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Optimal Capital Structure for Indonesian Automotive Listed Companies from 2015 to 2019

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Abstract:
Automotive industry plays a big role in Indonesia's economy. It is also an industry that has multi business chain such as components manufacturing, vehicles manufacturing, distribution channel, services, spare part sales, and after-market service. The business issue from this research is the profitability of listed automotive companies in IDX tend to stagnant especially from 2017 to 2019. Based on the last 10 years report, the net profit margin of the industry reached highest in 2011 as much as 11.76%. After 2011, the net profit margin decreased and stagnant since 2017 to 2019. However, this industry has many growth opportunities ahead. Therefore, determination of optimal capital structure is critical. This research aims to determine the optimal debt ratio for the companies from period 2015 to 2019.
This research employs ten listed automotive companies in IDX, that are PT Astra International Tbk (ASII), PT Gajah Tunggal Tbk (GJTL), PT Astra Otoparts Tbk (AUTO), PT Indo Kordsa Tbk (BRAM), PT Selamat Sempurna Tbk (SMSM), PT Multistrada Arah Sarana Tbk (MASA), PT Goodyear Indonesia Tbk (GDYR), PT Indospring Tbk (INDS), PT Garuda Metalindo Tbk (BOLT), and PT Prima Alloy Steel Universal Tbk (PRAS). Debt ratio level from 0% to 90% was used to obtain optimal capital structure. The optimal capital structure for the company is determined by debt ratio that has lowest weighted average cost of capital.
The optimal debt ratio for automotive companies listed in IDX varies between each company. The average optimal debt ratio for ASII, GJTL, AUTO, BRAM, SMSM, MASA, GDYR, INDS, BOLT, and PRAS are 40%, 60%, 10%, 20%, 20%, 10%, 20%, 20%, 10% and 20% respectively. ASII, AUTO, BRAM, SMSM, GDYR, INDS, and BOLT are under levered, while GJTL, PRAS, and MASA are over levered. In order to move to the optimal capital structure, those companies can do recapitalization, divest asset, financing its project disproportionately, or buy back stock.
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Keywords: *Optimal capital structure, automotive companies, weighted average cost of capital, firm value*

1. Introduction

Automotive industry plays a big role in Indonesia's economy. It is also an industry that has multi business chain such as components manufacturing, vehicles manufacturing, distribution channel, services, spare part sales, and after-market service. Automotive industry is an industry that engaged in producing vehicle as a tool for people transportation. The business issue from this research is the profitability of listed automotive companies in IDX tend to stagnant especially from 2017 to 2019. The profitability was determined from net profit margin ratio. Based on the last 10 years report, the net profit margin of the industry reached highest in 2011 as much as 11.76%. After 2011, the net profit margin decreased and stagnant since 2017 to 2019. There is some study that examined the relationship of capital structure and profitability. Those studies showed that capital structure have significant relationship with profitability (Abor, 2005; Agwan, 2017; Basdekis et al., 2020; Saripalle, 2018; Singh & Bagga, 2019). It can be explained by when firm apply good capital structure, it will give the maximal value for the company that will translate into better profitability. Indonesia automotive industry has undergone a phenomenal transformation from a pure export-oriented car manufacturing hub to a key domestic car sales market as per income capita grows. Its strong success over the past few years has rendered Indonesia as largest car market for ASEAN members in South-East Asia (Hidayatno et al., 2019). Indonesia is the second largest vehicle producer after Thailand despite being largest market in South-East Asia since 2015. As a comparison, total car production in Indonesia in 2019 was 1,286,848 while total car production in Thailand was 2,013,710 (OICA, 2020). Therefore, Indonesia should improve its production to increase its competitiveness in South-East Asia region. This industry has potential growth in the coming year due to infrastructure development in Indonesia that is still progressing. Moreover, according to the Association of Indonesia Automotive Industries (GAIKINDO), car ownership ratio has increased from 87 per 1000 people in 2017 to 99 per 1000 people in 2019 (Rahadiansyah, 2020). While there is economic downturn in the time of this writing, analyst from Fitch Solutions says that Indonesia automotive industry is still attractive. This is due to Indonesia has skilled labor with low labor costs that will translate into promising productivity. Indonesia is also favorable place for automotive manufacturers to start or maintain vehicle manufacturing operations in the Asian region and 23rd worldwide

(Rahman, 2020). Another point is government is encouraging in electronic vehicles usage in the future. This phenomenon implied that automotive companies have opportunity to grow.

Capital is fund that is used by company to finance its business operations. Choosing capital structure is one of financing decision faced by company and it is important since it will affect the company's value. Company may choose its capital source whether from internally or externally generated. Internally generated means the fund come from inside the company, while externally generated means the fund come from outside the company. For internally generated capital, company can choose retained earnings as its source of capital. Conversely, externally generated capital comprises of debt and equity.

Optimal capital structure refers to the combination of debt and equity that will maximize the value of a firm (de Wet, 2006). The firm's value is the present value of expected cash flow that is discounted by its weighted average cost of capital (WACC). Hence target capital structure is the combination of long-term financing source that leads to lowest WACC and as a result, to the highest value of a firm (Ehrhardt & Brigham, 2003).

Since automotive industry is capital intensive industry, it is crucial that listed automotive companies in Indonesia Stock Exchange (IDX) to optimize their capital structure. Therefore, in this research, the writer wants to determine the optimal capital structure of 10 listed automotive companies hence it will maximize the companies value.

2. Literature Review

2.1. Capital Structure Theory

2.1.1. Modigliani and Miller Theorem

This theory is introduced by (Franco Modigliani; Merton H. Miller, 1958) in their seminal work. It is also known as Modigliani-Miller Irrelevance Theory. The theory states that financial leverage will not affect to the firm value. It is caused by investors and firms have the same access to the financial market, so it allows them to make homemade leverage. The investor can build any leverage that was desired but not given, or the investor can get rid of any leverage made by the firm. The assumption of this theory is that it is done in perfect market. Perfect market means that there is no tax, no bankruptcy cost, no agency cost, and asymmetric information exist.

