

Optimal Capital Structure for PT XYZ

Nathanael Hans* and Mandra Lazuardi Kitri

School of Business and Management, Institut Teknologi Bandung, Indonesia

E-mail address: nathanael_hans@sbm-itb.ac.id

Abstract – PT XYZ is one of the biggest construction companies in Indonesia. Currently, PT XYZ only had a total amount of cash for 1,213 trillion IDR. It is not enough to pay the bond obligation that is due in September 2021 with the amount of 1,661 trillion IDR. Currently, PT XYZ (PERSERO) Tbk. has a Debt to Equity ratio of 339%, while based on the annual report of PT XYZ, the stock and debt holders of PT XYZ (PERSERO) Tbk. require PT XYZ (PERSERO) Tbk. to have a debt-to-equity ratio below 300%. To solve both problems above, PT XYZ needs to refinance their capital structure, in order to get the lowest cost of capital of funds that will be used to seek source of funding to pay the bonds obligation, also to fulfill the contract requirements with the debtholders. This research will use weighted average cost of capital (WACC) method, the cost of debt method that will be used is Damodaran (2020) model and the cost of equity method that will be used is capital asset pricing model (CAPM). The result of this paper is PT XYZ needs to decrease their debt level to 18%.

Keywords –: *Optimal Capital Structure; Weighted Average Cost of Capital; Debt and Equity Ratio; Construction*

I. INTRODUCTION

Construction is one of the industries that have considerable amount of risk and a considerable amount of uncertainty. Usually, the construction industry has a large debt, making it has a considerable amount of risk. In 2020, the average debt-to-equity ratio of the construction industry is 206%. The debt-to-equity ratio that are more than 100% indicates that the company is having more debt than equity and having a high amount of debt means having substantial risks of getting default. It is because the probability of bankruptcy increases linearly for all firms as they borrow more money [1]. Based on the latest data in 2020, there are about 159,308 construction companies in Indonesia, which increased from 2010, which has 140,777 companies. However, in 2020, the number of companies considered significant by Central Bureau of Statistic of Indonesia is only 1,653, decreasing from 2010, which has 2,516 companies [2]. That data shows that it is hard to sustain and develop in this industry because it has a considerable risk from many sectors.

Currently, there are 5 biggest construction companies in Indonesia based on the market capitalization, which are PT XYZ (Persero) Tbk., PT A (Persero) Tbk., PT B (Persero)

Tbk, PT C Tbk., and PT D (Persero) Tbk. [3]. Four of them are state-owned companies, which shows how hard it is to sustain in this industry because, as we know, state-owned companies are easier to get funding than non-state-owned companies. For example, in 2020, some of state-owned construction company such as PT XYZ, PT E, PT A got fundings from the government to run the government program, which is ‘Program Strategis Nasional (PSN)’. The details of the fundings are: PT XYZ get 3.4 trillion IDR, PT A get 1.2 trillion IDR and PT E get 2.3 trillion IDR. [4].

From the companies that have been mentioned above, the biggest company is PT XYZ (PERSERO) Tbk. PT XYZ is a state-owned company that was built on 1 January 1961. At first, when it was built, their business model was to create many water projects, such as reclamation, dredging, port, and irrigation. But as the times passed, PT XYZ’s business project expanded. Currently, PT XYZ’s project includes construction services, precast sales, toll road, property sales, hotel revenue, building rental. Also, Waskita has many toll roads across Indonesia. PT XYZ has 4 subsidiaries, which are PT Waskita Beton Precast Tbk, PT Waskita Toll Road, PT XYZ Infrastruktur, PT XYZ Realty [6]. In December 2012, XYZ made its Initial Public Offering (IPO) and was listed on Indonesia Stock Exchange (IDX), with the issuer code of WSKT. Currently, the ownership structure of WSKT is 66.036% of the Indonesian government, and the public has held the rest.

After the IPO, PT XYZ Tbk, had an overall good performance, thanks to the revenue and the net income which were constantly growing until 2018. As a result, PT XYZ’s firm value also consistently increased until 2018, peaked at 124,392 Billion IDR. However, after 2018, PT XYZ decreased its revenue and net income, making the firm value of PT XYZ decreased. PT XYZ's performance is also worsened because of Covid-19. Because during the COVID-19 pandemic, there are PSBB regulations. The purpose of the PSBB law is to prevent the spread of COVID-19, which obligates people to work from home and minimize physical contact to decrease the transmission of the virus. Because of the PSBB regulations, many of PT XYZ's sources of income have been reduced. Sekretaris Perusahaan Waskita Beton Precast, Siti Fathia Maisa Syafurah said that the government allocated budget for

infrastructure projects is being switched to countermeasures Covid-19. This policy from the government impacted PT XYZ. One of the impacts is the decreasing sales for precast and the decrease of construction projects.

Moreover, because of PSBB Regulations, some of the construction projects have been delayed or stopped [6]. Also, because of PSBB regulations, traveling is prohibited, which decreased PT XYZ's revenue from toll road revenue and hotel room revenue. In 2020, the revenue of PT XYZ had been reduced by 50% from the last period, and the net loss of PT XYZ's reached 9.4 trillion IDR. Because of the failure, the firm value of PT XYZ has been decreased much. In the late 2019, PT XYZ's bond rating is A, which is rated by fitch rating Indonesia. However, in October 2020, the rating of PT XYZ had fallen into CCC+, which requires them to pay more cost of debt.

