

# The Impact of International and National Credit Rating Level on Capital Structure Optimization: Evidence from Indonesia Non-Financial Listed Firms

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**Abstract** Credit rating is a measure of a firm's creditworthiness in financial markets. The cost and benefit given from credit rating is supposed to affect the capital structure decision in the following year. This research examines the effect of each rating level on the capital structure level and examines how credit ratings are substantial for the firms to reach the optimal capital structure. It will also compare the impact of credit ratings from different agencies. Quarterly data of 110 firms that fulfil the requirements are gathered from 2010 until 2021. Panel data analysis using the fixed effects method shows a nonlinear U-shape between Standard & Poor's and Fitch's credit rating on capital structure level and on the distance to optimal capital structure level. Low and high rated firms tend to have higher debt levels in the following year and have a larger distance to the optimal capital structure level. Meanwhile, mid rated firms have lower debt levels and smaller distances. However, the result is opposite using Moody's rating and insignificant using PEFINDO's rating. This research suggests that credit rating is important to the capital structure decisions and other Indonesia firms could acquire credit rating especially from international rating agency.

**Keywords** Credit Rating, Capital Structure, Optimal Capital Structure

## 1. Introduction

As of today, there are still an ongoing debate in academic literature about which and how determinants influence the capital structure decision. Before credit rating-capital structure theory from Kisgen[1] is introduced, credit rating has been neglected from the capital structure determinants. Whereas, credit rating is an objective assessment to measure the creditworthiness or firm's ability to fulfil the financial obligations in a timely manner. A certain credit rating affects the image of the firm. Low credit rating shows a bad image since it represents high credit risk or low ability of the firm to fulfil its financial obligations within the due dates. Thus, they usually provide high interest or coupons to get funding through bonds. Therefore, the credit rating level of a firm implies different costs and benefits and is supposed to affect the capital structure of a firm in the next period. Supported by other studies, credit rating is one of the most important variables in making the capital structure decisions [2], [3].

Reviewing the previous research presents contradictory results and gaps. First, there are none of the previous researches that examine the credit rating on the distance of actual and optimal capital structure. Therefore, this research not only saw the impact of credit rating level on capital structure level, but also examine whether the capital structure decision made following the credit rating

level is endeavoured to maintain or lessen the distance between actual and optimal capital structure.

Second, there is only a little research that examines the effect of credit rating from different rating agencies. In Indonesia, firms could have credit ratings from different rating agencies. Firms may have national credit rating PEFINDO, and/or international rating such as Standard & Poor’s, Moody’s, and Fitch. Knowing how each top 3 international rating agency and national agency impacts the capital structure decision of firms will give more broad results about the credit rating significance. Therefore, this research will determine how each rating agency gives impact in the Indonesia firm’s capital structure decision.

Third, even if the research about credit rating significance on capital structure is growing, there are still several studies in different countries that exclude the credit rating as one of the capital structure determinants. Therefore, this research would like to enrich the international debate by examining the Indonesia context. This research would like to validate and evaluate the effect of both national and international credit rating on the capital structure decision of Indonesia non-financial listed firms. The firms taken as the sample should be listed in IDX and classified in non-financial firms since financial firms have different credit ratings. Moreover, the firms have to be rated by one national rating agency or minimum one international rating agency. Eventually, 110 firm’s quarterly data are gathered from 2010 until the first quarter of 2021 since prior to the year of 2010, there is much data that is unavailable.

## 2. Literature Review

This section explains the details about the theoretical foundation that was used in this research.

### 2.1. Capital Structure

Capital Structure refers to the combination of long-term debt and equity used by a firm, to finance their operation

process and assets (Figure 1). Although using debt is cheaper than equity, if the firm relies too much on debt, it will increase the risk of default in repayment. As well as using equity in order to reduce debt risks, relying too high on equity resulting in shares dilution or decreasing present shareholder’s value in the firm. Therefore, capital structure decisions should be properly managed to the optimal level. With optimal capital structure, firms could minimize the cost of capital and increase the firm’s value. Modigliani and Miller[4] presented one of the first theories that debt has no advantages for firms and thus a firm’s value should be independent from its capital structure. However, the realization of the tax advantages of debt financing led Modigliani and Miller[5] to conclude that capital structure is relevant to the total value of the firm, since the value of levered firms get higher than unlevered firms with the same risk, due to tax deductibility on interest.

Afterwards, two theories namely the trade-off theory and pecking order theory become the most common theories to explain how firms determine their capital structure and financing choices. In the trade-off theory, the capital structure decisions depend on the optimal level of capital structure which happens when there are balances between the benefits from tax advantages of debt financing and the cost from financial distress [6], [7]. In pecking order theory, firms finance their activities with retained earnings when feasible. The order of financial sources used was internal funds from profits, short-term securities, debt, preferred stock, and common stock [7].

As of today, there are still on-going debates in academic literature about which and how determinants influence the capital structure decision. Tangibility, liquidity, profitability, firm size, and business growth are commonly used to determine the capital structure factors. Previous studies presented contradictory results. Some results support the trade-off theory but others support the pecking order theory. The five capital structure determinants that are mentioned will be the control variables in this research and the detail could be seen in the later sections.

Balance Sheet			
Assets	Current Liabilities		
	Long-term debt	Debt capital	Total capital
	Preferred stock	Equity capital	
	Common stock		

Figure 1. Capital Structure Composition

## 2.2. Credit Rating

Credit rating is an objective assessment to measure the creditworthiness or firm's ability to fulfil the financial obligations in a timely manner. The function of credit rating at the firm level is to reflect the possibility of firms to pay their debt back without issues or being default. Generally, there are two big categories in credit rating which are investment grade and speculative grade. Following the Standard & Poor's credit rating, investment grade consists of rates from AAA, AA, A and BBB. It can be said that this category has a high credit rating and has lower risk of default. The other category is speculative grade that consists of BB, B, CCC, CC, C and D. This category has low credit rating and higher risk of default and is commonly referred to as junk bonds.

High credit rating reflects that firms are able to pay their debt corresponding with the loan agreement and thus resulting lower risk. Whereas, low credit rating reflects higher risk since firms are having trouble to fulfill the financial obligations. Last, default credit rating means that the firms are already stated unable to pay the principal debt and/or the interest. With lower rating and higher risk, firms normally increase their interest offer to the bondholders to get funding. Therefore, credit rating is assumed to affect the cost of debt and thus affects the firm's value as well.

