2006).

Another popular multiple is the Price Book Value approach (Aljifri and Ahmad, 2018). With the PBV, the reference is the book value of the company's shares, as reported in the audited financial statements.

Based on this theory, the best PBV is one, meaning that the market price is equal to the book valuation price. If it is smaller than one, the company's stock is in an undervalued position, so it is worth buying. Conversely, if it is higher than one, then the stock is in overvalued position, so it should be sold (Damodaran, 2006). However, since PBV is one approach of relative valuation, we also need to compare with the industry average as a baseline when making an investment decision using PBV.

2.2 Firm Value

The value of an investment is essentially the present value of cash flows obtained from the company resources management (Mohammad, 2016). The value of an investment in a company is closely related to the value of the company's shares (Baresa et al., 2013). Two main controls that determine the value of share, the first is the perception of investors, and the second is demand and fulfilment (demand and supply) (Damodaran, 2006). The stock price in the market (market price) does not necessarily reflect the real price of the company (Paramitha et al., 2014). The business conditions of the company will significantly influence the value of a company (Paramitha et al., 2014).

Meanwhile, the macro conditions, such as the political, economic, social conditions of the country strongly influences the company operation and the industrial conditions. Therefore, in addition to evaluating the company, it is essential to conduct an assessment of macroeconomic and industrial conditions in the country where the company is engaged in business activities (Paramitha et al., 2014).

The main objective of corporate financial management is to maximize company value. Financial policies, corporate strategies, and company values are mutually supportive (Damodaran, 2006). The positive growth of company value is an achievement desired by its owners because the increase in the value of the company is synonymous with the welfare of its owners as well (Zemba and Hendrawan, 2018).

2.3 Discounted Cash Flow

The Discounted Cash Flow (DCF) is a valuation method of an assets by assuming its present value's cash flows (cash flows) that can be generated by the asset, discounted at a specific ratio which represents the risk of cash flows (Damodaran, 2006). We can calculate the cash flow generated by an asset with following basic formula where $E(CF)$ is the

estimation of the cash flow, n this year of estimation, and r is the discounted rate (Damodaran, 2006).

$$\text{Value of asset} = \frac{E(CF_n)}{(1+r)^n} \quad (1)$$

The Discounted Cash Flow (DCF) method is divided into three models, i.e. Dividend Discounted Model (DDM), Free Cash Flow to Equity (FCFE), and Free Cash Flow to Firm (FCFF) (Damodaran, 2006).

2.3.1 Dividend Discounted Model

Dividend Discounted Model (DDM) is the longest Discounted Cash Flow model practiced (Damodaran, 2006). Many researchers are shifting from the DDM model because the results obtained from this model is overly conservative (Damodaran, 2006). The underlying principle of the DDM model is when investors buy shares in a public company, in general, they expect two benefits; first, the profit from dividends during the holding period, and the second is the profit from the increase in the share price itself at the end of the holding period. Because the expected stock price is determined by future dividends, the value of a stock can be reflected as the present value of dividends forever (Damodaran, 2006).

The following is an example of a formula that can be used to calculate the intrinsic value of shares using the DDM model in n years, assuming the revenue is in stable growth and the company pays dividends regularly.

$$\text{Stock price} = \frac{\text{Div}}{(1+r)^n} \quad (2)$$

2.3.2 Free Cash Flow to Equity

Free Cash Flow to Equity (FCFE) is the cash flow available after repayment of obligations to non-equity investors (interest obligations, debt repayment, and preferred dividend) has been fulfilled (Damodaran, 2006). Furthermore, there are several stages that must be done to estimate the cash flow that can be generated by a company to shareholders (Damodaran, 2006).

The first stage, each investment expenditure issued must be reduced first with net income (net income) from a company so that it can represent the cash outflows. It is then added with depreciation.

In the second stage, if there is an increase in working capital, it will reduce the cash flow available to shareholders. In the last stage, if the company gets new debt and debt that has been paid in the company's cash flow, then the principal debt payment represents cash out money, while the issuance of new debt will represent the money that enters.