There are two propositions from this theory, first, the firm's total market value is independent to its capital structure. Second, the firm's cost of equity increases linearly with its debt-to-equity ratio. It means that the firm weighted cost of capital is linear with its debt ratio. However, the assumptions are unrealistic because tax exist in real world. In order to overcome this, Modigliani and Miller revised their theory in (Modigliani & Miller, 1963). They incorporate the effect of tax. As corporate tax exists, the firm value increase with the leverage due to tax shield. As a result, the optimal capital structure for the firm is 100% debt.

Even though this theory bring unrealistic assumption, it contribute to modern finance (Damodaran, 2014). First, this theory pioneers in the capital structure analysis and move the analysis from debt ratios based on comparable firms and management preferences to trade-off condition. Second, it drew attention to the impact of good investment on firm value.

2.1.2. Trade off Theory

This theory stem after Modigliani and Miller introduced tax effect to the firm. The firm will have tax advantage if it incorporates debt in its capital structure and as a result it will shield the firm's earnings. Since there is no offset for the cost of debt, it implies that the firm should follow 100% debt financing (Frank et al., 2005). As a result, an offset to cost of debt is needed.

There are two costs that can be used to offset cost of debt namely financial distress costs and agency cost. Increasing debt level will increase the financial distress cost because debt holders will require higher interest rate while share holder will also ask higher return for their investment (Brealey et al., 2011) Financial distress consists of direct and indirect costs. Direct financial cost is the probability of going bankrupt that includes administrative and legal fees. Indirect financial cost consists of losing customers, staffs, suppliers trust due to uncertainties (de Wet, 2006). Agency cost explains the relationship between management team (agent) with shareholders (principals) and how the agent acts as the shareholders' behalf. Agency cost can occur when the interest of agent conflicts with shareholders' interest. Agency costs is defined as the sum of the monitoring expenditures by the principal, the bonding expenditures by the agent, and the residual loss (Jensen & Meckling, 1976). Therefore, trade-off theory postulates that the optimal capital structure is achieved when there is balance between marginal benefit of debt and its marginal cost (Abeywardhana, 2017)

Trade off theory applies in some firms around the world. According to (Oke & Obalade, 2015) study on capital structure theory in Nigerian listed oil firms, they obtained that the firms follow trade off theory. The data used in the study was financial data from six of ten listed companies ranging from 2005 to 2012. Another study done by (Chaklader & Jaisinghani, 2017). They observe capital structure theory application on textile firm from India and China. The result confirms that textile firm in both countries follow trade-off theory. (Wiagustini et al., 2017) studied capital structure theories that applied best for nonfinancial companies in Indonesia. The observation was conducted by using data from 2010 to 2013 from all listed companies except financial sector. The result was nonfinancial companies in Indonesia follow trade-off theory.

2.1.3. Pecking Order Theory

Pecking order theory was developed based on asymmetric information (Myers & Majluf, 1984). This means management is better informed about the company condition, value of assets, and opportunities than investors. This theory suggest that firm will follow financing hierarchy plan, first internal financing then followed by external financing. First the firm will prefer to use internal funds such as retained earnings followed by issuing debt, convertible debt, preference shares and finally issuing equity as last resort. The difference between pecking order theory and trade off theory is pecking order theory suggest debt ratios would be determined by the firm's cumulative need for funds.

The issue of debt over equity should be driven by asymmetric information. Debt issuance indicates the management's confidence that the investment is profitable, and the current stock price is undervalued. Equity issuance may indicate a lack of confidence from the management that might believe that the share price is overvalued. Consequently, the issue of equity would lead to decline in the share price (Adair & Adaskou, 2015).

There were some researches that show the use of pecking order theory in firm. (Ahmad & Ali, 2017) research showed that Malaysian and Thailand food and beverage companies applied pecking order theory. Variables that were used are profitability, asset tangibility, growth opportunity, firm size, and liquidity level. The study used 10 years data from 2004 to 2013. The application of capital structure theories in Pakistan automobile firms had been studied (Yousaf, 2018). The research showed that Pakistan automobiles firms apply pecking order theory to finance its business. The study used 12 years data from 2000 to 2011. Indian automobile firms apply pecking order theory in their capital structure (Tripathi, 2019). The study observed 15 years data from 2000 to 2014.

2.2. Optimal Capital Structure

Beside internally generated source of financing, firm can acquire externally generated source namely debt and equity. Debt can be in the form of bank loans, bonds, or lease while equity can be in the form of common stock. Any mix of debt and equity will affect to the firm value because each source of financing has its own cost. Firm value can be calculated by discounting the firm expected cash flow by its cost of capital (WACC). The firm's expected cash flow can be calculated as cash flow after operating expenses, tax, and any capital investments needed but before debt payment. According to Handriani and Robiyanto (2018), optimal capital structure is capital structure that balances risk and return so it maximizes the company's share prices. Optimal capital structure will be generated when the firm has lowest cost of capital as the discount rate. As a result of minimizing cost of capital, firm will have maximized value. According to Damodaran (2014), firm value can be calculating as follows:

$$Value\ of\ the\ firm = \frac{FCFF_0(1+g)}{(WACC-g)}$$

$$FCFF = EBIT(1-T) + Depreciation\ and\ amortization - Capital\ Expenditure - Change\ in\ working\ capital$$

Several studies regarding the relationship of capital structure and firm value had been done. Relationship of capital structure, firm growth and dividend policy on profitability and firm value of palm oil plantation companies in Indonesia had been studied (Paminto et al., 2016). The result of the study showed that capital structure has significantly negative effect on firm value. On the contrary, studies by (Handriani & Robiyanto, 2018) and (Mangesti Rahayu et al., 2019) showed that capital structure has significant positive effect on firm value. The sample of both studies is manufacturing companies in Indonesia. This study implies that higher amount of debt in the capital structure improve the firm value. It can be achieved by higher amount of debt reduces the amount of taxes payable and will increase the stock price and as a result it will increase the company value.