However, the problem doesn't stop there. Because of COVID-19, PT XYZ's shortage in cash flow in 2020 has reached 8.065 Trillion IDR. The shortage in cashflow also affected PT XYZ's current cash level. By the end of 2020, PT XYZ only has a total cash equivalent of 1.213 Trillion IDR. Currently, PT XYZ's has two company bonds that will be matured in September 2021. The total amount of cash from the two bonds that PT XYZ needs to pay its debt holders is 1.661 trillion IDR. In dealing with the bond debt of 1.661 trillion IDR, PT XYZ needs to review its repayment options in order not to cause further problems. Based on financial hierarchy, retained earnings is the most preferable type of financing by managers, since it offers the most flexibility and control [1]. But since the retained earnings of PT XYZ has dropped below zero, PT XYZ needs new financing sources from external.

Based on the PT XYZ annual reports 2020, there are some contracts that PT XYZ has with their debtholders, such as Current Ratio must be above 1x, Debt and Equity Ratio must be below 3x, Interest Service Coverage Ratio must be above 2x. Because of the decrease in performance since 2019, PT XYZ started to couldn't fulfill the responsibility of the contract. In 2019, the current ratio of PT XYZ is still at 1.09x, the debt-to-equity ratio at 3.5x, and the Interest Service Coverage Ratio at 0.97x. But COVID-19 makes it worse. In 2020, the current ratio of PT XYZ had reached 0.67x, the Debt-to-equity Ratio has reached 3.327x, and the interest service coverage ratio has reached -0.94x.

To resolve those problems, in the latest annual report, PT XYZ stated that they want to restructure their debt with banks, restructure the accounts payable, and search for alternative financing for their debt. PT XYZ also determined to keep the ratings of their obligations to get a lower cost of debt. Furthermore, PT XYZ needs to pay

attention to their future financing to get the lowest amount of cost of capital. A cost of capital would be minimum after reaching the best mix of debt and equity financing [1].

Optimal capital structure is a financing mix that reduces total borrowing costs while maximizing the firm value. Lower the cost of capital, higher the net firm value will be. All firms, whether private or public, would use both debt and equity. The choices in terms of financing and the type of financing used to change as a firm progresses through the life cycle, with equity usually dominates at the earlier stages and debt as the firm matures. Capital structure usually is used for the long-term period [1].

In summary, because of the decrease of PT XYZ's performance since 2019 which was worsened because of COVID-19, PT XYZ needs to find a new financing source to pay its bonds obligation debt. Therefore, it is important to find the optimal capital structure to find the optimal funding source for PT XYZ. The optimal capital structure also could help PT XYZ to fulfill their responsibility with the debt holder's ratio contract, which has been violated since 2019. The optimal capital structure also could improve the debt-to-equity ratio. There are two research questions that this paper wants to answer, including what the optimal capital structure for PT XYZ is (PERSERO) Tbk., Does optimal capital structure of PT XYZ could deal with the contract holders' ratio? and with what kind of financing sources PT XYZ (PERSERO) Tbk. should pay the debt?

There is some previous research that has been conducted on the optimal capital structure for PT XYZ, which is the paper from [13] and [14]. [13] is using 2013 data, while [14] paper using 2014 data, their research isn't suitable to answer the debt-to-equity ratio problem which is incurred in 2019, and the obligation debt in September 2021, since the financial condition of PT XYZ now and then is different. Thus, the author wants to make the optimal capital structure in order to restructure the debt-to-equity ratio in order to fulfill the requirement on the contract with debt and shareholders, also to search for the cheapest method to finance the obligation debt in 2021. Based on the Damodaran, A cost of capital would be minimum after reaching the best mix of debt and equity financing. Also, the optimal capital structure may improve the debt-to-equity ratio since the optimal capital structure is restructuring the debt level and the equity level of the company. Research of [14], using dividend model to estimate the cost of equity, while this research is using CAPM as the method to find the cost of equity. Both previous research does not consider the country default spread in their model.

II. METHODOLOGY

The author gathered the secondary data for the research. The historical stock price for PT XYZ and IHSG historical price is being taken from yahoo finance. The rest of data was taken in the annual report of PT XYZ.

Furthermore, the author is using the capital assets pricing model (CAPM) method to observe the cost of equity, whether its current cost of equity or optimal cost of equity. To seek the current cost of debt and optimal cost of debt, the author uses the Damodaran cost of debt (2020) model. To determine the current cost of capital, the author uses the weighted average cost of capital (WACC) method.

To seek the optimal capital structure, the author uses the Weighted Average Cost of Capital (WACC) method [1]. Another approach that I found to count the optimal capital structure is the apv approach, based on [1], APV approach ignore the expected bankruptcy costs, leading them to the conclusion that firm value increases as firms borrow money. In general, with the same assumptions, the APV and the cost of capital conclusions give similar answers. However, the APV approach is more practical when firms are evaluating the feasibility of adding a dollar amount of debt, whereas the cost of capital approach is easier when firms are analyzing debt proportions. Since this paper wants to see the most suitable financing method for PT XYZ, the cost of capital (WACC) method is more suitable to be used rather than the APV approaches. In this WACC method, the author will find the smallest cost of capital possible for PT XYZ to maximize the firm value of PT XYZ. At the end of this research, the author will suggest how much PT XYZ should decrease or increase its debt or equity value. The step below is the step on how to determine the optimal capital structure of PT XYZ:

Firstly, we need to calculate first the cost of debt for PT XYZ. The method to find the cost of debt for PT XYZ is the Damodaran EBIT based cost of debt model. To calculate the cost of debt, there are some variables that were needed for the model, which are the latest EBIT, Interest Expense, Damodaran default spread table at table 1, risk-free rate, and tax rate.