## 2.3. Credit Rating Significance on Capital Structure

Credit ratings are a material consideration in manager's capital structure decisions due to the costs (benefits) associated with different rating levels [1]. Both upgrades and downgrades of credit rating affect significantly capital structure decisions of the American listed firms of the following year [8]. Downgraded firms to speculative grade reduce their debt issuance in the following year to reach the investment grade again. However, if the firms already reach the investment grade, they will increase their debt issuance without fear of being downgraded again. In contrast, Latin America, Germany, and Indonesia listed firms are not taking into account the credit rating changes to their capital structure decisions [9], [10], [11].

Meanwhile, with a different approach by using credit rating ordinal level instead of credit rating changes, there is a nonlinear inverted U-shape relationship between credit rating level and capital structure decisions of Asian and Pakistani listed firms [12], [13]. Mid-rated firms have a high level of debt while high and low-rated firms have a low level of debt. The different results of several empirical studies lead the researcher to assess the credit rating significance on capital structure decisions of Indonesia non-financial listed firms.

## 3. Materials and Methodology

This section discusses the details of procedures to

answer the research objectives and draw conclusions.

### 3.1. Hypothesis Development

Departing from the previous research, it can be concluded that credit rating has a contradictory relationship on capital structure. Moreover, there are still gaps that has not been examined. Thus, this research will examine the impact of credit rating level on capital structure level and on the distance between actual and optimal capital structure. The credit rating will be differentiate using international credit rating agencies (Standard & Poor, Moody's, Fitch) and national credit rating agency (PEFINDO). Besides, this research also includes control variables to separate their impact to the dependent variable. The model and hypothesis developed are shown in the Figure 2.

The hypotheses developed are departing from the previous researches which stated that credit rating has a significance effect in capital structure decision. First, this research developed hypotheses of the relationship between credit rating on the capital structure level in the following year. The hypotheses will be differentiated by different rating agencies following the Sajjad and Zakaria[12] recommendation. Thus, the hypotheses proposed as follows:

H1 = Standard & Poor's credit rating has a significant effect on the firm's capital structure level in the following year

H2 = Moody's credit rating has a significant effect on the firm's capital structure level in the following year

H3 = Fitch's credit rating has a significant effect on the firm's capital structure level in the following year

H4 = PEFINDO's credit rating has a significant effect on the firm's capital structure level in the following year.

Hereafter, this research developed hypotheses to assess the extent effect of credit rating which is the effect on the distance to optimal capital structure. The hypotheses are in line with previous research that found that credit rating has an impact on closing the gap between actual and optimal capital structure [10], [14]. Similar to the first section hypotheses, the hypotheses will be differentiated by different agencies. The hypotheses proposed as follows:

H5 = Standard & Poor's credit rating has a significant effect on a firm's distance to the optimal capital structure level in the following year

H6 = Moody's credit rating has a significant effect on a firm's distance to the optimal capital structure level in the following year

H7 = Fitch's credit rating has a significant effect on a firm's distance to the optimal capital structure level in the following year

H8 = PEFINDO's credit rating has a significant effect on a firm's distance to the optimal capital structure level in the following year.

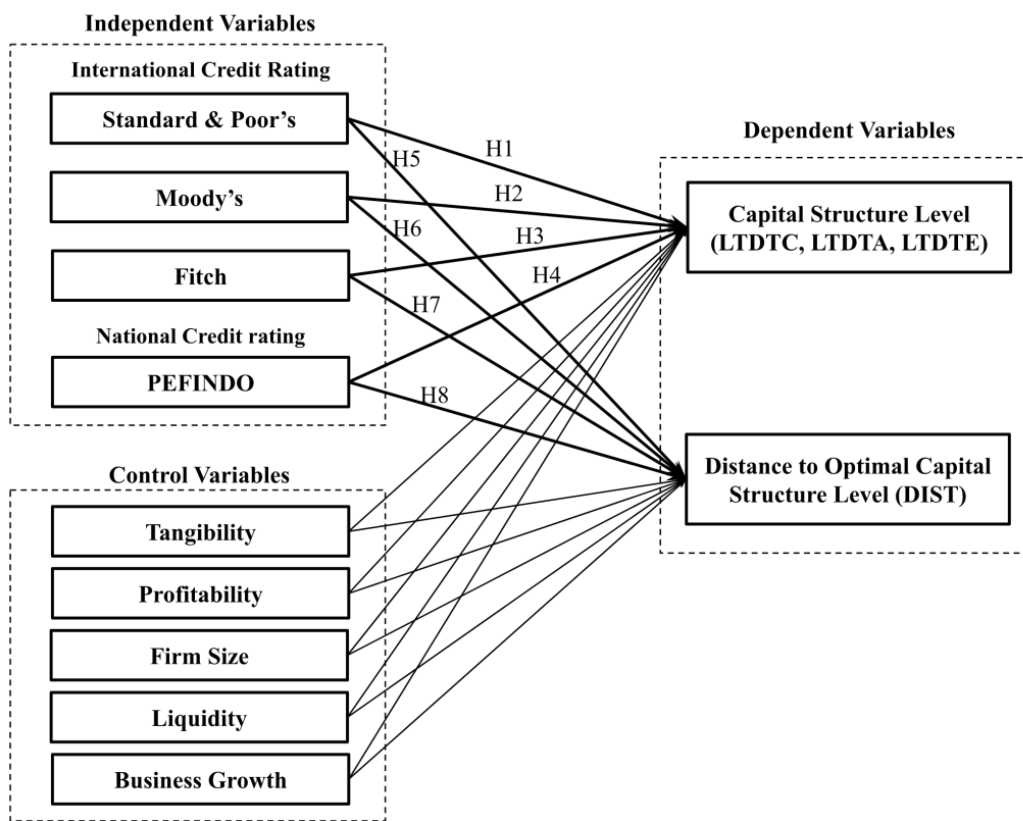


Figure 2. Hypotheses Development Model

3.2 Operation Variables

To test the relationship between credit rating and capital structure and to the distance to optimal capital structure level, the following dependent, independent, and control variables are used. The capital structure is measured using three proxies to increase the robustness, namely long-term debt to total capital ratio (LTDTC), long-term debt to total asset ratio (LTDTC), long-term debt to total equity ratio (LTDTC). The second dependent variable (DIST) is measured by the absolute distance between each capital structure proxy previously mentioned and the industry median leverage ratio (IMLR) of the previous period as the optimal level of capital structure. IMLR is used with assumptions that every sector has an optimal leverage ratio which becomes the target of firms that are in the industry.