2.3. Weighted Average Cost of Capital

There are some costs related to the types of fund the firm acquire. When the firm uses debt, it incurs cost of debt while the use of equity will incur cost of equity. Weighted average cost of capital is the sum of each weighted proportion of debt and equity multiplied by its respective costs. Meanwhile, weighted average cost of capital can be defined as the minimum required rate of return that the company can achieve for lender and shareholder (Alidhozic & Eric, 2013). Cost of capital can be written as follows (Damodaran, 2014).

$$Weighted\ average\ cost\ of\ capital = \mathrm{kD}\left(\frac{D}{E}\right) + kE(\frac{D}{E})$$

Where:

k_D = after-tax cost of debt

k_E = cost of equity

D = Market value of debt

E = Market value of equity

2.3.1. Cost of Debt

The debt in the firm includes all interest-bearing liabilities such as short-term debt, long-term debt, and lease commitments. Cost of debt measures the cost that the firm should pay because of the firm borrows fund to finance projects. It is determined by the current level of interest rates, the default risk of the company, and the tax advantage associated with debt.

There are several ways to calculate the firm cost of debt. First, by using yield to maturity of the firm's bond. The yield is adjusted for expected loss that is caused by potential default based on the bond's credit rating (Jagannathan et al., 2017). Second is by calculating interest coverage ratio and assign it to the synthetic rating and the default spread as stated

in Damodaran (Damodaran, 2014). The resulting default spread will be added to the risk-free rate to generate pre-tax cost of debt. Furthermore, the pre-tax cost of debt should be changed to after-tax cost of debt by subtract tax rate from 1 and multiply with pre-tax cost debt. The formula of interest coverage ratio will be shown below:

$$Interest\ Coverage\ Ratio = \frac{Earnings\ before\ interest\ and\ taxes}{Interest\ expenses}$$

Interest Coverage Ratio	Ratings (S&P/Moody's)	Spread (%)
>8.50	Aaa/AAA	0.69
6.50-8.50	Aa2/AA	0.85
5.50-6.50	A1/A+	1.07
4.25-5.50	A2/A	1.18
3.00-4.25	A3/A-	1.33
2.50-3.00	Baa2/BBB	1.71
2.25/2.50	Ba1/BB+	2.31
2.00-2.25	Ba2/BB	2.77
1.75-2.00	B3/B+	4.0
1.50-1.75	B2/B	4.86
1.25-1.50	B3/B-	5.94
0.80-1.25	Caa/CCC	9.46
0.65-0.80	Ca2/CC	9.97
0.20-0.65	C2/C	13.09
<0.20	D2/D	17.44

Table 1: Interest Coverage Ratios, Ratings, and Default Spreads (Damodaran, 2019)

2.3.2. Cost of Equity

Cost of equity is defined as the rate of return that the investors expect to invest in the equity of the firm. Capital asset pricing model (CAPM) is widely used for estimating the firm's cost of equity and evaluating the performance of managed portfolio (Fama & French, 2004). CAPM was introduced by William Sharpe and John Linter (Lintner, 1965; Sharpe, 1964). Firm is exposed to risk and investor's expected return may change over time so CAPM can help in assessing the investor's expected return for providing equity capital to the firm (Jagannathan et al., 2017). There are some components that consists in CAPM namely risk-free rate, risk premium and beta. CAPM formula can be written as follows.

$$Cost\ of\ equity = Rf + \beta \times ERP$$

Where:

Rf = Risk-free rate

β = beta

ERP = Equity Risk Premium

Risk free-rate is defined as the expected rate which investors will acquire certainly (Damodaran, 2014). To estimate risk-free rate, government bond rate is used because it is assumed that governments are default-free. As a result, risk-free rate is the yield offered by government bond.

Beta is a slope in the regression of its return on the market return, hence beta is a measure of risk of an asset compared to the market return (Fama & French, 2004). The common approach to estimate beta is by using historical price of the firm's share price. Historical price will reflect returns that an investor would have made investing in its equity in interval of a week or month over past period. The returns can then be compared to the market return to get beta in the CAPM. Risk premium that is denoted by market return subtracted by risk-free rate is a measure of extra return the investor demand. It happens because investors move their capital from risk-free asset to risky asset. In CAPM, risk premium is defined as the difference between the average return of stocks and average return of risk-free asset over the same period (Damodaran, 2014).

3. Methodology

3.1. Research Methodology

This research uses secondary data from automotive companies listed in Indonesia Stock Exchange. The financial data was obtained from annual report of each company ranging from 2015 to 2019. Historical risk-free rate was obtained from www.investing.com while historical equity risk premium for Indonesia was obtained from Damodaran's research (Damodaran, 2019). As a result, this research will use quantitative research method to emphasize objective measurements and analytical, or numerical data from the collected data. Moreover, other secondary data used in the research are books, journals, and other sources to help in analysis process.

3.2. Data Analysis

The objective of this research is to find optimal capital structure for each automotive company listed in Indonesia Stock Exchange. To obtain optimal capital structure, this thesis will use weighted average cost of capital approach. Optimal

capital structure is achieved when the firm has lowest weighted average cost of capital and highest firm value. Each calculation except determining unlevered beta will be done for every debt-to-equity proportion. In this research, debt proportion will change as much as 10 percent, while equity will be vice versa.
There are several steps to generate weighted average cost of capital as follows:

3.2.1. Determine the Firm Beta

The firm beta will be determined by regressing the stock adjusted price with the firm adjusted price in that year. The adjusted price is obtained from www.finance.yahoo.com and for this calculation weekly adjusted price for that year will be used. As a result, there are 52 data for each year.

3.2.2. Determining Historical Cost of Equity

Cost of equity will be calculated by using Capital Asset Pricing Model (CAPM) model. The formula of cost of equity is as follows:

$$Ke = Rf + \beta(Rm - Rf)$$

Where:

Ke = Cost of equity
Rf = Risk-free rate
B = Beta of the company
Rm-Rf = Risk premium

Some data required for the calculation are risk-free rate, firm return and beta. Risk-free rate will be obtained from 10 years government bond yield. Risk premium is the difference of firm return and risk-free rate. The firm return will be obtained from Indonesia Composite Index return.