TABLE 1 DAMODARAN DEFAULT SPREAD FOR THE EMERGING MARKET

For all emerging market firms and developed market firms with market cap < \$5 billion			
If interest coverage ratio is >	≤ to	Rating is	Spread is
12,5	100000	Aaa/AAA	0,63%
9,5	12,50	Aa2/AA	0,78%
7,5	9,50	A1/A+	0,98%
6	7,50	A2/A	1,08%
4,5	6,00	A3/A-	1,22%
4	4,50	Baa2/BBB	1,56%
3,5	4,00	Ba1/BB+	2,00%
3	3,50	Ba2/BB	2,40%
2,5	3,00	B1/B+	3,51%
2	2,50	B2/B	4,21%
1,5	2,00	B3/B-	5,15%
1,25	1,50	Caa/CCC	8,20%
0,8	1.249999000	Ca2/CC	8,64%
0,5	0.799999900	C2/C	11,34%
-100000	0.499999900	D2/D	15,12%

Firstly, we need first to calculate the cost of debt for PT XYZ. The method to find the cost of debt for PT XYZ is the Damodaran EBIT based cost of debt model. To calculate the cost of debt, there are some variables that were needed for the model, which are the latest EBIT, Interest Expense, Damodaran synthetic rating to find the default spread data that could be seen below, country default spread, risk-free rate, and tax rate. The default spread could be retrieved from [11]. The first step to calculate the cost of debt is to find the interest expense for each debt level. To calculate the interest expense for each debt level, we need to multiply the total debt with the pretax cost of debt from the debt ratio before. After knowing the interest expense, we need to seek the interest coverage ratio. The calculation of interest coverage ratio could be found at the equation 2. After knowing the interest coverage ratio, we could see our estimated rating, and could know the default spread of the company, by looking in what range our interest coverage ratio laid in the Damodaran default spread table. Adding the company default spread and country default spread with the risk-free rate will generates number of the pretax cost of debt. After we got the pretax cost of debt, we need to do iterations again with the pretax cost of debt we have found. We need to do more iterations by repeating steps above since the different iterations could produce different interest expense and it is possible for the ratings to change. We keep doing those iterations until we reach the steady state, which when the last two iterations results match. After calculating the pretax cost of debt, we only need to multiply it with (1- tax) to get the after-tax cost of debt. $Interest\ Coverage\ Ratio = EBIT/Interest\ Expense$

(1)

$$Interest\ Coverage\ Ratio = \frac{Earnings\ Before\ Interest\ and\ Tax\ (EBIT)}{Interest\ Expense}$$

The second step is to calculate the cost of equity. The author uses the capital asset pricing method (CAPM) (2) to calculate the cost of equity for the PT XYZ. To calculate the cost of equity, we need some variables: risk-free rate, market risk premium, levered beta, and unlevered beta. The author uses the linear regression of the stock price with the market index returns to count the levered beta. The variables that are needed for the beta counting are the historical price of PT XYZ stocks and the market index of Indonesia (JKSE) historical price. The historical price is taken for the period of year 2019, as the author wants to calculate the beta of WSKT and market index during 2019. The historical price data is taken weekly, because based on [7], beta that are estimated on the weekly rates tend to be more stable, rather than daily or monthly basis. After counting the equity beta, the author needs to calculate the unlevered beta. From the unlevered beta, the author needs to find the levered beta for each debt level to find the cost of equity in each debt level. The equation for levered beta could be seen at (3), while for unlevered beta could be seen at (4). For the cost of equity using capital asset pricing, the model equation could be seen in (2).

$$CAPM = R_f + \beta_{Levered} \times [E(R_m) - R_f] \quad (2)$$

$$\beta_{Levered} = \beta_{Unlevered} \times [1 + ((1 - Taxes) \times DE \text{ Ratio})] \quad (3)$$

$$\beta_{Unlevered} = \beta_{Levered} \div [1 + ((1 - Taxes) \times DE \text{ Ratio})] \quad (4)$$

The next step is to find the weight of equity and the weight of debt. The author uses the market value for equity: market capitalization, the market value for the obligation of the bonds, and the book value for the bank loans. The market capitalization could be found by multiplying the share price with the shares outstanding, while for the market value of bonds, we use this equation (5). All the data needed for this equation could be found in the annual report of PT XYZ. The calculation on finding the weight of equity could be found at (6) and weight of debt at (7).

$$Current \ Bond \ Price = \sum (C_n / (1 + YTM)^n) + P / (1 + i)^n \quad (5)$$

$$Weight \ of \ Equity = Total \ Equity \div Total \ Capital \quad (6)$$

$$Weight \ of \ Debt = Total \ Debt \div Total \ Capital \quad (7)$$

The last step is to calculate the WACC for the current and the optimal capital structure. The author decides to divide the calculation into 2 steps, 10% margin and 1% margin. The first step is the WACC is being calculated in 10% multiple of debt level, and to look for the more detailed result, the WACC is being calculated in 1% multiple of debt level. The calculation of WACC can be found in (8). Then, the author needs to calculate the WACC at each debt level by using the components calculated from all three steps before: cost of debt, cost of debt, and weight of debt and equity. After finding the smallest amount of cost of

capital, the author will give suggestion regarding the cheapest cost of capital PT XYZ.

$$WACC = (W_d \times (R_d(1 - Taxes))) + (W_e \times R_e) \quad (8)$$

After the author gets the optimal capital structure from the last calculations, the author will compare the difference in current capital structure and the optimal capital structure and then offer the debt payment financing suggestion. The difference between the optimal capital structure and optimal capital structure will be the amount of money required to build the optimal capital structure and pay the debt in September 2021. The following steps to answer the research question could be seen in Figure 2.