The independent variables used are credit rating from difference rating agencies. This research uses Standard & Poor's (CR1), Moody's (CR2), and Fitch (C3) rating as the international rating and PEFINDO's (CR4) rating as the national credit rating. The coding method is employed to transform the ordinal value of credit rating into numerical value, as shown in Table 1.

The international credit rating is standardized together and this research excluded the AAA rating code since it is not found at all in the data set. Moreover, the coding scheme is differentiated between international and

national credit rating due to the big gap of rating code.

Table 1. Credit Rating and Assigned Numerical Coding

Individual Rating Code	International Credit Rating			National Credit Rating		Individual Rating Code
	Standard & Poor's	Moody's	Fitch	PEFINDO		
1	BBB+	Baa1	BBB+	idAAA		1
2	BBB	Baa2	BBB	idAA+		2
3	BBB-	Baa3	BBB-	idAA		3
4	BB+	Ba1	BB+	idAA-		4
5	BB	Ba2	BB	idA+		5
6	BB-	Ba3	BB-	idA		6
7	B+	B1	B+	idA-		7
8	B	B2	B	idBBB+		8
9	B-	B3	B-	idBBB		9
10	CCC+	Caa1	CCC+	idBBB-		10
11	CCC	Caa2	CCC	idBB+		11
12	CCC-	Caa3	CCC-	idBB		12
13	CC	Ca	CC	idBB-		13
14	C	C	C	idB+		14
15	SD		RD	idB		15
				idB-		16
				idCCC		17

The international credit rating is standardized together and this research excluded the AAA rating code since it is

not found at all in the data set. Moreover, the coding scheme is differentiated between international and national credit rating due to the big gap of rating code.

Moreover, there are 5 control variables used in this research, which are tangibility ratio, profitability ratio, firm's size, liquidity ratio, and business growth. This research combines the control variables that are most commonly used in the previous researches [12], [14], [15],

[16]. The use of control variables is to separate the impact of other factors than the interested variables to the dependent variable. By separating the impact of control variables to the dependent variable, the result obtained of the relationship between interested variables will have more reliable results.

The summary of variables used in this research are shown from Table 2.

**Table 2.** Variables Definitions

Variables	Code	Measurement	Explanation
<b>Dependent Variables</b>			
Capital Structure Level	LTDTTC	Long-term debt / Total capital	LTDTTC is one of the common measurement leverage ratios of capital structure. This proxy is used by Khaw[17], Chakrabarti & Chakrabarti[18], Workman & Rosenberg[19], and Shah et al.[20] to define capital structure.
	LTDTA	Long-term debt / Total asset	LTDTTC is one of the common measurement leverage ratios of capital structure. This proxy is used by Mirza et al.[16], Wojewodzki et al.[14], Titman & Wessels[21], and Nguyen et al.[22] to define capital structure.
	LTDTTE	Long-term debt / Total equity	LTDTTC is one of the common measurement leverage ratios of capital structure. This proxy is used by Myers[23], Mouton & Smith[24], and Nadeem et al.[25] to define capital structure.
Distance to Optimal Capital Structure	DIST	LTDTTC – Industry median LTDTTC ,  LTDTA – Industry median LTDTA ,  LTDTTE – Industry median LTDTTE	DIST measures the absolute distance between each capital structure proxy and the industry median leverage ratio of the previous period as the optimal level of capital structure. Industry median leverage ratio is used with assumptions that every industry has an optimal leverage ratio which becomes the target of firms that are in the industry. This proxy is used by Hull[26], Graham & Harvey[3], and Naomi et al.[27].
<b>Independent Variables</b>			
International Credit Rating	CR1	Please refer to Table 1 to check the numerical coding.	CR1 stands for Standard & Poor's credit rating. The type of rating that is used in this research is long-term issuer rating that is the most commonly used in research.
	CR2	Please refer to Table 1 to check the numerical coding.	CR2 stands for Moody's credit rating. The type of rating that is used in this research is long-term issuer rating that is the most commonly used in research.
	CR3	Please refer to Table 1 to check the numerical coding.	CR3 stands for Fitch's credit rating. The type of rating that is used in this research is long-term issuer rating that is the most commonly used in research.
National Credit Rating	CR4	Please refer to Table 1 to check the numerical coding.	CR4 stands for PEFINDO credit rating. The type of rating that is used in this research is long-term issuer rating that is the most commonly used in research.
<b>Control Variables</b>			
Tangibility	TANG	Fixed Asset / Total Asset	High tangibility ratio linked to high debt levels according to Hovakimian et al.[28] and Frank & Goyal[29]. The results support the trade-off theory. However, tangibility is also found to have a negative relationship with capital structure according to Titman & Wessels[21] and Booth et al.[30]. The results support the pecking order theory.
Profitability	PROF	Earnings after tax / total assets (ROA)	High profitability ratio is linked to low debt levels [4]. The results support the pecking order theory. However, profitability also found to have a positive relationship with capital structure [31]. Thus, supporting the trade-off theory.
Firm Size	SIZE	Ln (total assets)	Bigger firm size linked to high debt levels [21], [32], [33]. The results support the trade-off theory. However, firm size may also have a negative relationship with capital structure [34]. The result supports the pecking order theory.
Liquidity	LIQU	Current assets / current liabilities	High liquidity ratio linked to low debt levels [35]. Thus, supporting the pecking order theory. However, liquidity may also have a positive relationship with capital [36]. The results support the trade-off theory.
Business Growth	GROWTH	% Changes in total assets	High business linked to low debt levels according to Myers[37] and Bevan & Danbolt[38]. The results support the pecking order theory. However, business growth may also have a positive relationship with capital structure [38]. The result supports the trade-off theory.