3.2.3. Determining Historical Cost of Debt

Debt can be in the form of long-term debt, lease, or bond. To calculate cost of debt, we can use interest coverage ratio and assign to the synthetic rating as previously explained in chapter 2. The marginal tax rate of 25% will be used. After-tax cost of debt (Kd) will be used, and the formula is as follows:

$$After-tax\ cost\ of\ debt = Pretax\ cost\ of\ debt(1 - Tax\ rate)$$

3.2.4. Determining Historical Weighted Average Cost of Capital

After cost of equity and cost of debt have been obtained, the weighted average cost of capital can be calculating by assigning each debt and equity proportion to each cost and sum both costs. The formula of weighted average cost of capital is as follows:

$$Weighted\ average\ cost\ of\ capital = \mathrm{Kd}\left(\frac{D}{E}\right) + Ke\left(\frac{D}{E}\right)$$

3.2.5. Determine Market Value of the Firm

The firm will be valued by its firm value of debt and firm value of equity in the year. Book value of debt will be converted into firm value of debt by treating all debt on the books as coupon bond. The coupon set equal to interest expenses that the company paid in that year and the maturity set equal to the face-value weighted average maturity of debt. This coupon bond will be valued at current cost of debt for the company. Converting book value of debt to firm value of debt is as follows:

$$Market\ value\ of\ debt = IE \times \left[\frac{1 - \frac{1}{(1+Kd)^t}}{1 - Kd}\right] + \frac{BV\ of\ debt}{(1+Kd)^t}$$

Where:

IE = Interest Expense
Kd = After-tax cost of debt
BV of debt = Book value of debt
t = period of maturity

After estimating firm value of debt at that year, firm value of equity will be determined. This can be obtained by multiplying number of shares outstanding with closing price of that stock in the year. The closing price of the stock was obtained from www.finance.yahoo.com. The firm value of that year will be equal to sum of firm value of debt and firm value of equity.

3.2.6. Determining Historical Unlevered Beta

The first step is to determine the unlevered beta. Unlevered beta is the company firm risk without the effect of debt. Debt to equity weight is calculated by amount of interest-bearing debt to total equity. Debt consists of current portion of long-term debt and long-term debt. Unlevered beta can be calculated as follows (Damodaran, 2014):

$$\beta u = \frac{\beta l}{(1 + (1 - T)\left(\frac{D}{E}\right))}$$

Where:
βu = Unlevered beta
βl = Levered beta
T = Marginal tax rate
D/E = debt to equity ratio

3.2.7. Determine Cost of Equity in Each Debt Ratio

After unlevered beta has been obtained, cost of equity can be determined for each debt ratio. Cost of equity will be determined by using CAPM method as done previously. However, the unlevered beta should be converted into levered beta as follows.

$$\beta l = \beta u \times (1 + (1 - T)\left(\frac{D}{E}\right))$$

3.2.8. Estimating Cost of Debt in Each Debt Ratio

To compute the firm cost of debt, the calculation starts from the amount of debt that the firm will borrow by multiplying debt ratio to the firm value. From that, interest expense can be determined by multiplying amount of debt with pre-tax cost of debt. The interest expense will be used to determined interest coverage ratio. EBIT for the company at each debt ratio will be fixed.

There will be circular step in the calculation in estimating interest expense while pre-tax cost of debt also needed. To overcome this, pre-tax cost of debt starts with assign likely rating to each debt ratio and assign the interest coverage ratio until it matches the value in Table 1. When the interest expense exceeds the firm EBIT, there will be adjustment in tax rate as suggested by Damodaran (2014). In the adjusting process, the firm maximum tax benefit will be calculated and then adjusted tax rate can be determined.

$$Maximum\ tax\ benefit\ = EBIT\ \times Marginal\ tax\ rate$$

$$Adjusted\ tax\ rate = \frac{Maximum\ tax\ benefit}{Interest\ expense}$$

3.2.9. Determine Cost of Capital in Each Debt Ratio.

After cost of equity and cost of debt have been determined in each debt ratio, cost of capital can be obtained by assigning each debt and equity proportion to each cost and sum both costs. The optimal debt ratio is that minimizes the firm weighted average cost of capital.

3.2.10. Determine Value of the Firm in Each Debt Ratio

After weighted average cost of capital has been obtained, the next step is calculating the firm value that has been discounted by WACC. Maximal firm value will be achieved when the company has the lowest WACC that is optimal debt ratio. Value of the firm is calculated as follows (Gitman & Zutter, 2015):

$$Value\ of\ the\ firm = \frac{EBIT \times\ (1 - tax\ rate)}{(WACC)}$$

4. Results and Analysis

4.1. PT Astra Internasional Tbk

In 2019, the company outstanding interest- bearing debt was as much as Rp 76 B. The market value of equity was Rp 254 B that resulted from multiplication of 40,848 million shares outstanding with the stock closing price in 2019 as much as Rp 6,295. The company held cash and marketable securities as much as Rp 24 B. The enterprise value for ASII in 2019 was Rp 307 B. This value will be used to estimate the amount of debt that the company should issue in the debt ratio simulation.