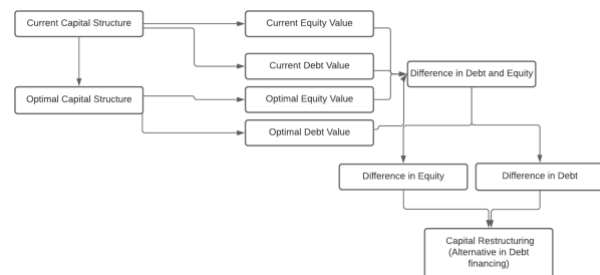


Figure 2: Data Analysis RQ 2

III. RESULTS

There are some assumptions that the author needs to retrieve to complete the calculation, which are risk free rate, market risk premium, tax rate and beta. The details about the assumption could be seen at the table below

TABLE 2 KEY ASSUMPTION

No	Type	Value	Description
1	Risk free rate	5%	BI Rate 7-day (Reverse) Repo Rate 31 December 2019
2	Market Risk Premium	4.90 1%	Expected market return from CAGR JKSE from 1991-2019 (9.901%) subtracted by risk free rate
3	Tax Rate	25%	Indonesia corporate tax rate 2019
4	Beta PT XYZ	2.64 53	Linear Regression Counting 2019, data taken weekly from 1 January 2019- 31

			December 2019
5	Indonesia Default Spread	1.59 %	[11] with damodaran method, data taken on 31 December 2019

Firstly, the author needs to calculate the current capital structure of PT XYZ. This step aims to know the current cost of capital of PT XYZ, and in the end, the author will compare the difference between the current and optimal capital structure.

Firstly, to determine the table to be used, we need to know the market capitalization from PT XYZ because Aswath Damodaran creates two different type of tables, one for the company that has market capitalization below 5 billion USD and one for the company that has a market capitalization bigger than 5 billion USD. The market capitalization could be known by multiplying the stock price and the shares outstanding. On 31 December 2019, the market capitalization of PT XYZ reached 20,157 trillion IDR, and if we convert it to USD (assuming 1 USD=14400), the market capitalization of PT XYZ is 1.357 billion USD. Thus, we will use the table for the company that has a market capitalization below 5 billion USD. Below is the step by step on how to calculate the current cost of debt for PT XYZ.

To start the calculations, we need to see the rating for the company to know its cost of debt. Because the expected return to bondholders, rather than the yield to maturity of corporate debt, is a correct value for the cost of debt [8]. We could see the rating for the bonds of PT XYZ in the annual report. For PT XYZ, the rating is A-. From there, we could see the default spread for PT XYZ based on the Damodaran default spread table is 1.22%. Adding the number with the risk-free rate and country default spread will give us the first cost of debt, which is 7.81%.

TABLE 3 CURRENT COST OF DEBT ITERATION 1

Rating of PT XYZ July 2019(A)	A3/A-
Default Spread (B)	1.22%
Cost of Debt (C= B+risk free rate + country default spread)	7.81%

The next step is we need to do the second iteration, because we need to see if the estimated cost of debt is already placed in the right category. The step that we need to do is calculate the interest expense, by multiplying the first cost of debt with the total debt. And then, we need to divide it with the EBIT, to generate the interest coverage ratio.

Thus, we got interest coverage ratio of 1.618. From the interest coverage ratio, we could get the expected rating which resulted into default spread, which is 5.150% and the cost of debt for 11.740%.

TABLE 4 CURRENT COST OF DEBT ITERATION 2

Interest Expense (D= Total Debt*C)	Rp	3,089,587
EBIT (E)	Rp	5,000,556
Interest Coverage Ratio (F= E/D)		1.618519471
Default Spread (G)		5.150%
Cost of Debt (H= G+risk free rate + country default spread)		11.740%

Since we don't get the same number of the cost of debt, we need to do more iteration. In the third iteration, we get the third cost of debt which is 15.230%. With the same step, we could get the third estimated cost of debt, as seen on the table below.

TABLE 5 CURRENT COST OF DEBT ITERATION 3

Interest Expense (I= Total Debt*H)	Rp	4,644,270
Interest Coverage Ratio (J= E/I)		1.076715253
Default Spread (K)		8.640%
Cost of Debt (L= K+ risk free rate + country default spread)		15.230%

Since we don't get the same number of the cost of debt with the iteration before, we need to do more iteration. In the fourth iteration, we get the fourth cost of debt, which is 15.230%. The fourth iteration of the cost of debt could be seen at the table below.

TABLE 6 CURRENT COST OF DEBT ITERATION 4

Interest Expense (M= L* Total Debt)	Rp	6,024,892
Interest Coverage Ratio (N= E/M)		0.829982736
Default Spread (O)		8.640%
Cost of Debt (P= O+risk free rate + country default spread)		15.230%

Since the cost of debt is same with the iteration before, we could assume that the estimated cost of debt of PT XYZ is 15.230%. As we could get the estimated cost of debt of PT XYZ, we could proceed to the next step, which is to calculate the after-tax cost of debt. we need to multiply it with the (1- effective tax rate), to get the after-tax cost of debt. For the effective tax rate calculation could be seen

below. As we could see on the table below, the after-tax cost of debt for PT XYZ in current debt level is 14.472%.

TABLE 6 AFTER TAX COST OF DEBT

Cost of Debt (P)	15.230%
Maximum Tax Income (Q)	Rp 299,752
Tax (R)	4.975%
After Tax Cost of Debt ($S=P*(1-R)$)	14.472%

The next step is we need to calculate the current cost of equity. The calculation of the current cost of equity could be seen at the table below.

TABLE 7 COST OF EQUITY

Variables	Values
Risk Free Rate (A)	5%
Expected Market Return (B)	9.901%
Market Risk Premium ($C=B-A$)	4.901%
Beta PT XYZ (D)	2.6453
Cost of Equity ($E= A+(D*(C))$)	17.96%

After we have known the current cost of debt and current cost of equity, we need to count the current weight of debt and the current weight of equity. The calculation could be seen at the equation below.