### 3.3. Population Sample and Data Source

This research is focusing on non-financial firms listed on the Indonesia Stock Exchange since financial firms have different financial structures, special regulations, and different credit ratings from non-financial firms. Eventually, the main object of this research is 110 non-financial listed firms that have a national credit rating or minimum one international credit rating. Initially, this research used 45-quarterly time-series analysis from the first quarter of 2010 until the first quarter of 2021 since prior 2010, there are only few firms that have credit rating and there are several financial reports that are unavailable. However, this research uses the lag of one year relationship between the credit rating and capital structure which means that the dependent variable needs the credit rating data from the previous 4 quarters. Thus, the data used for dependent variables are only from the first quarter of 2011, indicating that the first quarter of 2010 until the fourth quarter of 2010 are unobservable and leaving the time-series to be only 41 quarters. All secondary data for dependent, independent, and control variables was gathered from the historical quarterly data of the financial report of each firm, using Thomson Reuters EIKON database.

### 3.4. Statistical Model

The statistical models divided into two dependent variables and stated as follow:

$$\text{Capstru}_{it} = \alpha_0 + \alpha_1 \text{CR}_{it-4} + \alpha_2 \text{CR}_{it-4}^2 + \sum_{k=1}^5 \beta_k \text{Control}_{k,it} + \varepsilon_{it} \quad (1)$$

$$\text{DIST}_{it} = \alpha_0 + \alpha_1 \text{CR}_{it-4} + \alpha_2 \text{CR}_{it-4}^2 + \sum_{k=1}^5 \beta_k \text{Control}_{k,it} + \varepsilon_{it} \quad (2)$$

Equation (1) is the statistical model to assess the effect of credit rating level to the capital structure level of firm  $i$  at time  $t$ . Equation (2) is the statistical model to assess the effect of credit rating level to the distance to optimal capital structure level of firm  $i$  at time  $t$ .

$\text{Capstru}_{it}$  is the capital structure level for firm  $i$  at time  $t$  and represented by long-term to total capital ratio (LTDTTC), long-term to total asset ratio (LTDTA), or long-term to total equity ratio (LTDTE). The different proxies will be tested separately in different models.  $\text{DIST}_{it}$  is the distance to optimal capital structure that is measured by the absolute subtraction of actual capital structure level for firm  $i$  at time  $t$  with the Industry Median Leverage Ratio (IMLR) from the previous year. The actual and optimal capital structure level will also be represented by three different proxies and tested separately in different models.  $\text{CR}_{it-4}$  is the credit rating lagged one year or 4 quarters, while the  $\text{CR}_{it-4}^2$  is the square term of the credit rating to capture the non-linear

relationship. The CR code could be CR1, CR2, CR3 or CR4 that represent credit ratings from different agencies. Besides,  $\alpha_0$  is the intercept,  $\alpha_1$ ,  $\alpha_2$ , and  $\beta_k$  are the slope parameters,  $\text{Control}_{k,it}$  is the control variables, and  $\varepsilon_{it}$  is the error terms.

### 3.5. Data Analysis Method

There are three main ways to run a panel data, which are pooled OLS model, fixed effect model, and random effect model [39]. Pooled OLS is the simplest model which pools all of the observations, meaning that it disregards the space and time dimension. Thus, Pooled OLS assumed to be inefficient when dealing with panel data. This research preferred the fixed effect model over pooled OLS since it is perceived to have individual specific effects. Another alternative is the random effect which assumes that the variables are a random sampling and the model is efficient when the individual-specific has no correlation with the regressors. Fixed effect is preferable than random effect since the sample taken is not a random sampling and the individual-specific effects are perceived to be correlated with the independent variables. The Hausman test also applied to make sure that the fixed effect choice is better than random effect. This research runs all models but is not completely presented in this paper. Moreover, this research may not have utilized a generalized moment of method (GMM) that could have addressed the endogeneity problem due to preventing inefficiency in small samples that this research has using Moody's rating. This also becomes the limitations of this research and thus it's included as a recommendation for future research to validate the results. However, according to Sajjad and Zakaria[12] that also examine credit rating and capital structure, it is found that both fixed effect and GMM gave consistent results. Thus, utilizing fixed effects as the common method in panel data regression is presumed to be sufficient in this situation. Furthermore, the classical assumption test that consists of multicollinearity, heteroscedasticity, and autocorrelation is also being tested to make sure that the model is optimal and not biased. Meanwhile, the normality test is neglected since the number of observations is above 100. All panel regression was conducted using the RStudio program.

## 4. Results and Discussion

This section exhibits the result of the research, whether the hypotheses are accepted or rejected.

### 4.1. Descriptive Statistics

Due to space limitation, the statistical results presented are only with the LTDTTC as the proxy of capital structure.

**Table 3.** Descriptive Statistics

Variable	Obs.	Mean	STD	Min	Max
Model 1.1					
DIST	707	0.2732	0.2298	0.00038	2.317
LTDTTC	707	0.3886	0.2758	0	2.5217
CR1	707	7.0707	2.2343	3	15
TANG	707	0.6121	0.1944	0.1575	0.98808
PROF	707	-0.0172	0.0622	-1.2173	0.152
LIQU	707	2.195	1.8876	0.00837	11.134
GROWTH	707	0.0654	0.1690	-0.6822	1.0008
SIZE	707	30.778	0.7308	28.4244	32.494
Model 2.1					
DIST	155	0.1662	0.109	0.00335	0.4311
LTDTTC	155	0.3248	0.1598	0.0488	0.6392
CR2	155	2.5484	1.0457	1	4
TANG	155	0.7227	0.1232	0.3462	0.8959
PROF	155	0.0156	0.0187	-0.0399	0.05101
LIQU	155	1.2099	0.8129	0.2796	4.2848
GROWTH	155	0.0835	0.1083	-0.155	0.4135
SIZE	155	32.082	0.4872	31.177	33.1402
Model 3.1					
DIST	615	0.2650	0.1878	0.0015	1.8592
LTDTTC	615	0.4057	0.2091	0	2.2681
CR3	615	6.099	2.5212	1	15
TANG	615	0.6099	0.2051	0	0.9881
PROF	615	0.0047	0.0392	-0.4917	0.152
LIQU	615	2.1227	1.7954	0.0091	11.0991
GROWTH	615	0.0888	0.1780	-0.4447	1.10694
SIZE	615	30.906	0.9187	28.9921	33.1402

