The Determinant of Capital Structure in Mining and Metal Company

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Abstract. A mining sector has substantial capital and funding needs. It triggered the go public company to continue to improve its performance to attract investors, especially PMA. The increase in production in this research was measured through the company's capital structure pattern. The variables that were wanted to know the effect on the company's capital structure in the mining sector in ROA, IOS, tangibility assets, taxes, and sales growth. Based on the results of multiple linear regression analysis using panel data with a fixed effect model was as the best model in this research. The test results through the t test showed that ROA, taxes and sales growth had a non-significant effect on the capital structure, while the IOS variables and charges had a significant influence on the development of capital structures. Whereas through a simultaneous test, the independent variables together had a significant effect on the capital structure.

Keywords: ROA, IOS, tangibility assets, tax, sales growth, and capital structure.

1 Introduction

A mining sector is excellent for foreign and domestic investors, as noted by BAPPENAS that based on sector/line of business, in the fourth quarter of 2016, five sectors that contributed the most to the realization of FDI in a row were the Basic Metals, Metals Machinery, and Electronics with a percentage of 14.3 percent, Mining at 14.3 percent. In addition to high growth, mining companies also have a high level of risk, which is related to the risk of fluctuations in commodity prices of mining goods in world commodity markets, as well as dangers in exploration activities carried out by mining companies.

The mining sector also has substantial capital or funding needs and in the long-term. The funding needs related to the facilities and the infrastructure in the process of extracting mining goods. The funding source or capital structure is a long-term financing comparison as measured by the level of debt to equity [1]. The capital structure has been of interest for researchers in the field of financial theory for over 60 years [2]. The problem of capital structure is a significant decision for the company because in general, the primary goal of the company is to maximize the value of the company. Important decisions were taken by company managers that are related to the long-term funding source strategy used by the company and the source of the funds originate, the number of funds, the amount and composition of funds used.

The problems often happened that the companies used the debt as a tool to access the availability of dividends that must be shared with shareholders. Such a strategy would drive the company towards systemic bankruptcy. Therefore an alternative approach must be made, including allocating company profits in the form of retained earnings, so that it would strengthen

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the capital position. While the average net income owned by the mining sector between 2014 and 2016 had decreased by more than 20 percent. The measurement of earnings could be seen through the ratio of Return on Assets (ROA), which was the ability of companies to earn profits with the level of sales of total assets owned and own capital. In this research, the Capital structure is calculated by comparing the total company debt with total equity held by the company and measured using the Debt to Equity Ratio (DER) ratio [3].

As one of the measurements for the capital structure in a company could be seen from the side of the tangible assets of the company. Real assets have an essential place; therefore, mining and metal have a capital-intensive structure. This allows the mining and metal sector to borrow from a wide range of different channels. Also, activity and financial risks of mining and metal companies are very high risks [4]. Most capital structure theories argue that the type of assets owned by a firm in some way affects its capital structure choice [5]. Investors would be more comfortable in assessing companies when companies had an asset tangibility value that was greater than the cost of asset intangibility. The number of tangible assets showed the number of assets that the company uses to generate profits. Based on the trade-off theory, the tax rate should be positively related to the company's' debt, because of higher income that should be a shield from taxation. However, empirical results fail to support this statement. Most of the results do not find a significant impact of the tax on the capital structure [6].

The performance of the mining sector experienced many problems in the period 2013 to 2015, at the beginning of 2013 increasingly depressed as mining commodity prices in the international market were down. The questions also occurred in 2014 mining related to government policies that required all non-oil and gas mining companies to export all metal ore from processed material production by using a smelter process. In 2015, the Global mining sector recorded a net loss of US $ 27 Billion (Annual Report of Pricewaterhouse Coopers (PwC). This was the case where market capacity fell by 37 percent.

Through some of the explanations above, this article tries to review the results of studies that examine the strength of the direct influence of the dependent variables that have been determined on the capital structure of mining companies in Indonesia. This article is divided into two parts, where the first part describes the background and method of conducting research and continues the next section is the presentation of the results of the test.

2 Research Method

2.1 Research Type and Data Source

This research was descriptive research and used quantitative research methods. The data were secondary data whose population was obtained from the Indonesia Stock Exchange with data samples were companies in the Metal and Mineral Mining Sub-Sector as many as 6 companies. The data needed in this research comes from the company's annual financial statements, especially balance sheet and income statement in PT Aneka Tambang (Persero) Tbk, PT Cita Mineral Investindo Tbk, PT Cakra Mineral Tbk, PT Central Omega Resources Tbk, PT Vale Indonesia Tbk, PT J Resources Asia Pacific Tbk, PT SMR Utama Tbk, dan PT Timah (Persero) Tbk. The data was panel data which was a combination of time series data and cross-section data from 2011 to 2016 that had been published from the Indonesia Stock Exchange or Bank Indonesia or www.idx.co.id and www.sahamok.com, as well as www.bi.go.id. The data

collection techniques used documentation techniques that were obtained through notes or documents