Following is the formula for calculating FCFE values, where NWC is the net working capital.

$$\begin{aligned} \text{FCFE} = & \text{Net Income} \\ & - \text{Capex} \\ & + \text{Depreciation} \\ & - \Delta\text{NWC} \\ & + \text{Cash} \end{aligned} \quad (3)$$

2.3.3 Free Cash Flow to Firm

The Free Flow to Firm Cash (FCFF) is the amount of cash flow available to all investors in a company, including common stockholders, bondholders, or preferred-stockholders (Damodaran, 2006). The general calculation formula for getting a Free Cash Flow to Firm (FCFF) is as follows:

$$\begin{aligned} \text{FCFF} = & (\text{EBIT} \times (1-\text{Tax})) \\ & + \text{Depreciation} \\ & - \text{Capex} \\ & - \Delta\text{NWC} \end{aligned} \quad (4)$$

The value of the company is obtained by discounting the Free Cash Flow to Firm (FCFF) with the Weighted Average Cost of Capital (WACC) factor in this method (Damodaran, 2006). We can use the following formula to calculate the value of the company, where t is the year of calculation (Damodaran, 2006):

$$\text{Value of Firm} = \sum_{n=1}^t \frac{\text{FCFF}_t}{(1+\text{WACC})^t} \quad (5)$$

After getting the present value of the cash flow obtained from a particular scenario (FCFF) and discounted terminal value. Then, the two present values are summed to get the firm value or equity value (Damodaran, 2006). The formula that can be used to calculate company value using FCFF whose growth has stabilized in a given year, and continues to grow stably at the perpetual growth level of g is as follows (Damodaran, 2006). TV is the terminal value that will be discussed in the next section.

$$\text{FV} = \sum_{n=1}^t \frac{\text{FCFF}_t}{(1+\text{WACC})^t} + \frac{\text{TV}}{(1+\text{WACC})^n} \quad (6)$$

$$TV = \frac{FCFF_{n+1}}{(WACC - g_n)} \quad (7)$$

2.4 Cost of Capital

The cost of capital definition is the rate of return that becomes an return expectation when an investor put an investment in a capital market (Damodaran, 2006). In general, the expected rate of return is represented by the Weighted Average Cost of Capital (WACC) in the company value formula. The Weighted Average Cost of Capital (WACC) provides an illustration to investors that the capital cost of a company is a weighted average of the various costs contained in the company's capital structure (Damodaran, 2006).

WACC is a very important parameter when estimating the value of a company using the DCF model. Minor changes in WACC will result in major change in company value. The WACC is calculated by weighting the source of capital according to the company's financial structure and then multiplying it with the portion of their costs. The WACC calculation formula is as follows:

$$WACC = (\text{Equity ratio} \times \text{Equity rate}) + ((\text{Debt ratio} \times \text{Debt rate}) \times (1 - \text{tax})) \quad (8)$$

In the WACC calculation there are two main factors explained as follows:

a. Cost of equity

Definition of cost of equity (R_e) is the rate of return expected by the shareholder (equity) on his investment in a company (Damodaran, 2006). The formula to calculate the cost of equity (R_e) is as follows (Damodaran, 2006):

$$R_e = R_f + \beta(ER_m - R_f) \quad (9)$$

If the company distributes dividends regularly, alternative formula that can be used to calculate R_e is as follows (Damodaran, 2006):

$$R_e = \frac{DPS/P_0}{\text{Dividends Growth Rate}} \quad (10)$$

b. Cost of debt

Cost of debt (R_d) is the interest rate that must be paid by the company for its debt or external capital (Damodaran, 2006).

2.5 Terminal Value

The technical problem that often arises is how to determine the proxy that can represent the value of the company after an explicit projection period. For example, the company conducts financial report projections for five years. Terminal value provides an estimate of the amount of the estimated value of the company after the fifth year period. Terminal value is a proxy to simplify the calculation of company value after an explicit period (Damodaran, 2006).