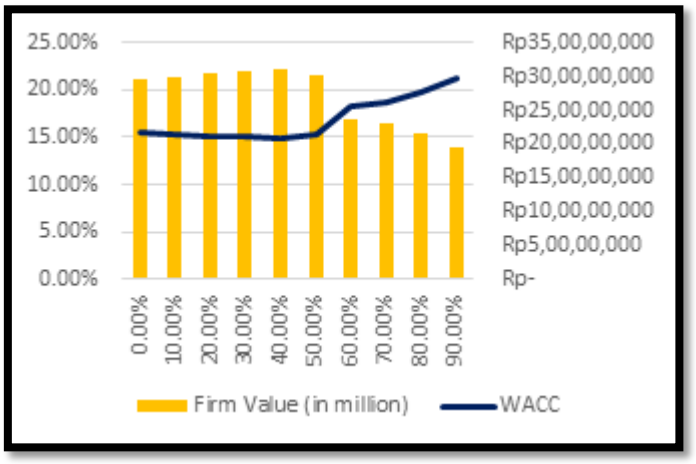

Figure 1: Optimal Debt Ratio for ASII in 2019

	Current	Optimal
Debt to capital	23.17%	40.00%
Cost of capital	15.04%	14.89%
Enterprise value (in million)	Rp 307,390,780.00	Rp 311,778,052.41
Value per share	Rp 6,295	Rp 6,403.37

Table 2: Effect of Moving to Optimal Debt Ratio for ASII

The implied growth rate that will be used to estimate the firm value is 4.98%. It is resulted from current enterprise value, FCFF, and cost of capital of the company. Based on the debt ratio simulation from 10 to 90%, the optimal debt ratio that minimizes cost of capital for ASII is 40%. In this debt ratio, the cost of capital will be at lowest as much as 14.89%. Based on latest financial data of 2019, the cost of capital for the company was 15.04%. By moving to the optimal debt, the cost of capital for the company will be lowered by 0.15%. The firm value is also maximized in the optimal debt ratio as much as Rp 311,778,052.41. By moving to the optimal debt, value per share of the company will increase by 1.7%. Based on the calculation, it shows that ASII is under levered.

4.2. PT Gajah Tunggal Tbk

In 2019, the company outstanding interest- bearing debt was as much as Rp 2,038 B. The market value of equity was Rp 5,701 B that resulted from multiplication of 3,484 million shares outstanding with the stock closing price in 2019 as much as Rp 585. The company held cash and marketable securities as much as Rp 635 B. The enterprise value for GJTL in 2019 was Rp 7,104 B.

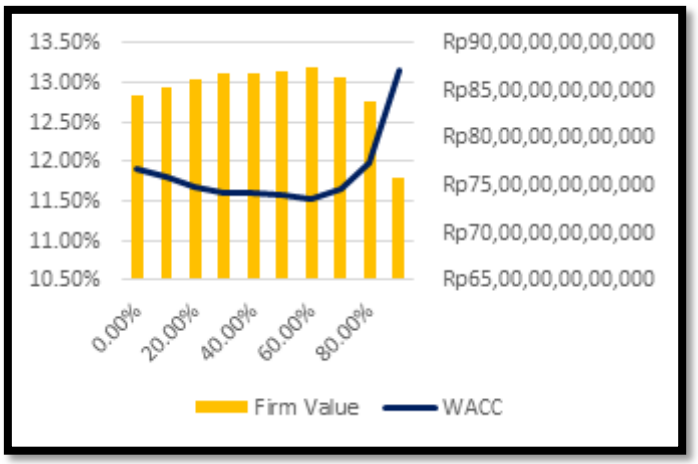

Figure 2: Optimal Debt Ratio for GJTL in 2019

	Current	Optimal
Debt to capital	73.66%	60.00%
Cost of capital	13.98%	11.52%
Enterprise value (in million)	Rp 7,104,834	Rp 8,743,054
Value per share	Rp 585	Rp 1,055

Table 3: Effect of Moving to Optimal Debt Ratio for GJTL

The implied growth rate that will be used to estimate the firm value is 0.86%. Based on the debt ratio simulation from 10 to 90%, the optimal debt ratio that minimizes cost of capital for GJTL is 60%. In this debt ratio, the cost of capital will be at lowest as much as 11.52%. Based on latest financial data of 2019, the cost of capital for the company was 13.98%. By moving to the optimal debt, the cost of capital for the company will be lowered by 2.46%. The firm value is also maximized in the optimal debt ratio as much as Rp 8,743 B. By moving to the optimal debt, value per share of the company will increase by 80%. In 2019, the company held 73.66% debt to capital ratio. As a result, GJTL is over levered.

4.3. PT Astra Otoparts Tbk

In 2019, the company outstanding interest- bearing debt was as much as Rp 250 B. The market value of equity was Rp 5,976 B that resulted from multiplication of 4,820 million shares outstanding with the stock closing price in 2019 as much as Rp 1,240. The company held cash and marketable securities as much as Rp 788 B. The enterprise value for GJTL in 2019 was Rp 5,438 B.

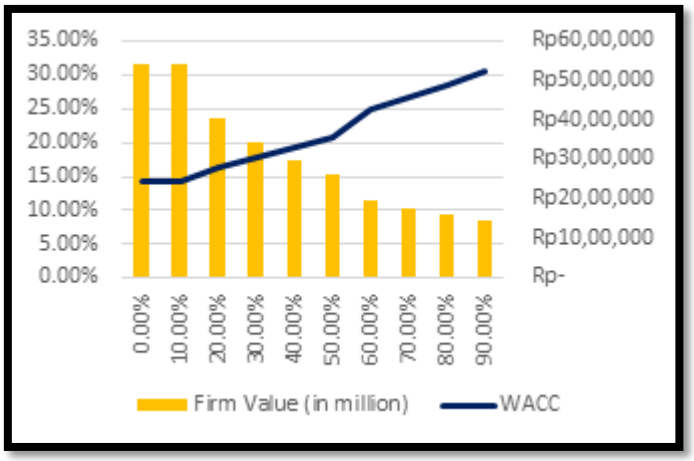

Figure 3: Optimal Debt Ratio for AUTO in 2019

	Current	**Optimal**
Debt to capital	4.01%	10.00%
Cost of capital	14.15%	14.14%
Enterprise value (in million)	Rp 5,438,647	Rp 5,448,585
Value per share	Rp 1,240	Rp 1,242.06

Table 4: Effect of Moving to Optimal Debt Ratio for AUTO

The implied growth rate that will be used to estimate the firm value is 8.05%. Based on the debt ratio simulation from 10 to 90%, the optimal debt ratio that minimizes cost of capital for AUTO is 10.00%. In this debt ratio, the cost of capital will be at lowest as much as 14.14%. The firm value is also maximized in the optimal debt ratio as much as Rp 5,448 B. By moving to the optimal debt, value per share of the company will increase to Rp 1,242.06. In 2019, the company held 4.01% debt to capital ratio. As a result, AUTO is under levered.