TABLE 8 WEIGHT OF EQUITY AND DEBT

Variables	Values (in Million IDR)
Total Equity (A)	20,157,317
Total Debt (B)	39,559,368
Total Capital ($C=A+B$)	59,716,685
Weight of Equity ($D=A/C$)	33.75%
Weight of Debt ($E=B/C$)	66.25%

The table above shows the total equity and total debt that PT XYZ had. The total equity is from the market capitalization of PT XYZ in 2019, and the total debt is from PT XYZ's annual reports. For the obligation, the author uses the market value, and for the rest, the author uses the book value since they couldn't be sold. The total debt only includes the long-term debt because capital structure

definition by [9] is the mix of long-term debt and equity provided by the firm. As we could see, the weight of equity: weight of debt of PT XYZ is 33.75%:66.25%

The next step to count the current cost of capital is to count by the WACC method. The calculation could be seen at the table below.

TABLE 9 CURRENT COST OF CAPITAL

Variables	Values
Current After-Tax Cost of Debt (Rd) (A)	14,472%
Current Cost of Equity (Re) (B)	17.964%
Weight of Debt (Wd) (C)	66.245%
Weight of Equity (We) (D)	33.755%
Weighted Average Cost of Capital (WACC) (E= see equation 11)	15.651%

As we could see from the table, after knowing the current cost of debt, the current cost of equity, the weight of debt, and equity from the previous step, we could calculate the cost of capital using the WACC method. As we can see, the current cost of capital of PT XYZ is 15.651%. The cost of capital is obtained from the current cost of debt multiplied by the weight of debt added by the current cost of equity added by the weight of equity.

The next step is to calculate the optimal capital structure for PT XYZ. The assumption that will be used on this step is the same as the last step, also the work stages are the same as before. The author needs to find the cost of debt, cost of equity, and weight of debt and equity. The difference is that the author will simulate the cost of debt, cost of equity, and Weighted Average Cost of Capital in each debt level, from 10% to 1%, to get more detailed results.

To calculate the cost of debt, the author used Damodaran EBIT based model. To determine the rating in each debt level, the author uses the interest service coverage ratio. The interest expense will always change when the debt level rises. The interest expense is acquired from through several iteration, until the interest expense at the last and the second last iteration matches, it's identical with the method to find the current cost of debt, which has been explained before. For the example when we calculate the interest expense for the 10% debt percentage, the first step

is we need to multiply the total debt with the cost of debt of debt ratio before. In this case, we need to multiply the total debt with the 0% debt percentage. Because the 0% debt percentage doesn't have any debt and interest, we assume the interest coverage ratio will be infinite, and the estimated bond rating will be triple A. Adding the default spread, which is 0.63% with the risk-free rate and country default spread will shows the cost of debt in the 0% debt ratio, which is 7.22%. After we got the cost of debt for 0% debt ratio, we could calculate the cost of debt for 10% debt ratio with the steps that has been stated in the last chapter. The calculation of the cost of debt for each debt level could be seen in the appendix

As we could see in the table, the tax rate of each debt level is different, because there is a maximum tax benefit. The maximum tax benefit of PT XYZ could be gathered from PPH (pajak penghasilan) of PT XYZ with an amount of 299,752 million IDR. As you can see, the maximum tax benefit of PT XYZ only covers the income until 20% debt ratio. The effective tax rate could decrease from 20%, because at the 21% debt ratio and above, the interest expense multiplied by 25% is bigger than the maximum tax benefit. The tax shield of PT XYZ is considered little because PT XYZ taxes mostly are a final tax rate. The final tax rate didn't deduct the interest income because the tax final tax rate is deducted from the revenue, not from EBT (Earning Before Tax) as the non-final tax rate/ income tax rate does. The effective tax rate could be different in each debt level because the interest rate changes in each debt level. The bigger the interest expense, the lower the effective tax rate. To calculate the effective tax rate of each level, the equation could be seen at equation 14. From the table above also, we could see that the higher the debt level, it becomes riskier, resulting in bigger default spread. The company bond ratings also decrease with higher debt level. The second step is to count the cost of equity for each debt level. To calculate the cost of equity in each debt level, the author needs to find the unlevered beta and then calculate the unlevered beta into the levered beta in each debt level. The equation of unlevered beta goes like this:

$$\text{Unlevered Beta: } \frac{2.64530}{((1 + (1 - 4.975\%)) * 1.96)}$$

The tax rate is only 4.975%, because it uses the effective tax rate that applied for the current debt level, which is 66.25%. The debt-to-equity ratio only consists of long-term debt and market capitalization of PT XYZ, since in the optimal capital structure counting only uses the long-term debt. After calculating the unlevered beta, the author

needs to convert it into levered beta for each debt level. The equation for this could be seen in equation 10. The calculations of the cost of equity for PT XYZ for each debt level could be seen in the following table:

Table 10 Optimal Cost of Equity

Debt (A)	Equity (B)	Debt To Equity Ratio (C=A/B)	Tax Rate (D)	Unlevered beta (E)	Levered Beta (F)	Cost of Equity (G)
0%	100%	0%	25.00 0%	0.9233 50635	0.9233 50635	9.53%
10%	90%	11%	25.00 0%	0.9233 50635	1.0002 96521	9.90%
20%	80%	25%	25.00 0%	0.9233 50635	1.0964 78879	10.37%
30%	70%	43%	18.61 2%	0.9233 50635	1.2454 22	11.10%
40%	60%	67%	10.68 9%	0.9233 50635	1.4731 19661	12.22%
50%	50%	100%	6.592 %	0.9233 50635	1.7858 3698	13.75%
60%	40%	150%	5.493 %	0.9233 50635	2.2322 96225	15.94%
70%	30%	233%	3.999 %	0.9233 50635	2.9916 70444	19.66%
80%	20%	400%	3.499 %	0.9233 50635	4.4875 05666	26.99%
90%	10%	900%	3.111 %	0.9233 50635	8.9750 11331	48.98%
100%	0%	99999 900%	2.312 %	0.9233 50635	902001 .8968	44204 20.89%

As we could see on the table, the cost of equity will always rise when the debt level is rising. Based on the theory, the more debt that the company has, the riskier it is. From the investor's perspective, the riskier an investment, the more return they would have. Thus, the more debt that the company has, there is also more cost of equity they must pay. From the table above, we could also see that the risks are scaled based on the value of levered beta.