One common method used to calculate proxy terminal values is the Gordon Growth method. The Gordon Growth method uses the potential for growth in calculating the proxy terminal value. This method is derived to two, namely: (1) Growing Free Cash Flow Perpetuity; and (2) Shortcut Growing Cash Flow Perpetuity (Damodaran, 2006).

a. Growing Free Cash Flow Perpetuity

This method assumes that free cash flow will grow continuously over a very long period of time, or forever, after passing an explicit projection period, when the growth rate is constant. The formula for Growing Free Cash Flow Perpetuity is as follows (Damodaran, 2006):

$$TV_t = \frac{FCFF_{t+1}}{WACC - g} \quad (11)$$

b. Shortcut Growing Free Cash Flow Perpetuity

This method is the same as the method of Growing Free Cash Flow Perpetuity whose terminal value is calculated from the expected free cash flow for the first year after the explicit projection period. The difference is that this method simplifies how to get FCF_{t+1} by assuming $FCF_{t+1} = FCF_t \times (1 + g)$, so that the formula is as below (Damodaran, 2006):

$$TV_t = \frac{FCFF_t \times (1 + g)}{WACC - g} \quad (12)$$

2.6 Relative Valuation

The easiest analogy for understanding relative valuation is if we are going to buy a 100m² type house, then we will compare the price of the similar type of house around it with the price of the house we will buy. With the relative valuation method, we value an asset based on the similarity of similar assets valued in the market (Damodaran, 2006).

There are several approaches that can be used to do a valuation of a company using the relative valuation method.

a. Price Earnings Ratio Approach

Price/Earnings (P/E) multiple analysis is considered as the king of relative valuation. It is computed as the ratio between the share price and earnings per share (EPS) or alternatively as market capitalization over total earnings. The multiple can be built in different ways, depending on the methodology used to select earnings (Massari et al., 2018):

$$PER = \frac{P_o}{EPS} \quad (13)$$

b. Price to Book Value Approach

Another approach that can determine the value of a stock in relative valuation method is to compare the stock market price to the book value per share (Damodaran, 2006). In ideal conditions, the market value of a stock must describe the value of the book (Damodaran, 2006).

The formula that can be used to determine price book value (PBV) is as follows (Damodaran, 2006):

$$PBV = \frac{P_o}{BV} \quad (14)$$

2.7 Building Research Assumptions

Uncertainty is an unpredictable part and reward of the valuation process, two things that are crucial are the times when we make a valuation of a company, and how long our valuations last until new information is found that affects the valuation validity. Information can be in the form of the specific information related to the company, and it can also be more general related to the sector in which the company operates, or more general market information, such as interest rates and general economic conditions (Damodaran, 2006).

Furthermore, the valuations can be wrong with several reasons that can be categorized into three groups as follows (Damodaran, 2006):

- a. Estimation uncertainty. Although the source of information used is indisputable, at the time of valuation, a valuator must convert raw information into inputs, and process it in a research model. An error in data processing or assessment that occurs at this stage can cause estimation errors.
- b. Firm-specific uncertainty. Estimates built when valuing a company can be completely wrong. A

company can in fact produce better or worse performance than our prediction, causing earnings and cash flows to be far different from our estimates (Abdullah et al., 2017).

- c. Macroeconomic uncertainty. When both of these things are in accordance with the estimation of a valuator, macroeconomic conditions can change unexpectedly. Interest rates can go up or down in certain situations, and general economic conditions can get better or worse. Changes in these macroeconomic conditions will affect the value of a company

2.8 Framework of Thinking

Stock price valuation analysis in this research was carried out by utilizing the Discounted Cash Flow (DCF) method Free Flow to Firm (FCFF) approach, then comparing the results with the relative valuation (RV) method to validate the estimates using the FCFF method. The validation using RV can minimize bias and assumptions error when doing valuations. RV is carried out with the Price Earnings Ratio (PER) and Price Book Value (PBV) approach by utilizing data that is already available in quarterly reports on the Indonesia Stock Exchange.

The basis of estimation utilizes company data samples taken in the last five years, namely from 2013 to 2017. The stock valuations using the Discounted Cash Flow (DCF) method require assumptions and projection determinations the condition of the company to produce free cash flow in the future and then calculate the present value (Neaxie and Hendrawan, 2017). Determination of assumptions and projections needs to be adjusted to specific scenarios because of uncertainty on the company condition in the future. The research uses three scenarios, namely optimistic conditions, moderate conditions, and pessimistic conditions (Neaxie and Hendrawan, 2017).