**Table 3.** Descriptive Statistics (Cont.)

Model 4.1					
DIST	1212	0.1786	0.2297	0.00002	4.2218
LTDTTC	1212	0.2777	0.2453	0	4.3071
CR4	1212	5.773	2.5873	1	18
TANG	1212	0.5438	0.1994	0.018	0.9881
PROF	1212	0.0055	0.0538	-0.978	0.7061
LIQU	1212	1.5829	1.1104	0.0091	13.0742
GROWTH	1212	0.1165	0.2152	-0.7858	1.6088
SIZE	1212	30.091	1.3376	26.167	33.140

Based on the Table 3 above, the mean of each capital structure level across the credit rating type was not very different from each other. However, the number of observations is different due to the different firms included in each credit rating model, which then probably show different characteristics. In total, there are 36 firms rated by Standard & Poor's with 707 total observations, 7 firms rated by Moody's with 155 total observations, 36

firms rated by Fitch with 615 total observations, and 69 firms rated by PEFINDO with 1212 total observations. Results using other proxies which are LTDTA and LTDTE are available upon request. As additional information, although firms that are rated by Moody's are only 7, the total observations are still above 100, which then still allows panel data to get conclusions.

## 4.2. Regression Results

The table exhibits the panel data regression result of 4 models with LTDTTC as the capital structure proxy but different credit rating agencies. Model 1.1 uses Standard & Poor's, model 2.1 uses Moody's, model 3.1 uses Fitch, and model 4.1 uses PEFINDO's rating. The model applied a cross-sectional fixed effect technique. Time series is 41 quarters between 2011-2021. TANG is tangibility ratio;

PROF is profitability ratio; LIQU is liquidity ratio; GROWTH is business growth; SIZE is firm size. The Hausman Test is to validate that the fixed effect model is more preferable than random effect; VIF score is to check multicollinearity; White test is to check heteroscedasticity; Wooldridge test is to check autocorrelation. Models with heteroscedasticity and/or autocorrelation problems use robust standard error estimation. \*, \*\*, \*\*\* indicates significance level at 10%, 5% and 1%, respectively.

**Table 4.** Regression Results of Credit Rating on Capital Structure Level

Dependent Variable: Capital Structure Level								
Coefficient	(1.1)	VIF score	(2.1)	VIF score	(3.1)	VIF score	(4.1)	VIF score
Hausman	0.00019		0.00000		0.00000		0.00030	
White Test	0.00000		0.06032		0.00000		0.00000	
Wooldridge	0.00000		0.00000		0.00000		0.00000	
Constant	1.35364		-3.12253***		0.67300		1.76302	
CR	-0.12671***	8.521276	0.11671***	12.207166	-0.11677***	8.799035	-0.09097	10.718867
I(CR <sup>2</sup> )	0.00762***	7.369871	-0.02630***	10.355810	0.00956***	6.363236	0.00728	7.472138
TANG	0.09093	3.709577	0.07141**	3.753164	-0.23806	4.544570	0.73646*	4.133698
PROF	0.59629***	1.201957	-0.81605**	2.035349	-0.20536	1.336819	-0.52997	1.167972
LIQU	0.01587	2.455895	0.02236**	3.022430	0.02044***	2.400219	0.06385***	2.401743
GROWTH	0.02897	1.275291	-0.01056	1.228520	-0.06861	1.245745	0.02289	1.252379
SIZE	-0.00292	3.037397	0.10387***	3.309809	0.00908	4.185630	-0.05731	5.878825
Observations	707		155		615		1,212	
R <sup>2</sup>	0.59023		0.96117		0.76813		0.60157	
Adjusted R <sup>2</sup>	0.56431		0.95759		0.75110		0.57564	
F Statistic	22.77217***		268.45140***		45.11659***		23.19878***	

**Table 5.** Regression Results with Credit Rating on the Distance to Optimal Capital Structure Level

Dependent Variable: Distance to Optimal Capital Structure Level								
Coefficient	(1.1)	VIF score	(2.1)	VIF score	(3.1)	VIF score	(4.1)	VIF score
Hausman	0.00148		0.002242		0.00000		0.00000	
White Test	0.00000		0.1798		0.00000		0.00000	
Wooldridge	0.00000		0.00016		0.00000		0.00000	
Constant	2.14173		1.67132		2.14359		2.58060	
CR	-0.13668***	8.521276	0.06973***	12.207166	-0.13677***	8.799035	-0.08389	10.718867
I(CR <sup>2</sup> )	0.00861***	7.369871	-0.02315***	10.355810	0.01057***	6.363236	0.00684	7.472138
TANG	-0.00451	3.709577	-0.18851	3.753164	-0.30513	4.544570	0.74714*	4.133698
PROF	0.36959**	1.201957	-1.25310***	2.035349	-0.36929*	1.336819	-0.49893	1.167972
LIQU	0.00786	2.455895	-0.00316	3.022430	0.01547**	2.400219	0.05575***	2.401743
GROWTH	-0.02683	1.275291	-0.01435	1.228520	-0.06833	1.245745	0.03602	1.252379
SIZE	-0.03371	3.037397	-0.04094	3.309809	-0.04171	4.185630	-0.09004	5.878825
Observations	707		155		615		1,212	
R <sup>2</sup>	0.56781		0.87252		0.76813		0.57294	
Adjusted R <sup>2</sup>	0.54047		0.86077		0.75110		0.54515	
F Statistic	20.77050***		74.23599***		45.11659***		20.61342***	