2.2 Data Analysis

This section showed the results of the data analysis used. The study used Eviews version 10 to choose the best regression model between common effects, fixed effects, and random effects.

a. Model Conformity Test

Chow test is a test by looking at the results of F statistics to choose a better model between the common effector fixed effect models. Hausman test is a statistical test to select whether the fixed effect or random effect model is best used.

b. Analysis of Multiple Linear Regression

The multiple linear regression equation models in this research that was done by transforming the regression equation into a logarithmic form. The main purpose of transformation was to change the scale of measurement of the original data into a semi-log form, was a form of logarithms used for several independent variables that were positively correlated so that it was easy to test the hypotheses in this study. The equation model was written as follows:

$$Y = \alpha + b1\ X1 + b2\ X2 + b3\ X3 + b4\ X4 + b5\ X5 + e \qquad (1)$$

c. Test of Classical Assumptions

The classic assumption test was done as a requirement for processing multiple linear regression data with panel data by using the e-views program 10. The traditional assumption test conducted in this research was the normality test, multicollinearity test, heteroscedasticity test, and autocorrelation test.

3 Result and Discussion

3.1 Model estimation test

a. Chow Test

To determine the best statistical model the first test conducted in multiple regression analysis with panel data was the chow test. Based on the results of the chow test, the analysis output is table 1.

Table 1. Chow Test Processing Output

Effects Test	Statistic	d.f.	Prob.
Cross-section F	10.165900	(5,20)	0.0001
Cross-section Chi-square	45.523559	5	0.0000

It was from the result; it was known that the probability value with a significance of 5% is equal to 0,0001 or less than the significance value, the best method based on the chow test was

the fixed effect method. However, the next test was still needed to determine whether the fixed effect method was the best in this research, namely through the Hausman test.

b. Hausman Test

The Hausman test was used to select the most appropriate model used between the fixed effect model or the random effect model. The results of the Hausman test data processing output are as follows:

Table 2. Hausman Test Processing Output

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.000000	5	0.0010

Based on the results of the Hausman test obtained p-value less than 5% significance value that was equal to 0.0010, it could be concluded that based on the results of the chow test and Hausman test, the best model that could be used in estimating this research was the fixed effect model.

c. Multiple Regression Analysis

After estimating the most appropriate model used in this research was the fixed effect, then the next was to estimate to identify the results of multiple regression tests on the fixed effect model. This research used Return On Assets (ROA), Investment Opportunity Set (IOS), tangibility Asset, tax and sales growth as independent variables. While the dependent variable used in this research that was the capital structure using the debt ratio or Debt to Equity Ratio (DER) as the parameter. The mathematical equation model for this research as follows:

$$DER = C1 + C2 * ROA + C3 * IOS + C4 * \text{Asset Tangibility} + C5 * Tax + C6 * growth + (CX = R) \quad (2)$$

Based on the results of processing the following equations are obtained:

$$DER = -10.61398 + (0{,}041092) * ROA + (0{,}170204) * IOS + 102{,}5244 * \text{Asset Tangibility} + 0{,}497162 * Tax + 0{,}163159 * growth + (CX = R) \quad (3)$$

Based on the output of multiple linear regression in table 3, it was known that the intercept results were -10.61. This gives the intention that when the independent variables were zero, then the capital structure variable decreases by 10.61. However, if each independent variable increases by 1%, then:

1. Increased ROA of 1%, would reduce DER by -0.041092.
2. Increased IOS of 1%, would reduce DER by -0.170204.
3. Increased Asset tangibility of 1%, would increase DER by 102.5244
4. An increased tax of 1%, would add a DER of 0.497162
5. Increased sales growth of 1%, would multiply the DER by 0.163159

Table 3: Results of Processing Multiple Linear Regression with Fixed Effect Model

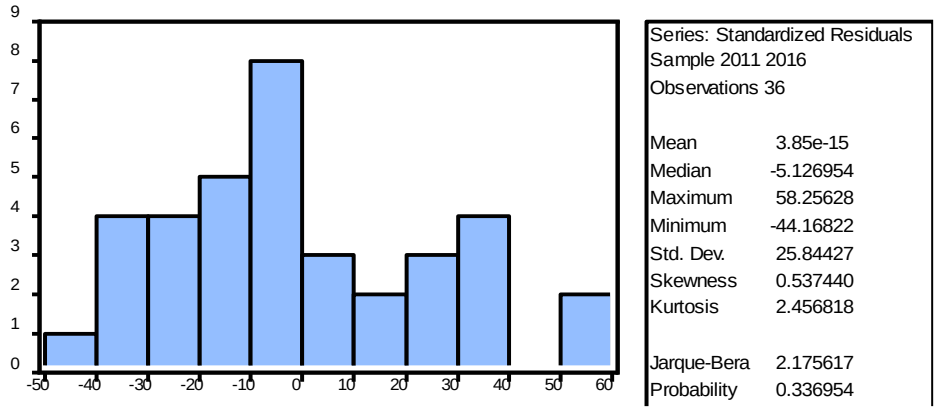
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-10.61398	18.95334	-0.560006	0.0017
X1?	-0.041092	0.400423	-0.102622	0.0693
X2?	-0.170204	0.268546	-0.633798	0.0334
X3?	102.5244	51.63917	1.985400	0.0210
X4?	0.497162	2.279085	0.218141	0.2295
X5?	0.163159	0.664654	0.245480	0.0786
R-squared	0.822801	Mean dependent var		24.98972
Adjusted R-squared	0.689902	S.D. dependent var		29.86760
S.E. of regression	16.63221	Akaike info criterion		8.761661
Sum squared resid	5532.607	Schwarz criterion		9.465448
Log-likelihood	-141.7099	Hannan-Quinn criteria.		9.007302
F-statistic	6.191164	Durbin-Watson stat		1.483992
Prob(F-statistic)	0.000124			