The scenarios can be determined based on information on environmental data and facts (Neaxie and Hendrawan, 2017). An optimistic condition is a condition that is considered as the highest growth condition of the company and seen from the difference in industrial growth and the target of company management (above the industry growth average). Moderate conditions are conditions where the most likely to occur is seen from the fundamental states of the company (the most likely conditions) whereas the pessimistic condition is the condition where the condition of the company is the worst (Neaxie and Hendrawan, 2017).

The optimistic condition will be calculated from the average growth of the industry plus the spread

between the average growth of the industry and the average growth of the company coupled with half of the spread of growth. While moderate conditions will be calculated from the average growth of the industry

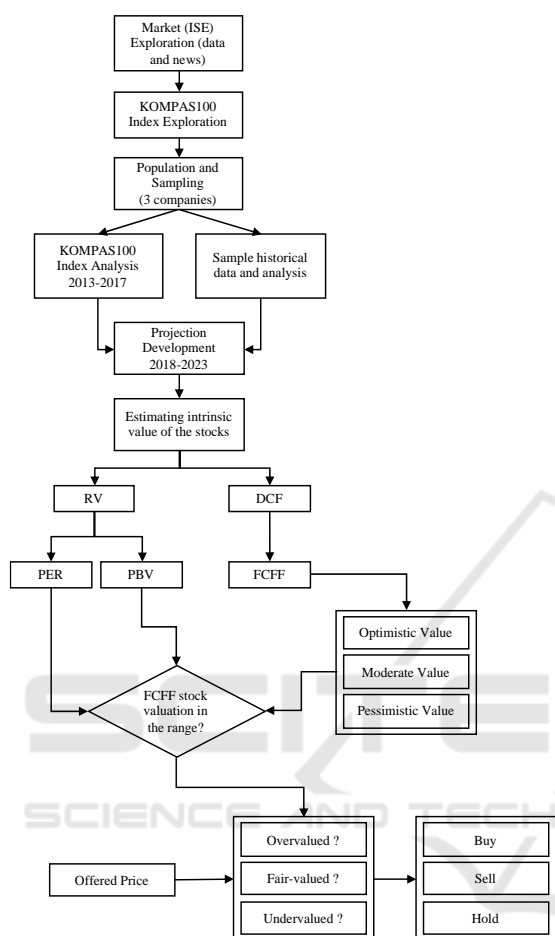


Figure 5: Research framework of thinking

The final process of valuation with Discounted Cash Flow (DCF) method is to obtain equity value or intrinsic value of the company which then gets the intrinsic value per share in each defined scenario. Then, the equity value obtained from the fundamental estimation is compared to the market price, so it can be concluded whether the stock price is fair-valued, undervalued, or overvalued (Damodaran, 2006).

After knowing the position of the stock price, we can advise whether the shares can be bought, held, or sold so that investors can maximize their investment to get the maximum profit.

The framework of thinking developed in this research follows the flow diagram in Figure 5.

3 PROBLEM DEFINITION

Based on the introduction and literature review in previous sections, the problem definition in this research are:

- What is the intrinsic value of ANTM, INCO, and TINS shares in the Indonesia Stock Exchange using the Discounted Cash Flow method with the Free Cash Flow to Firm (FCFF) approach? Also, What is the value of the Price Earnings Ratio (PER) and Price Book Value (PBV) in the optimistic scenario for 2018?
- What is the intrinsic value of ANTM, INCO, and TINS shares in the Indonesia Stock Exchange using the Discounted Cash Flow method with the Free Cash Flow to Firm (FCFF) approach? Also, What is the value of the Price Earnings Ratio (PER) and Price Book Value (PBV) in the moderate scenario for 2018?
- What is the intrinsic value of ANTM, INCO, and TINS shares on the Indonesia Stock Exchange using the Discounted Cash Flow method with the Free Cash Flow to Firm (FCFF) approach? Also, What is the value of the Price to Earnings Ratio (PER), and Price Book Value (PBV) in the pessimistic scenario for 2018?
- What recommendations can this research give to the investors after knowing the share's intrinsic value, PER and PBV of these companies in those three scenarios? Is it sold, bought or held?