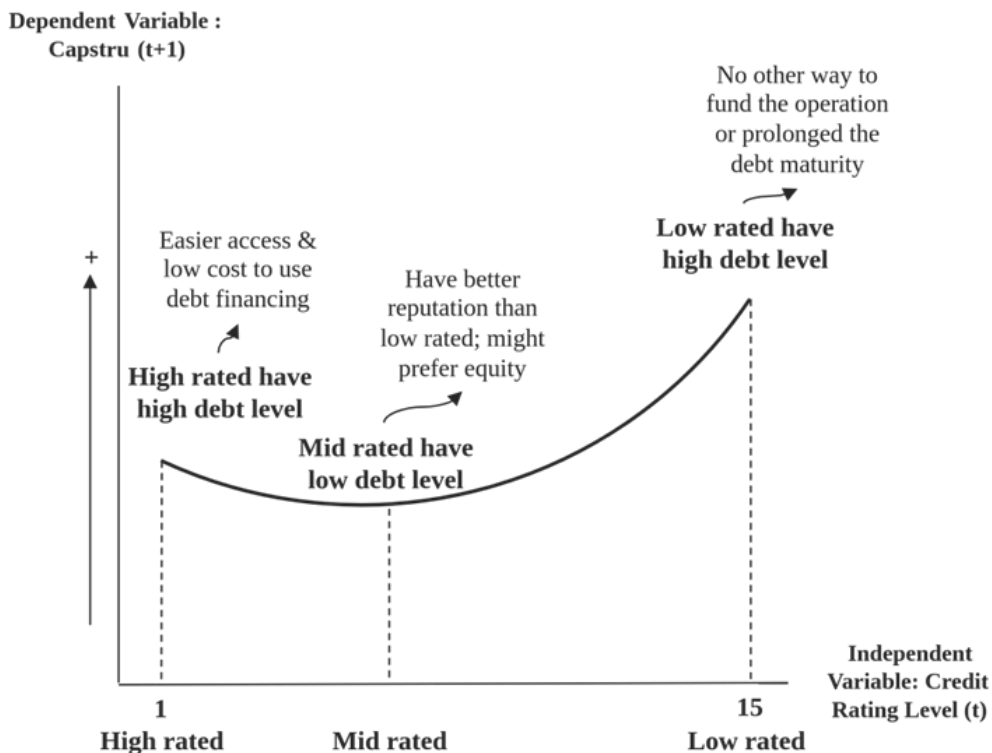
The table exhibits the panel data regression result of 4 models with LTDC to the IMLR as the proxy of optimal capital structure level, but with different credit rating agencies. Model 1.1 uses Standard & Poor's, model 2.1 uses Moody's, model 3.1 uses Fitch, and model 4.1 uses PEFINDO's rating. The model applied a cross-sectional fixed effect. Time series is 41 quarters between 2011-2021. TANG is tangibility ratio; PROF is profitability ratio; LIQU is liquidity ratio; GROWTH is business growth; SIZE is firm size. The Hausman Test is to validate that the fixed effect model is more preferable than random effect; VIF score is to check multicollinearity; White test is to check heteroscedasticity; Wooldridge test is to check autocorrelation. Models with heteroscedasticity and/or autocorrelation problems use robust standard error estimation. \*, \*\*, \*\*\* indicates significance level at 10%, 5% and 1%, respectively.

**4.3. Discussions**

Based on Table 4, there is a significant effect at 1% between Standard & Poor's, Moody's, and Fitch credit rating on the capital structure level in the following year. Therefore, accept hypotheses using international rating agencies which are H1, H2, and H3. However, PEFINDO's rating shows insignificant impact thus rejecting H4.

The illustration graph of Standard & Poor and Fitch ratings are shown in Figure 3. However, the exact skewness and turning point is not taken into account.

The result presents a non-linear U-shape relationship with the capital structure level in the following year. It means that firms with low and high credit rating levels tend to have a higher debt in the following year while the mid-rated firms have lower debt. High rated firms have a better reputation in fulfilling the financial obligations thus having an easier access to debt financing and do not require high interest offers. This opportunity seems to be employed by high-rated firms in Indonesia that have Standard & Poor's or Fitch rating to issue more debt, thus supporting the trade-off theory. The findings aligned with Drobetz and Heller[10] and Krichene and Khoufi[8] but were also contradictory in terms of the low-rated firms. This research shows that low-rated firms have higher debt levels while the previous research stated that low-rated firms are likely to strengthen or even reduce their debt in order to repair the credit rating. The high debt level of low-rated firms could take place due to some probable scenario. First, firms may have no other methods to fund their financial activities due to poor operation, so they issue more debt. Second, firms that are projected to be unable to pay their debts could negotiate with debt holders to extend the debt maturity, resulting in higher payment in the future. However, this unusual occurrence is beyond the scope of this research and needs further research. On the other hand, the low debt level for mid-rated firms may be caused due to their preference of issuing equity instead of debt. Mid-rated firms might be more conservative in issuing debt to maintain their rating and prefer equity with better access than low-rated firms.



**Figure 3.** Illustration of Standard & Poor's and Fitch Rating Relationship on Capital Structure Level

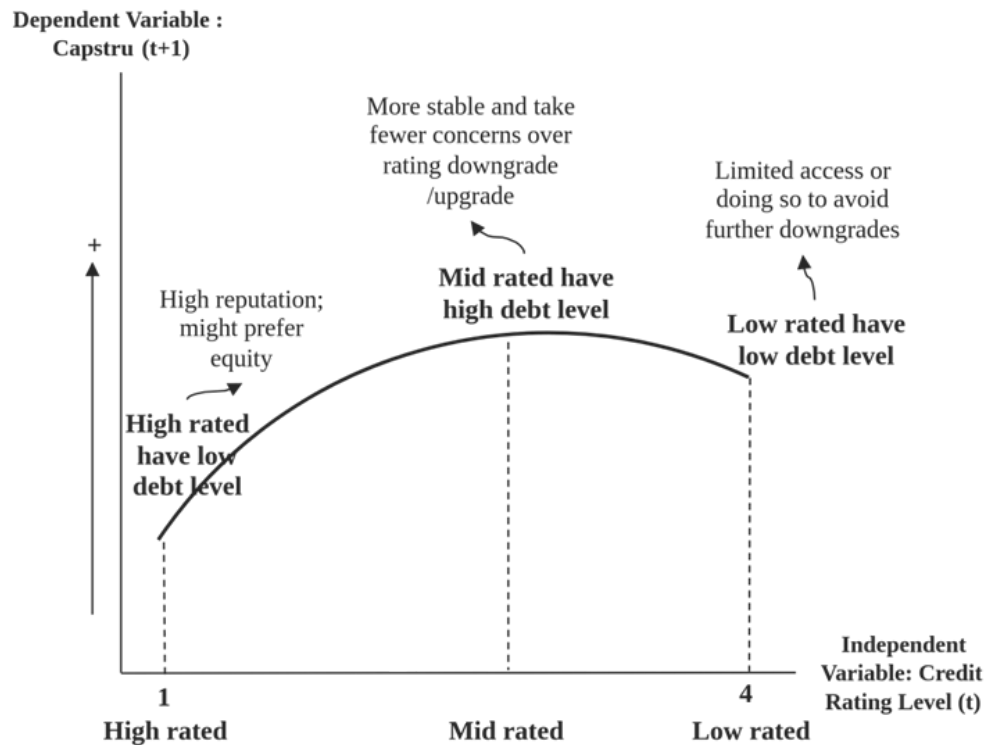


Figure 4. Illustration of Moody's Rating Relationship on Capital Structure Level

The illustration graph of Moody's rating is shown in Figure 4. However, the exact skewness and turning point is not taken into account.