After calculating the cost of debt and cost of equity for each debt weight, the author will calculate the cost of capital for PT XYZ by using the Weighted Average Cost of Capital (WACC) method. To find the optimal WACC, firstly, the author will use a 10% multiple from 0% debt weight to 100% debt weight. The calculation of the WACC method could be seen in the table below:

TABLE 11 OPTIMAL COST OF CAPITAL

Debt	Equity	D/E Ratio	Rd	Rd (1-t)	Re	WACC
0%	100%	0%	7.220%	5.415%	9.53%	9.53%
10%	90%	11%	7.370%	5.528%	9.90%	9.46%
20%	80%	25%	7.810%	5.858%	10.37%	9.47%
30%	70%	43%	8.990%	7.317%	11.10%	9.97%
40%	60%	67%	11.740%	10.485%	12.22%	11.53%
50%	50%	100%	15.230%	14.226%	13.75%	13.99%
60%	40%	150%	15.230%	14.393%	15.94%	15.01%
70%	30%	233%	17.930%	17.213%	19.66%	17.95%
80%	20%	400%	17.930%	17.303%	26.99%	19.24%
90%	10%	900%	17.930%	17.372%	48.98%	20.53%
100%	0%	9900%	21.710%	21.208%	4420420.89%	21.21%

The lowest cost of capital zone is highlighted, which is on 10%-20%. For the next step, in order to get more specific result, the author will repeat the step from searching the cost of debt for each debt level and searching for the cost of equity at each debt level in a margin of 1%.

TABLE 12 OPTIMAL COST OF CAPITAL – 1%

Debt	Equity	D/E Ratio	Rd (1-t)	Re	WACC
10%	90%	11%	5.5275%	9.9021%	9.465%
11%	89%	12.36%	5.5275%	9.9445%	9.459%
12%	88%	13.64%	5.6775%	9.9878%	9.471%
13%	87%	14.94%	5.6775%	10.0322%	9.466%
14%	86%	16.28%	5.6775%	10.0775%	9.462%
15%	85%	17.65%	5.7525%	10.1239%	9.468%
16%	84%	19.05%	5.7525%	10.1715%	9.464%
17%	83%	20.48%	5.7525%	10.2202%	9.461%

18%	82%	21.95%	5.7525%	10.2700%	9.457%
19%	81%	23.46%	5.8575%	10.3211%	9.473%

As you can see from the table above, the lowest cost of capital for PT XYZ is on debt level of 18%, and equity level of 82%. The combination of 18% debt level and 82% equity level resulted the cost of capital of 9.457%. There is a difference of 6.194% with the current capital structure on the cost of capital. Because there isn't any way to decrease the cost of capital of PT XYZ, the firm value of PT XYZ is maximized.

The next step is to find the financing for PT XYZ based on the optimal capital structure. Based on the WACC method, the least cost of capital is achieved when the debt proportion and equity proportion reach 18%: 82%. Below is the explanation for PT XYZ's future financing.

TABLE 13 FUTURE FINANCING FOR PT XYZ

Variable	Value (in Million IDR)
Current Total Equity	Rp 20,157,317
Current Total Long Term Debt	Rp 39,559,368
Current Total Capital	Rp 59,716,685
Optimal WE	82.0%
Optimal WD	18.0%
Total Optimal Equity	Rp 48,967,682
Total Optimal Long-Term Debt	Rp 10,749,003
Money to convert	Rp 28,758,498

From the table above, to achieve the optimal capital structure from the current capital structure, PT XYZ needs to decrease its debt by 28.758.498 million IDR. The optimal capital structure for PT XYZ consists of 82% equity and 18% the debt. Therefore, PT XYZ needs to reduce their long-term debt to 10,749,003 million IDR and increase their equity to 48,967,682 million IDR to achieve that ratio.

IV. DISCUSSION

To answer the second research question, PT XYZ needs to get financing from equity, such as creating new shares for the government or new shares to the public. Because from the optimal capital structure calculation, they must decrease their debt and increase their equity for 28,758,498 million IDR.

Since at the contract the counting of debt-to-equity ratio is using all interest debt, we need to adjust our optimal capital structure, because our model only includes long term debt only. We need to add the short-term debt to the equations to convert it to all interest-bearing debt. After adding the short-term debt into the calculation, the debt-to-equity ratio of PT XYZ is 81.023%, which is lower than the fulfillment of the contract, which is 300%. The equation could be seen at the table below.

TABLE 14 OPTIMAL CAPITAL STRUCTURE ALL INTEREST BEARING DEBT FOR PT XYZ

Total Optimal Equity	Rp 48,967,682
Total Optimal Debt + st debt	Rp 39,675,285
Current total Equity	Rp 20,157,317
Current total Debt	Rp 68,433,783
Total Capital	Rp 88,591,100
We optimal	55.27%
Wd +interest bearing debt optimal	44.785%
DER	81.023%

Based on [1], a behavioral perspective to sticking with the industry averages on the debt ratios of individual firms in the industry is too strong to be ignored, because there are two reasons behind it. The first one is following the leader. In this model, success, and reputation lead to one firm being anointed the leader for a sector. When this firm chooses a financing mix, presumably based upon its fundamentals, other firms in that industry then imitate the leader, hoping to imitate its success. The second factor is herd migration. A study by [10], using a parable of behavior of the birds and wilde-beast to explain why some companies choose to stick around to industry averages. They note that the same “safety in numbers” that induces animals to travel in groups also influences managers when they make financing choices. Put another way, a manager who chooses to take on a significant amount of debt, simply because other firms in the sector have also done so, is unlikely to be fired even if that debt turns out to be too high. In fact, if analysts follow the same herd mentality, they are likely to punish firms that deviate from the herd, even if that deviation can be justified on intrinsic grounds.