4 METHODOLOGY / APPROACH

This research took a quantitative descriptive approach and aimed to provide an up-to-date description of the fair price of sampled company stocks. Quantitative descriptive research is a type of research giving a deeper picture of the present situation (Zemba and Hendrawan, 2018). The fair price reference in this research is the intrinsic stock price obtained from the valuation techniques used in this research.

The research variable used in this study is the intrinsic value of shares based on the company's fundamental value (firm value). Then the variables will be calculated using the Discounted Cash Flow

(DCF) method Flow to the Firm Free Cash (FCFF) approach, and Relative Valuation approaches with Price Earnings Ratio (PER), Price Book Value Ratio (PBV) approaches. The measurement scale used to measure the research variable is the ratio measurement scale (Zemba and Hendrawan, 2018).

The sampling technique used by researchers was purposive sampling technique. The purposive sampling technique is a sampling selection technique that selects a specific sample intentionally by the researcher because only the sample represents or can provide information to answer the research problem statements (Sekaran, 2003).

The criteria of the purposive sampling technique in this research are as follows:

- a. Shares in the Indonesia Stock Exchange (IDX) mining sector in the metal and mineral mining sub-sector,
- b. Shares listed on the KOMPAS100 index on the Indonesia Stock Exchange (IDX),
- c. Active shares up to June 2018 on the Indonesia Stock Exchange (IDX) and are not suspended.

From each of these criteria, the companies that become the population are obtained and the sample as follows:

- a. Based on the first criteria acquired nine companies as follows:
 1. Aneka Tambang Tbk.
 2. Cita Mineral Investindo Tbk.
 3. Cakra Mineral Tbk.
 4. Central Omega Resource Tbk.
 5. Vale Indonesia Tbk.
 6. Merdeka Copper Gold Tbk.
 7. J Resource Asia Pacific Tbk.
 8. Timah Tbk.
 9. Kapuas Prima Coal Tbk.
- b. Based on the second criteria, three companies were sampled, namely Aneka Tambang Tbk., Vale Indonesia Tbk., And Timah Tbk. The reference used in determining the companies that enter KOMPAS100 is the announcement of the Indonesia Stock Exchange regarding companies coming to the KOMPAS100 Index Number Peng-00698 / BEI.OPP / 07-2018, dated July 25, 2018, which is valid from August 2018 to January 2019.
- c. Based on the data available on the website www.duniainvestasi.com daily transaction data for these three companies complete the observation period January 1, 2013, to June 30, 2018, which means that the three companies never experience the suspension throughout the period of data collection

The type of data used in this research is the secondary data types, such as company financial

statements, Indonesia Stock Exchange, World Stocks, and Yahoo Finance. Secondary data is supporting data obtained from other sources.

The data used in this research are secondary data originating from the published and audited financial statements historically in the last five years of the sample companies, i.e., from January 2013 to December 2017. The five-year historical data of the KOMPAS100 index is taken from Yahoo Finance.

4.1 DCF-FCFF Share Value Approach

Estimating the share's intrinsic value stages using the Discounted Cash Flow (DCF) - Free Cash Flow to Firm (FCFF) approach is as follows (Damodaran, 2006):

- a. Classify the historical data as the basis for projection

In this stage data classification from financial statements and company annual reports is in the form of sales data (revenue), the percentage of operating expenses (EB), depreciation and amortization costs (DA), EBIT, tax costs, capital expenditure, and net working capital. The data was taken in the range from 2013 to 2017.

Based on the historical data, we can get the average data percentage (%) on revenue. That leads us to its cost behavior. The cost behavior is used as a reference for projecting over the next five years, namely 2018-2022.

- b. Conduct projections and analysis of financial statement ratios

The basis of future financial statement projections is taken from financial statement data in the past. So that conducting company valuation involves elements of forecasts, estimates, and assumptions.