Using Moody's rating, the result exhibits a non-linear inverted U-shape with the capital structure level in the following year. These findings support the previous research by Sajjad and Zakaria[12] and Ali and Javid[13]. It means that firms with low and high credit rating level tend to have a lower debt in the following year while the mid-rated firms have higher debt. High-rated firms are less opaque in the eyes of investors which lead up to lower information asymmetry, therefore decreasing the cost of equity financing and increasing the probability to issue equity. This opportunity seems to be employed by high-rated firms in Indonesia that have Moody's rating to issue more equity instead of debt. While for the low-rated firms, they also have lower debt that might be due to the limited access to debt financing and in order to avoid further downgrades. On the other hand, mid-rated firms have higher debt levels since they are more stable and take fewer concerns over rating downgrade or upgrade as compared to high and low rated firms.

Moving on to the second dependent variable which is the distance to optimal capital structure. Based on Table 5, there is a significant effect at 1% between Standard & Poor's, Moody's, and Fitch credit rating on the distance to optimal capital structure level. Therefore, accept

hypotheses using international rating agencies which are H5, H6, and H7. Moreover, PEFINDO's rating still shows insignificant impact thus rejecting H8.

The illustration graph of Standard & Poor and Fitch ratings are shown in Figure 5. However, the exact skewness and turning point is not taken into account.

Using Standard & Poor's and Fitch's credit rating, the result presents a non-linear U-shape relationship with the distance to optimal capital structure level in the following year. Following up the previous section, firms with low and high credit rating level tend to have a higher debt in the following year while the mid-rated firms have lower debt. Afterward, this section extends the impact of credit rating in terms of the distance to optimal capital structure level. Obtaining a similar result means that high-rated and low-rated firms have a higher debt and also a bigger distance to the optimal capital structure level. Thus, it can be concluded that they adjust their capital structure level and enjoy the advantages of debt financing without optimizing the distance to the optimal level, which fails to support the trade-off theory. On the other hand, mid-rated firms have lower debt levels and also a smaller distance to the optimal capital structure level. Thus, it can be concluded that they adjust their capital structure and enjoy equity financing to strengthen or improve their distance to optimal capital structure.

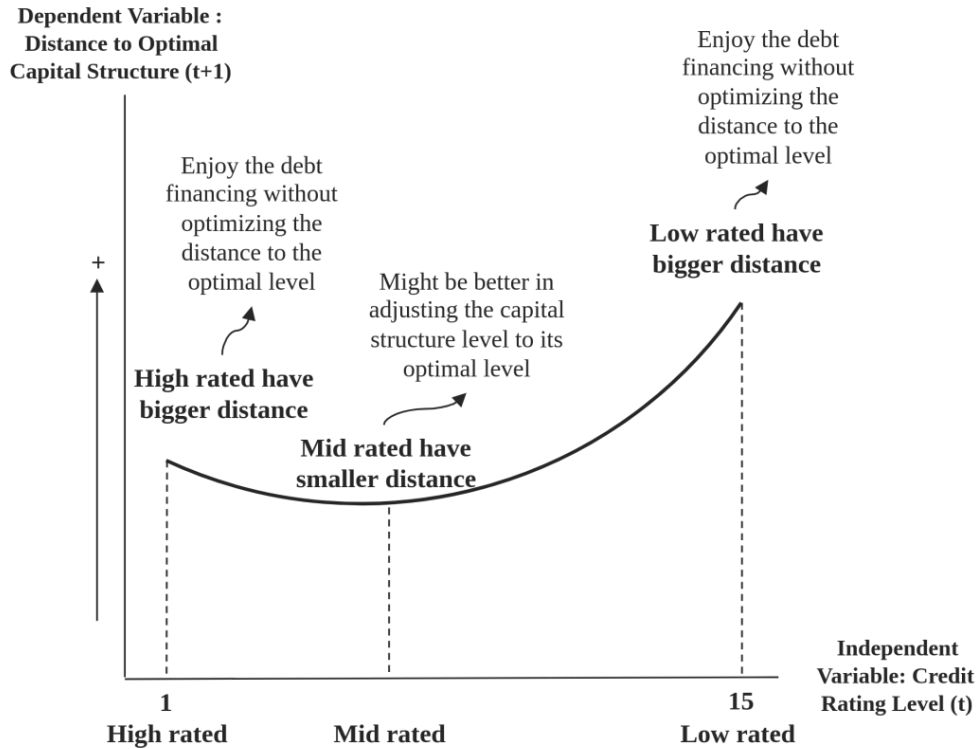


Figure 5. Illustration of Standard & Poor's and Fitch Rating Relationship on the Distance to Optimal Capital Structure Level