4.4. PT Indo Kordsa Tbk

In 2019, the company was mostly financed with equity. The company outstanding interest- bearing debt was as much as $ 14 M. The market value of equity was $ 350 M that resulted from multiplication of 450 million shares outstanding with the stock closing price in 2019 as much as $ 0.778. The company's share trades in Indonesia stock market so the closing price of the stock is denominated in Indonesian Rupiah. However, in order to ease the calculation, the share price was converted to US $. It is done by dividing the company share price of Rp 10,800 with USD to IDR conversion price in 2019 of Rp 13,880. The company held cash and marketable securities as much as $ 14 M. The enterprise value for BRAM in 2019 was $ 350 M.

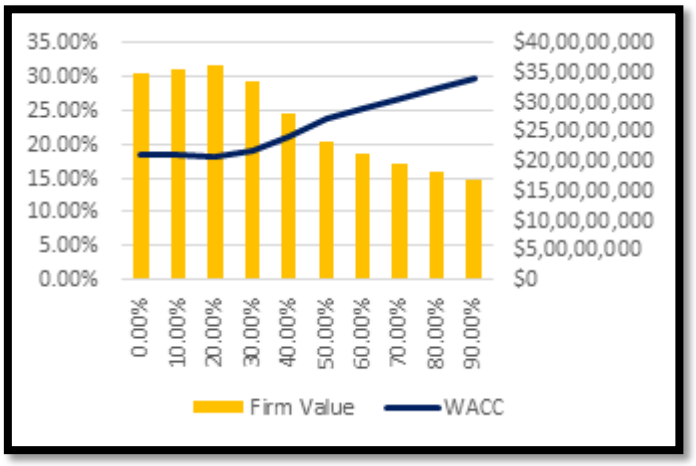

Figure 4: Optimal Debt Ratio for BRAM in 2019

	Current	Optimal
Debt to capital	4.06%	20.00%
Cost of capital	18.47%	18.18
Enterprise value	$ 350, 687, 835.00	$ 360,848, 647.95
Value per share	Rp 10,800	Rp 11,112

Table 5: Effect of Moving to Optimal Debt Ratio for BRAM

The implied growth rate that will be used to estimate the firm value is risk-free rate that as much as 8.05%. Based on the debt ratio simulation from 10 to 90%, the optimal debt ratio that minimizes cost of capital for BRAM is 20%. In this debt ratio, the cost of capital will be at lowest as much as 18.18%. Based on latest financial data of 2019, the cost of capital for the company was 18.47%. By moving to the optimal debt, the cost of capital for the company will be lowered by 0.29%. The firm value is also maximized in the optimal debt ratio as much as $ 360 M. By moving to the optimal debt, value per share of the company will increase by 2.90%. In 2019, the company held 4.06% debt to capital ratio. As a result, BRAM is under levered.

4.5. PT Selamat Sempurna Tbk

Most of Selamat Sempurna's capital was funded by equity. It is shown by the amount of equity that was greater than amount of debt. In 2019, the company outstanding interest- bearing debt was as much as Rp 47 B. The market value of equity was Rp 8,580 B that resulted from multiplication of 5,758 million shares outstanding with the stock closing price in 2019 as much as Rp 1,490. The company held cash and marketable securities as much as Rp 244 B. The enterprise value for SMSM in 2019 was Rp 8,384 B.

Figure 5: Optimal Debt Ratio for SMSM in 2019

	Current	Optimal
Debt to capital	0.55%	20.00
Cost of capital	11.00%	10.90%
Enterprise value (in million)	Rp 8,384,173,405,600	Rp 8,495,473,354,975
Value per share	Rp 1,490	Rp 1,509.33

Table 6: Effect of Moving to Optimal Debt Ratio for SMSM

The implied growth rate that will be used to estimate the firm value is 3.15%. Based on the debt ratio simulation from 10 to 90%, the optimal debt ratio that minimizes cost of capital for SMSM is 20.00%. In this debt ratio, the cost of capital will be at lowest as much as 10.90%. The firm value is also maximized in the optimal debt ratio as much as Rp 8,495 B. By moving to the optimal debt, value per share of the company will increase to Rp 1,50933. In 2019, the company held 0.55% debt to capital ratio. As a result, SMSM is under levered.

4.6. PT Multistrada Arah Sarana Tbk

The company outstanding interest- bearing debt was as much as $ 166 M. The market value of equity was $ 305 M that resulted from multiplication of 9,182 million shares outstanding with the stock closing price in 2019 as much as $ 0.03. The company's share trades in Indonesia stock market so the closing price of the stock is denominated in Indonesian Rupiah. However, in order to ease the calculation, the share price was converted to US $. It is done by dividing the company share price of Rp 460 with USD to IDR conversion price in 2019 of Rp 13,880. The company held cash and marketable securities as much as $ 4 M. The enterprise value for MASA in 2019 was $ 468 M.