- c. Calculating the free cash flow

After projecting the financial components that form the EBIT, such as sales, costs, and depreciation/amortization, then calculate FCFF using formula 4.

- d. Calculating the estimated cost of capital

The next is determining the discount. In this approach, the discount rate used is WACC. WACC is calculated based on the proportion of the company's financing sources (equity and debt). WACC is calculated using formula 8.

- e. Figuring Value Terminals

In this research, the authors assume that growth is constant, so the equation that can be used is formula 7 or 11.

- f. Calculating cash flows from FCFF and Terminal Value

The next step is to calculate the projection of free cash flows until 2021, and the cash flow of the terminal value assuming the company has a constant growth in 2022. Cash flow projections in this research used formulas 6.

- g. Calculating the Enterprise Value
 Furthermore, the enterprise value is obtained from the sum between the number of FCF present values from 2018 to 2021 plus the present value of the terminal value.
- h. Calculating the company's Equity Value
 The value of equity is obtained using the value of the company or enterprise value reduced by the amount of debt held, minus the ownership of the minority company, and summed by the amount of cash carried (Antwi et al., 2012).
- i. Calculating the intrinsic value of the stock
 We need to divide the equity value with the number of shares outstanding to get the intrinsic value of the stocks. The intrinsic value per share will be different depending on the three scenarios of predetermined conditions (optimistic, moderate, pessimistic) (Zemba and Hendrawan, 2018).
- j. Assessing and providing recommendations
 After getting the intrinsic value, the value of the stock needs to be compared with the stock price in the evaluation period. The results of this comparison will conclude that the value of shares is in an undervalued, fair-valued, or overvalued condition. From these conditions, the researcher will advise investors to buy, hold, or sell the evaluated shares.

4.2 PER Approach

This method uses the value of earnings to estimate intrinsic value. The Price to Earnings Ratio (PER) method is also called the multiplier method because investors will count the multiplier value of earnings reflected in the stock price. Thus, the PER method describes the ratio or comparison between stock prices and earnings per share of the company (Damodaran, 2006).

The higher the PER value, the smaller the profit for each share, because market prices are considered to be increasingly expensive. Conversely, the lower the PER value indicates the higher the benefit gained for each share since the price is considered cheaper (Damodaran, 2006).

Table 1: Stock Valuation Based on PER Value

PER > Average PER of Industry	Overvalued
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PER < Average PER Industry	Undervalued
PER = Average PER Industry	Fair-valued

The PER value of a share of 5 means that the return on investment is five years, or investors will get a return of twenty percent each year. Meanwhile, if the PER value is 10, then the return on invested investment is ten years, equivalent to a gain of ten percent per year. So, the higher the PER of a stock, the worse it is because the profit per share is relatively smaller (Damodaran, 2006).

The stages of estimating the PER value based on the intrinsic value of shares obtained from the DCF estimation are as follows (Zemba and Hendrawan, 2018):

- a. Calculate Earnings per Share (EPS) using a formula

$$EPS = EAT / \text{Number of Shares} \quad (15)$$

- b. Calculating PER using a formula

$$PER = \text{Share Intrinsic Value} / \text{EPS Price} \quad (16)$$

Table 2: Investment Decisions based on Stock Assessment Results

Stock price position	investment decision
Undervalued	Buying because it is possible prices will rise
Overvalued	Selling because it is likely prices will fall
Correctly valued	Hold (wait and see)

The next step is to compare the PER value obtained with the industry average. Table 1 provides an overview of stock positions if assessed based on the estimated PER. Investment decisions based on PER analysis is as shown in Table 2.

4.3 PBV Approach

The steps that must be taken to determine the position of the stock are in an undervalued, fair valued or overvalued position on the Price Book Value method (PBV) is quite simple. Ideally, the stock market price compared to the book value of its assets will approach one. Stocks that have a low price/book value ratio should be purchased to obtain a higher level of return at a certain level of risk (Damodaran, 2006).