Looking across 182 firms in 10 sectors, they find evidence of herd behavior in 7 of the 10 sectors. Although comparisons of firm debt ratios to an industry average are commonly made, they are generally not very useful in the presence of large differences among firms within the same industry. [12] discover that industry average leverage ratios are stable over time and firms gravitate toward such ratios as if these ratios are optimal. They suggest that a firm’s industry average book value of debt to market-based equity ratio is a valid proxy for an optimal leverage ratio.

To make sure that PT XYZ optimal capital structure before, the author will compare the optimal debt to equity from the counting before and the debt-to-equity ratio from the behavioral perspective. As we could see, the optimal capital structure of PT XYZ could be reached at the debt level of 44.785%, or at the debt of equity ratio of 81.023%, while the debt to equity ratio of average construction industry of Indonesia, , in 2019 has an average of 2.14. Since the result is still far enough, we need to find another benchmark, to know if the capital structure of average Indonesian construction industry has been optimized yet. The author decides to find another benchmark, which are Malaysia and Singapore construction industry. For the sample, we decide to take biggest construction companies in Singapore and Malaysia based on the market capitalization. To count the Debt-to-Equity ratio, we used the same method, which are total interest-bearing debt divided by the market cap. For the debt, the author retrieved it from wsj.com, while for market capitalization counting, the author gathered it from yahoo finance. The result is the average debt to equity ratio for Singaporean construction company is 0.93x and average debt to equity ratio for Malaysian construction company is 0.75x.

The business model of construction usually requires a lot of capital to run the project. As PT XYZ is one of the state-owned companies, it is easier for PT XYZ to gather funds for their project. To gather the amount of the capital needed, PT XYZ could gather the money from the internal financing or the external financing. Because the construction project needs a large amount of capital, usually internal financing is not enough to cover the capital that a company needs. Because of that, the company usually needs external financing. Currently, PT XYZ always finances their project by using the debt, since it offers more liquidity rather than equity, and also won't create agency problems. It is proven by the big amount of debt to equity that the company has. Usually, the revenue that they get from a project is big and could be used to pay the debt that they owed. However, since the world has experienced pandemic conditions, the number of projects that could be completed by PT XYZ has decreased,

impacting the revenue that PT XYZ will have. It is better for PT XYZ to finance their capital from now on by the equity. Another factor that could be discussed is the tax rate for the construction company. In Indonesia, the tax rate used for construction companies is the final tax rate, which is deducted from the revenue. Because of this final tax rate, there won't be any tax saving for the company. Since the debt advantages aren't really shown, it is better to use equity as the form of the financing, as the tax saving does not really have a big impact, and also to avoid the probability of default, since the revenue of PT XYZ couldn't be sustained. For the comparison, as you can see, the big construction companies from other countries could sustain their business in the low level of debt. As for the lowest cost of capital might be in around of the average of debt-to-equity ratio, which is on Singapore construction company, Malaysia construction company and our optimal capital structure counting, it could be indicating that currently Indonesia construction company does not in the optimal condition.

V. CONCLUSION

PT XYZ Tbk's current capital structure is dominated by debt, which is the debt composition is 66.25% in the amount of 39,559,368 million IDR, and the equity composition is 33.75% with the amount of 20,157,317 million IDR. With this composition, the cost of capital of PT XYZ is 15.651%. After calculating the optimal capital structure with the weighted average cost of capital, the debt proportion will fall into 18%, and the amount will decrease to 10,749,003 million IDR, and the equity proportion will rise to 82%, and the amount of equity will increase into 48,967,682 million IDR. By doing this, the cost of capital for PT XYZ will decrease by 6.194%, to 9.457%. PT XYZ needs to decrease the debt and increase the equity by 28,758,498 million IDR to reach this debt and equity proportion. If we include all of the interest-bearing debt in the capital structure countings, the weight of debt of PT XYZ would be 44.785% and the weight of the equity of PT XYZ would be 55.274%, and it will result in 81.023% for the debt to equity ratio, which were lower than the contract regulations with the debt and shareholders. After knowing the optimal capital structure for PT XYZ, to pay their obligation debt due in September 2021 with 1.661 trillion IDR, PT XYZ should pay it with equity to decrease their cost of capital. The money that is used to convert debt-to-equity, which is 28,758,498 million IDR, could be used to pay their obligation debt. To reach this amount of equity, PT XYZ needs to issue some shares, whether its government shares or public shares.

In their latest annual report, PT XYZ stated that they want to keep their bond rating to get the lower cost of debt in the future. To do this, based on the Damodaran cost of debt model, which approximate the cost of debt with the interest coverage ratio, PT XYZ needs to keep their EBIT high or keeping the debt ratio low, in order to get the bond rating low.

PT XYZ should decrease their debt level because it's too risky to have debt in the Covid-19 pandemic season. While this research is conducted and being written, Indonesia still hasn't recovered from the Covid-19 pandemic. Since the company's revenue is still not yet recovered into pre-pandemic condition, the company should reduce their debt because the possibility of failing to pay the debt is stronger also, since the company didn't have enough income. In the current situation, it's better to have more equity because the default risk of a company increases during the pandemic. Although issuing some shares will find some dilution because currently, the stock markets have a negative price movement, it is better than having a high default risk.