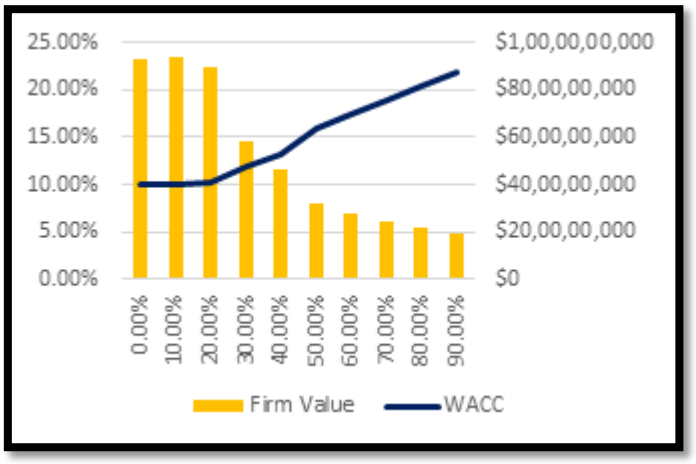

Figure 6: Optimal Debt Ratio for MASA in 2019

	Current	Optimal
Debt to capital	35.27%	10.00%
Cost of capital	13.4%	9.96%
Enterprise value	$ 468,147,173.74	$ 939,957,342,.69
Value per share	Rp 460	Rp 1.175

Table 7: Effect of Moving to Optimal Debt Ratio for MASA

The implied growth rate that will be used to estimate the firm value is risk-free rate that as much as 6.91%. Based on the debt ratio simulation from 10 to 90%, the optimal debt ratio that minimizes cost of capital for MASA is 10%. In this debt ratio, the cost of capital will be at lowest as much as 9.96%. Based on latest financial data of 2019, the cost of capital for the company was 13.47%. By moving to the optimal debt, the cost of capital for the company will be lowered by 3.44%. The firm value is also maximized in the optimal debt ratio as much as $ 939 M. By moving to the optimal debt, value per share of the company will increase by 155%. In 2019, the company held 35.27% debt to capital ratio. As a result, MASA is over levered.

4.7. PT Goodyear Indonesia Tbk

The company outstanding interest- bearing debt was as much as $ 7 M. Based on the financial report of GDYR in 2019, the company did not have long-term debt and it uses short term debt. The market value of equity was $ 59 M that resulted from multiplication of 410 million shares outstanding with the stock closing price in 2019 as much as $ 0.14. The company's share trades in Indonesia stock market so the closing price of the stock is denominated in Indonesian Rupiah. However, in order to ease the calculation, the share price was converted to US $. It is done by dividing the company share price of Rp 2000 with USD to IDR conversion price in 2019 of Rp 13,880. The company held cash and marketable securities as much as $ 8 M. The enterprise value for GDYR in 2019 was $ 58 M.

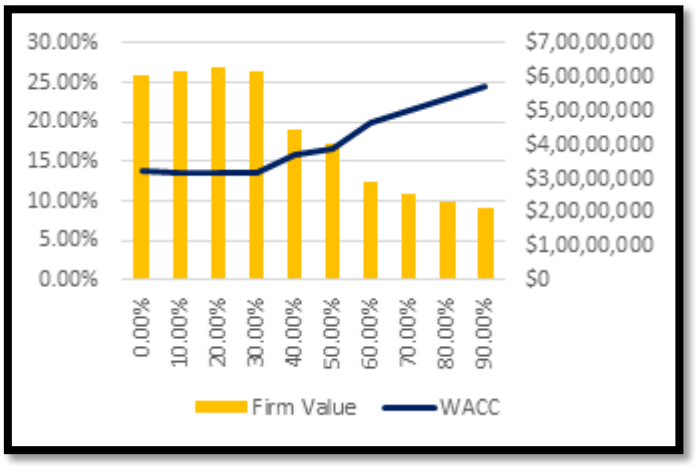

Figure 7: Optimal Debt Ratio for GDYR in 2019

	Current	**Optimal**
Debt to capital	11.52%	20.00%
Cost of capital	13.93%	13.53%
Enterprise value	$ 58,263,456.43	$ 62,511,665.65
Value per share	Rp 2,000	Rp 2,143

Table 8: Effect of Moving to Optimal Debt Ratio for GDYR

The implied growth rate that will be used to estimate the firm value is risk-free rate that as much as 8.05%. Based on the debt ratio simulation from 10 to 90%, the optimal debt ratio that minimizes cost of capital for GDYR is 20%. In this debt ratio, the cost of capital will be at lowest as much as 13.53%. Based on latest financial data of 2019, the cost of capital for the company was 13.93%. By moving to the optimal debt, the cost of capital for the company will be lowered by 0.4%. The firm value is also maximized in the optimal debt ratio as much as $ 62 M. By moving to the optimal debt, value per share of the company will increase by 7%. In 2019, the company held 11.52% debt to capital ratio. As a result, GDYR is under levered.

4.8. PT Indospring Tbk

The company outstanding interest- bearing debt was as much as Rp 6 B. The market value of equity was Rp 1,509 B that resulted from multiplication of 656 million shares outstanding with the stock closing price in 2019 as much as Rp 2300. The company held cash and marketable securities as much as Rp 131 B. The enterprise value for INDS in 2019 was Rp 1,384 B.

Figure 8: Optimal Debt Ratio for INDS in 2019

	Current	**Optimal**
Debt to capital	0.46%	20.00%
Cost of capital	11.01%	10.93%
Enterprise value	Rp 1,384,462,015,650	Rp 1,423,665,062,830
Value per share	Rp 2,300	Rp 2,359.74

Table 9: Effect of Moving to Optimal Debt Ratio for INDS

The implied growth rate that will be used to estimate the firm value is risk-free rate that as much as 8.05%. Based on the debt ratio simulation from 10 to 90%, the optimal debt ratio that minimizes cost of capital for INDS is 20%. In this debt ratio, the cost of capital will be at lowest as much as 10.93%. Based on latest financial data of 2019, the cost of capital for the company was 11.01%. By moving to the optimal debt, the cost of capital for the company will be lowered by 0.08%. The firm value is also maximized in the optimal debt ratio as much as Rp 1,423 B. By moving to the optimal debt, value per share of the company will increase to Rp 2,359. In 2019, the company held 0.46% debt to capital ratio. As a result, INDS is under levered.

4.9. PT Garuda Metalindo Tbk

The company outstanding interest- bearing debt was as much as Rp 157 B. The market value of equity was Rp 2,40 B that resulted from multiplication of 2,434 million shares outstanding with the stock closing price in 2019 as much as Rp 840. The company held cash and marketable securities as much as Rp 9 B. The enterprise value for BOLT in 2019 was Rp 2,193 B.