PBVs that have a value below or close to one is considered good by investors, but PBV that has a value above one means classified as expensive (overvalued). However, PBVs that have high value still can rise if the company has excellent performance and business processes. Business

prospects can be seen from how high the profits that can be produced by the company. Investors can see the amount of Return On Equity to know the company's ability to generate profits based on owned capital (Damodaran, 2006).

Further, since the native of relative valuation, we need to also consider the average PBV of industry to determine the position of evaluated shares in the market. Therefore, below is the guideline for the investors to determine the share position based on PBV (Neaxie and Hendrawan, 2017).

- a. If $PBV > \text{industrial PBV}$, then the stock is in an overvalued position
- b. If $PBV = \text{industrial PBV}$, then the stock is in a fair-valued position
- c. If $PBV < \text{industrial PBV}$, then the stock is undervalued

5 ANALYSIS AND RESULT

The historical data were derived from the company's financial reports from 2013 - 2017 and in further taken as the reference for the free cash flow calculation. The projection of free cash flow to the firm is based on the cost behavior of the historical data in 2013 - 2017 for the projections of 2018-2022.

In this research, we generated three scenarios of projected corporate revenue growth based on industry analysis namely the pessimistic, moderate, and optimistic scenarios. A pessimistic scenario is a scenario where the company's growth is the same as industrial growth. The moderate scenario is a scenario where the company's growth is industrial growth plus the company's historical growth difference to industrial growth. An optimistic scenario is a scenario where the company's growth is industrial growth plus the company's historical growth difference to industrial growth, then added half of the difference (Neaxie and Hendrawan, 2017).

The pessimistic scenario is built on the assumption of consistent revenue growth of 2.16% per year per the average industrial growth. The moderate scenario was constructed with the assumption of revenue growth of 5.15% for ANTM, 3.19% for INCO, and 3.52% for TINS. The three companies are assumed to experience revenue growth of 2.16% at the end of the year of analysis.

The optimistic scenario is built on the assumption of revenue growth of 6.64% for ANTM, 3.71% for INCO, 4.20% for TINS. The three companies are assumed to experience revenue growth of 2.16% at the end of the year of analysis.

5.1 DCF-FCFF Valuation Results

The stock valuation using DCF-FCFF method in this research resulted in the share's intrinsic value as listed in Table 3.

Table 3: DCF-FCFF Valuation Results

Company	Scenario	Intrinsic Value	Opened Price 2 Jan 2018	Analysis
ANTM	Pessimistic	IDR 644	IDR 635	Undervalued
	Moderate	IDR 735	IDR 635	Undervalued
	Optimistic	IDR 784	IDR 635	Undervalued
INCO	Pessimistic	IDR 2,376	IDR 2,920	Overvalued
	Moderate	IDR 2,455	IDR 2,920	Overvalued
	Optimistic	IDR 2,496	IDR 2,920	Overvalued
TINS	Pessimistic	IDR 568	IDR 780	Overvalued
	Moderate	IDR 611	IDR 780	Overvalued
	Optimistic	IDR 633	IDR 780	Overvalued

5.2 PER Valuation Results

The stock valuation using relative valuation method with Price Earnings Ratio (PER) approach resulted in the PER values as listed in Table 4. This research used the average PER of the industry from Q1 Statistic Report of Indonesia Stock Exchange.

Table 4: PER Valuation Results

Company	Scenario	PER Result	PER Industry Q1-2018	Analysis
ANTM	Pessimistic	115.65	25.62	Overvalued
	Moderate	122.52	25.62	Overvalued
	Optimistic	126.25	25.62	Overvalued
INCO	Pessimistic	49.02	25.62	Overvalued
	Moderate	50.06	25.62	Overvalued
	Optimistic	50.61	25.62	Overvalued
TINS	Pessimistic	11.86	25.62	Undervalued
	Moderate	12.46	25.62	Undervalued
	Optimistic	12.77	25.62	Undervalued

5.3 PBV Valuation Results

The stock valuation using relative valuation method with Price Book Value (PBV) approach resulted in the PBV values as listed in Table 5. This research also used the average PBV of the industry from Q1 Statistic Report of Indonesia Stock.