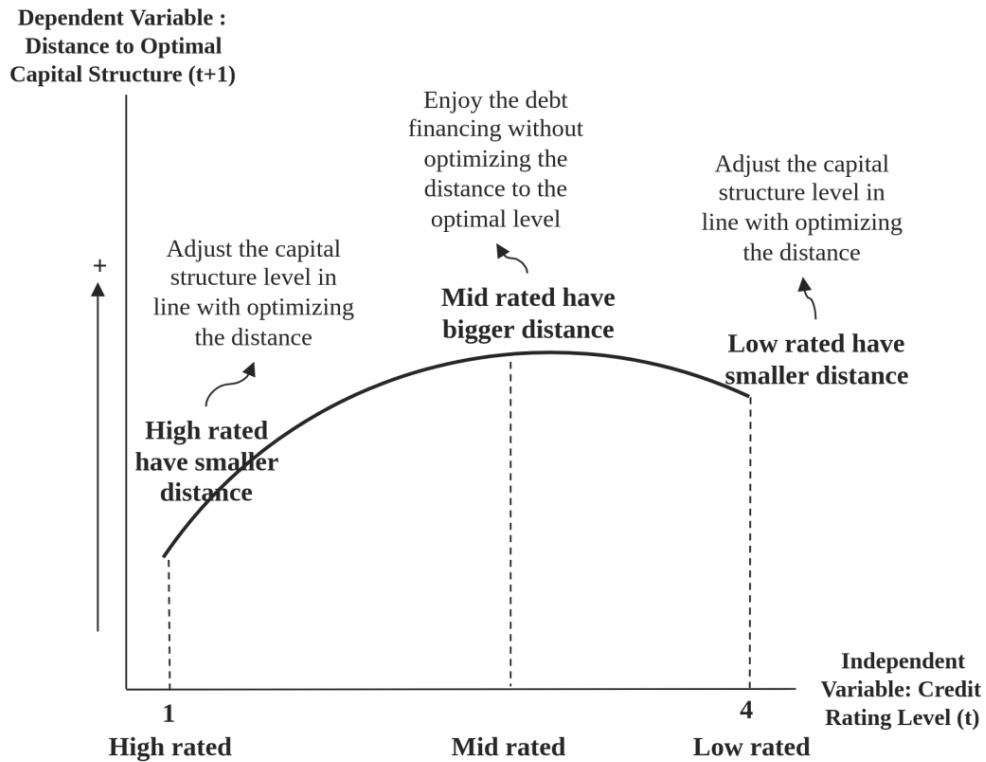


Figure 6. Illustration of Moody's Rating Relationship on the Distance to Optimal Capital Structure Level

The illustration graph of Moody's rating is shown in Figure 6. However, the exact skewness and turning point is not taken into account.

Using Moody's rating, the result exhibits a non-linear

inverted U-shape with the distance to optimal capital structure level in the following year. Following up the previous section, firms with low and high credit rating level tend to have a lower debt in the following year while

the mid-rated firms have higher debt. Following up the previous section, firms with low and high credit rating level tend to have a lower debt in the following year while the mid-rated firms have higher debt. Obtaining a similar non-linear U-shape result means that high-rated and low-rated firms have a lower debt and also a smaller distance to the optimal capital structure level. Thus, it can be concluded that they adjust their capital structure level in line with optimizing the distance to the optimal level. On the other hand, mid-rated firms have high debt levels and also a bigger distance to the optimal capital structure level. Thus, it can be concluded that they adjust their capital structure and enjoy debt financing without optimizing the distance to optimal capital structure.

The different results obtained between Standard & Poor's, Fitch, and Moody's might be caused by different assessment criteria that are conducted by each international rating agency. Its differences might give different reactions to the firms. However, this research acknowledged that firm's sample using Moody's ratings is much less than using other rating agencies. Thus, expanding samples to other regions are recommended, especially to add samples of firms rated by Moody's.

Furthermore, this result also finds an interesting result which states that national rating from PEFINDO is insignificant on the capital structure decision of Indonesia listed firms. If we take a look back, the data using PEFINDO rating contains more stable conditions, meaning that the rating assigned doesn't change often. Moreover, there are high ratings issued which is idAAA using PEFINDO rating while using the international rating, the highest rating found is only BBB or the equal ratings. It might imply that PEFINDO as the national rating agency gave high ratings more easily and could cause firms to presume that the national ratings are no longer important in their capital structure decisions. The result using PEFINDO rating is in line with previous research that also examines PEFINDO ratings on capital structure[11].

The above results obtained are robust, meaning that excluding the firms with few sample observations and state-owned firms doesn't materially change the results. The relationship is still significant and the coefficient direction is still the same. This research also finds that tangibility, profitability, liquidity, and firm size have a significant impact on both dependent variables, while business growth has an insignificant impact.

## 5. Conclusion and Recommendation

With the panel data regression using fixed effect model, this research shows that firms with international credit rating of Standard & Poor's and Fitch agency have a non-linear U-shape relationship to the capital structure level and to the distance to optimal capital structure in the

following year. It means high-rated firms enjoy the advantages of high credibility and the debt financing even though the capital structure is getting more away than the optimal level. In contrast, firms with international credit rating of Moody's agency have a non-linear inverted U-shape relationship to the capital structure level and to the distance to optimal capital structure in the following year. On the other hand, the national credit rating of PEFINDO has no significant relationship at all with the capital structure level and to the distance to optimal capital structure in the following year.

This research finds that international credit rating is an important determinant of capital structure level in the following year. Non-rated firms in Indonesia could choose to obtain the international credit rating with the benefit given such as decreased information asymmetries due to creditworthiness scrutiny from the professional rating agency, resulting in better credibility validation and easier access to debt financing. However, obtaining credit rating does not always give a better access to debt financing if the rating is not maintained well. Firms should maintain their rating to ensure the stability of the access to issue debt. In depth, firms better incorporate the cost and benefit from rating with the cost and benefit from debt and equity financing, thus maintaining a certain desired rating and achieving the optimal level of capital structure.

For future research, adding a macroeconomic condition such as GDP growth, inflation, and real interest rate, as the control variables might give other findings about how the external conditions affect the firm's financing decision. Second, due to only a few Indonesia firms that are rated by the rating agencies, the sample used in this research is still limited and could not be distinguished based on every sector. Further research could also take into account the other regional firms such as Asian firms to enrich the sample and validate the findings. Third, this research applied the fixed effect panel regression technique which was quite restricted to include the lagged dependent variable as the independent variable. Therefore, future research could also apply Generalized Moment of Method regression technique which could efficiently take into account the lagged dependent variable as the independent variable since the current capital structure level may also be influenced by its previous value. Thus, including a lagged dependent variable as the regressor may also decrease the autocorrelation problem. Future research could compare the result with and without lagged dependent variable on the right side. Fourth, this research counts heavenly on the actual capital structure level with its optimal level. Future research might also want to examine the effect of credit rating with the net debt and net equity issuance, to capture the exact firm's choice of using rather retained earnings, debt, or equity, assessing the pecking order theory. Fifth, this research uses IMLR as the optimal level for the firms within a sector. To validate these research findings, future research could also

try to calculate optimal capital structure for each individual since each firm might have their preference and condition. Sixth, future research might be needed to observe the difference between credit rating agencies. The different criteria and assessment process of each rating agency might affect the firm's behavior on dealing with their capital structure decisions. Lastly, for general purposes of capital structure research, credit rating, especially rating generated by the top three international agencies should be considered as one of the important determinants of capital structure level. Taking account of the credit rating as one of the determinants will ensure correct interpretations and provide a more accurate depiction of the behavior of firms regarding the capital structure decisions.

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