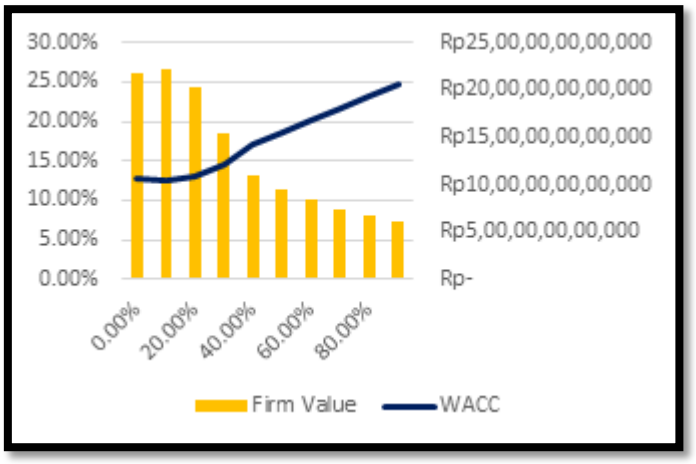

Figure 9: Optimal Debt Ratio for BOLT in 2019

	Current	**Optimal**
Debt to capital	7.16%	10.00%
Cost of capital	12.67%	12.61%
Enterprise value	Rp 2,1943,813,068,328	Rp 2,220,681,466,299
Value per share	Rp 840	Rp 851.04

Table 10: Effect of Moving to Optimal Debt Ratio for BOLT

The implied growth rate that will be used to estimate the firm value is risk-free rate that as much as 8.05%. Based on the debt ratio simulation from 10 to 90%, the optimal debt ratio that minimizes cost of capital for BOLT is 10%. In this debt ratio, the cost of capital will be at lowest as much as 12.61%. Based on latest financial data of 2019, the cost of capital for the company was 12.67%. By moving to the optimal debt, the cost of capital for the company will be lowered by 0.06%. The firm value is also maximized in the optimal debt ratio as much as Rp 2,220 B. By moving to the optimal debt, value per share of the company will increase to Rp 851. In 2019, the company held 7,16% debt to capital ratio. As a result, BOLT is under levered.

4.10. PT Prima Alloy Steel Universal Tbk

The company outstanding interest- bearing debt was as much as Rp 130 B. The market value of equity was Rp 95 B that resulted from multiplication of 701 million shares outstanding with the stock closing price in 2019 as much as Rp 136. The company held cash and marketable securities as much as Rp 10 B. The enterprise value for PRAS in 2019 was Rp 216 B.

Figure 10: Optimal Debt Ratio for PRAS in 2019

	Current	Optimal
Debt to capital	57.87%	20.00%
Cost of capital	17.30%	10.32%
Enterprise value	Rp 216,002,567,949	Rp 427,077,705,727
Value per share	Rp 136	Rp 437.09

Table 11: Effect of Moving to Optimal Debt Ratio for PRAS

The implied growth rate that will be used to estimate the firm value as much as 3.18%. Based on the debt ratio simulation from 10 to 90%, the optimal debt ratio that minimizes cost of capital for PRAS is 20%. In this debt ratio, the cost of capital will be at lowest as much as 10.32%. Based on latest financial data of 2019, the cost of capital for the company was 17.30%. By moving to the optimal debt, the cost of capital for the company will be lowered by 6.98%. The firm value is also maximized in the optimal debt ratio as much as Rp 427 B. By moving to the optimal debt, value per share of the company will increase to Rp 437.09. In 2019, the company held 57.87% debt to capital ratio. As a result, PRAS is over levered.

5. Conclusion and Implementation Plan

5.1. Conclusion

- The optimal debt ratio for automotive companies listed in IDX varies between each company. The average optimal debt ratio for ASII, GJTL, AUTO, BRAM, SMSM, MASA, GDYR, INDS, BOLT, and PRAS are 40%, 60%, 10%, 20%, 20%, 10%, 20%, 20%, 10% and 20% respectively.
- Firms can move to its optimal debt by recapitalization, asset disposal, finance new investment either by equity or debt, or change dividend payout. Under levered firm is advised to take good project with new debt or pay dividends if the company do not have good new project. On the contrary, over levered firm can decrease debt by using equity to finance new good projects or pay off debt with the company's equity.

5.2. Implementation Plan

There are four techniques for firm to move to its optimal debt ratio Damodaran (2014):

5.2.1. Recapitalization

It is simplest method to move the optimal debt ratio by changing the way existing investments are financed. Under levered firm can increase its debt ratio by borrow more money to buy back stock or provide debt-for-equity swap. By borrowing money to buy back stock, it will decrease total equity of the firm hence it will increase the debt ratio. In debt-for-equity swap, the company substitute equity with debt of equivalent market value by swapping the two securities. Over levered firm can do the same process. The firm can renegotiate debt agreements and try to persuade some of the lenders to take an equity interest in the company instead of some or all their debt in the company. Moreover, over levered firm can ask for longer term or lower interest rates. Besides that, over levered firm can issue new equity to pay off its debt.

5.2.2. Asset Disposal and Use of Proceeds

Under levered firm can sell its assets to buy back stock hence it will increase its debt ratio. On the contrary, over levered firm can sell its assets to retire the outstanding debt hence it will decrease the debt ratio.

5.2.3. Financing New Investment

By funding new projects disproportionately with debt or equity, companies may also alter their debt ratios. When the company use higher proportion of debt to finance its project than current debt ratio, it will increase the debt ratio. Conversely, when the company employ higher proportion of equity than existing ratio, it will decrease its debt ratio.

5.2.4. Change Dividend Payout

By increasing the dividend payout ratio or buy back stock in each period will increase the company's debt ratio. It can be occurred because paying dividend or buy back stock will decrease the equity ratio. In addition to changing dividend payout, it forces the company the need for external financing to fund the projects or investments

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