Table 5: PBV Valuation Results

Company	Scenario	PBV Valuasi	PBV Industry Q1-2018	Analysis
ANTM	Pessimistic	0.84	3.55	Undervalued
	Moderate	0.96	3.55	Undervalued
	Optimistic	1.02	3.55	Undervalued
INCO	Pessimistic	0.96	3.55	Undervalued
	Moderate	0.99	3.55	Undervalued
	Optimistic	1.01	3.55	Undervalued
TINS	Pessimistic	0.70	3.55	Undervalued
	Moderate	0.75	3.55	Undervalued
	Optimistic	0.78	3.55	Undervalued

6 CONCLUSIONS

The conclusions of this research are as follows:

- a. Based on the analysis carried out on the optimistic scenario, it can be concluded that the intrinsic value of ANTM shares is IDR 784 with a PER value of 126.25 and a PBV value of 1.02. The intrinsic value of INCO shares is IDR 2,496 with a PER value of 50.61 and PBV at a value of 1.01. The intrinsic value of TINS shares is IDR 633 with a PER value of 12.77 and PBV at a value of 0.78.
- b. Based on the analysis carried out in the moderate scenario it can be concluded that the intrinsic value of ANTM shares is IDR 735 with a PER value of 122.52 and a PBV value of 0.96. The intrinsic value of INCO shares is IDR 2,455 with a PER value of 50.06 and PBV at a value of 0.99. The intrinsic value of TINS shares is IDR 611 with a PER value of 12.46 and PBV at a value of 0.75.
- c. Based on the analysis that has been done on the pessimistic scenario it can be concluded that the intrinsic value of ANTM shares is IDR 644 with a PER value of 115.65 and a PBV value of 0.84. The intrinsic value of INCO shares is IDR 2,376 with a PER value of 49.02 and PBV at a value of 0.96. The intrinsic value of TINS shares is IDR 568 with a PER value of 11.86 and PBV at a value of 0.70.
- d. Recommendations from the results of this study are as follows:
 1. PT Aneka Tambang Tbk.

Based on the FCF approach, the research recommends buying ANTM shares on all scenarios because the valuation results are undervalued. Based on the Price Earnings Ratio (PER) approach, the valuation produced an overvalued position against the industry PER (12.62x) in all scenarios, so the researcher's recommendation is to sell ANTM shares. Based on the Price Book Value (PBV) approach, the

valuation resulted in undervalued values in all scenarios, since they are below the industry average of 3.55. Based on the result, the author recommends buying ANTM shares.

2. PT Vale Indonesia Tbk.

Based on the results of the analysis using the FCF approach, it was concluded that INCO shares were overvalued in all scenarios, so they were recommended for sale. If using the Price Earnings Ratio (PER) approach, the three scenarios produce values above the industry average of 25.62x, so the researcher also recommends selling INCO shares. While the analysis of INCO stock prices using the Price Book Value (PBV) concluded that INCO shares were in an undervalued position on all scenarios because they are below the industry average of 3.55, so they are worth buying.

3. PT Timah Tbk.

The result of the analysis using the FCF approach recommends selling in all three scenarios since the share value was overvalued. If using the Price Earnings Ratio (PER) approach, the three scenarios produce PER values in the investment range below the Industry average of 25.62, so the researcher recommends buying PT Timah Tbk shares. While the analysis of the stock price of PT Timah Tbk. using Price Book Value (PBV) produces a value below the industry average of 3.55 in all three scenarios, which means the shares of PT Timah Tbk. worth to buy.

7 STUDY LIMITATIONS AND FURTHER STUDY

Refer to the stock price trend, and the discussions in this research, metal and mineral sub-sector could probably have the relation with the battery and smartphone industry trend. Researchers have yet explored that interesting correlation. Further study in that field is expected to strengthen the fluctuation analysis of the stocks.

Another limitation of this research is the intrinsic value valid time is only in 2018, and the sampled companies were only 3 of 12 industry players. The next valuator will have a possibility to reevaluate the intrinsic value of the company in 2019 and so on, or include all industry players to have a complete figure of the industry.

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