Although PT XYZ is a state-owned company with a low probability of going bankrupt, and the fact that average construction companies' debt-to-equity ratio is higher than other industries, it's still better for PT XYZ to keep the debt level low. Because we couldn't know when another financial crisis would come, and as construction company is categorized as a cyclical company, which are rely on economic condition to get revenue, PT XYZ needs to be prepared with the probability of incoming financial crisis that could make the company bankrupt. Moreover, by using equity, PT XYZ could use the profit from the business to expand their business, not to pay its debt. Also, in the future, the sovereign wealth fund (SWF) of Indonesia will be launched soon. It is great for PT XYZ when the SWF of Indonesia is launched because the SWF of Indonesia could buy the shares of PT XYZ and make PT XYZ easier to earn more equity for the firm.

For the future researcher, the author recommends to research deeper into the methods to having more equity, as this research has already stated that PT XYZ should have more equity rather than debt in their financing. There are some ways that are available to adding equity for PT XYZ, and each method had its own strength and weakness. The following research question could be used for the future researcher:

- Should the company issue the new shares? Or should the company ask their debtholders to convert their debt into equities?
- How much shares should be issued if the company wants to issue the new shares? What should be the realistic price for the shares?

REFERENCES

- [1] Damodaran, A., 2015. Applied Corporate Finance. 4th ed. Wiley India.
- [2] Bps.go.id. 2021. Badan Pusat Statistik. [online] Available at: <<https://www.bps.go.id/indicator/4/216/1/banyaknya-perusahaan-konstruksi.html>> [Accessed 9 June 2021].
- [3] Stockbit.com. 2021. Stockbit - Investasi Saham Bersama Komunitas Saham Terbesar di Indonesia. [online] Available at: <<https://stockbit.com/#/symbol/WSKT>> [Accessed 9 June 2021].
- [4] Mediatama, G., 2021. *Progam pemulihan ekonomi, XYZ (WSKT) dapat dana talangan Rp 3,4 triliun*. [online] kontan.co.id. Available at: <<https://investasi.kontan.co.id/news/progam-pemulihan-ekonomi-waskita-karya-wskt-dapat-dana-talangan-rp-34-triliun>> [Accessed 1 July 2021].
- [5] XYZ. 2021. Tentang Kami - XYZ. [online] Available at: <<https://www.waskita.co.id/tentang-kami/>> [Accessed 9 June 2021].
- [6] Mediatama, G., 2021. Penundaan proyek akibat wabah virus corona menggerus bisnis material bangunan. [online] kontan.co.id. Available at: <<https://industri.kontan.co.id/news/penundaan-proyek-akibat-wabah-virus-corona-menggerus-bisnis-material-bangunan>> [Accessed 8 June 2021].
- [7] Momcilovic, M., Begovic, S. and Tomasevic, S. (2014) 'Influence of return interval on stock's beta', *Advances in Economics, Law and Political Sciences*, (January 2011), pp. 168–171
- [8] Baule, R., 2018. The cost of debt capital revisited. *Business Research*, 12(2), pp.721-753.
- [9] Gitman, L. and Zutter, C., 2012. *Principles of managerial finance*. 13th ed. Pearson.
- [10] Patel, J., R. Zeckhauser, and D. Hendricks. 1991. "The Rationality Struggle: Illustrations from Financial Markets,". *American Economic Review Papers and Proceedings*, pp. 232–236
- [11] Cota, R., 2021. *RPubs - Global Default Spreads & Risk Premiums*. [online] Rpubs.com. Available at: <https://rpubs.com/rafael_nicolas/crp> [Accessed 15 July 2021].
- [12] Bowen, R., Daley, L. and Huber, C., 1982. Leverage Measures and Industrial Classification: Review and Additional Evidence. *Financial Management*, 11(4), p.10.
- [13] Lukmana, M. and Soekarno, S., 2013. FINANCIAL PERFORMANCE ANALYSIS OF PTXYZ RELATED TO ITS INITIAL PUBLIC OFFERING STOCK PRICE AND FUTURE PROSPECT. *THE INDONESIAN JOURNAL OF BUSINESS ADMINISTRATION*, 2(12).
- [14] Wardani, M. and Damayanti, S., 2017. Debt or equity? Optimal capital structure in Indonesia's construction sector companies listed in Indonesia stock exchange (IDX). *International Journal of Monetary Economics and Finance*, 10(3/4), p.235.

Debt	Debt In Million IDR	Interest Expense	Interest Coverage Ratio	Expected Bond Rating	Default Spread	Risk Free Rate + Country Default Spread	Pretax Cost of Debt	Maximal Tax Benefit	Effective Tax Rate	R
0%	-	-	1000000.0000%	Aaa/AAA	0.630%	6.59%	7.22%	299,752	25.00%	5
10%	5,971,669	440,112	1136.2009%	Aa2/AA	0.780%	6.59%	7.37%	299,752	25.00%	5
20%	11,943,337	932,775	536.0948%	A3/A-	1.220%	6.59%	7.81%	299,752	25.00%	5
30%	17,915,006	1,610,559	310.4857%	Ba2/BB	2.400%	6.59%	8.99%	299,752	18.61%	7
40%	23,886,674	2,804,296	178.3177%	B3/B-	5.150%	6.59%	11.74%	299,752	10.69%	10
50%	29,858,343	4,547,426	109.9646%	Ca2/CC	8.640%	6.59%	15.23%	299,752	6.59%	14
60%	35,830,011	5,456,911	91.6371%	Ca2/CC	8.640%	6.59%	15.23%	299,752	5.49%	14
70%	41,801,680	7,495,041	66.7182%	C2/C	11.340%	6.59%	17.93%	299,752	4.00%	17
80%	47,773,348	8,565,761	58.3784%	C2/C	11.340%	6.59%	17.93%	299,752	3.50%	17
90%	53,745,017	9,636,481	51.8919%	C2/C	11.340%	6.59%	17.93%	299,752	3.11%	17
100%	59,716,685	12,964,492	38.5712%	D2/D	15.120%	6.59%	21.71%	299,752	2.31%	21

APPENDIXES – Cost of Debt 10%