d. Test of Classical Assumptions

Normality Test

According to Winarto (2009) Histograms and Jarque-Bera Tests were used to test the normality of the data used in software e-views.

Table 4.: Normalitas Test Processing Output



Based on the results of the normality test, it was known that the probability value of 0.336954 was more significant than the 5% significance value. Therefore it could be concluded that H0 was accepted which meant that the residuals in the data were normally distributed so that the data got the assumption of normality.

Multicollinearity Test

Based on the results of the classic assumption test for testing the existence of a definite relationship between independent variables or multicollinearity tests described in the table 5 in the table it could be concluded that the independent variables were Return On Assets (ROA), Investment Opportunity Set (IOS), Asset tangibility , tax and sales growth had a tolerance value> 0.8 and VIF value <0.8, it could be proved that the linear regression equation in this research was free from the assumption of multicollinearity.

Table 5: Multicollinearity Test Results

	X1	X2	X3	X4	X5
X1	1.000000	0.021661	0.139082	0.210955	-0.083524
X2	0.021661	1.000000	-0.035317	0.053150	-0.016536
X3	0.139082	-0.035317	1.000000	0.018999	-0.215651
X4	0.210955	0.053150	0.018999	1.000000	0.050122
X5	-0.083524	-0.016536	-0.215651	0.050122	1.000000

Heteroscedasticity Test

Table 6. Heteroscedasticity Test Processing Output

	Value	df	Probability
Likelihood ratio	1.774950	6	0.9392
LR test summary:			
	Value	df	
Restricted Log L	-167.6499	30	
Unrestricted Log L	-166.7624	30	

The result of heteroscedasticity tests indicated the presence or absence of deviations in the form of variance inequalities from residuals for all observations in the regression model (Gujarati, 2012). In this research, the results of heteroscedasitisat testing were presented in table 6. Based on these tables, the results of the LR test showed the probability of F-statistic greater than α (0.05) which was equal to 0.9821 which meant that there was no problem of heteroscedasticity in this research data.

3.2 Hypothesis Test

a. Partial Significance Test (t-test)

This test aimed to determine the effect of each independent variable (ROA, IOS, tangibility, tax, sales growth) which one was the most dominant to the dependent variable (capital structure). Determination of the hypothesis accepted or rejected was determined from the probability value. If the probability value used is 5% or 0.05. Significance testing is:

H_0 : not significant

H_1 : significant

If the probability (sig t)> α (0.05), then H0 was accepted and H1 was rejected

If the probability (sig t) <α (0.05), then H0 was rejected, and H1 was accepted

The results could be concluded from the t-test on each independent variable based on table 3. The result from the relationship of ROA to the Capital Structure explains that the probability was 0.0693; this value was higher than = 5% (0.05). It could be concluded that H1 was rejected and accepts H0, meaning that the ROA variable had a positive but not significant relationship to the Capital Structure. It was concluded that the profitability variable measured by using the ROA ratio had a contribution of 0.041092 or had an effect on the Capital Structure but the effect could be neglected, so that the size of the profit of a company had a small and negligible effect on the company's funding sources. This result from this study support [7] research that firms tend to choose retained earnings to finance most of the funding needs, so the higher the level of profitability, the smaller the proportion of debt in the firm capital structure

For the result influence of IOS on the capital structure that the probability of 0.0334 was obtained, this value was less than α = 5% (0.05). It could be concluded that H1 was accepted and rejected H0, meaning that the IOS variable had a significant influence on the Capital Structure. It was concluded that the Investment Opportunity Set variable had a contribution of 0.1702 or had a negative effect on the Capital Structure but its influence could not be ignored, so the size of the opportunity to develop company investment had a considerable influence on the development of corporate funding sources which would ultimately be able to increase company profits.

For the result influence of Asset Tangibility variable on the capital structure that the probability of 0.0210 was obtained, this value was less than α = 5% (0.05). It could be concluded that H1 was accepted and rejects H0, meaning that the Asset Tangibility variable had a significant influence on the Capital Structure. It was concluded that the Asset Tangibility variable had a contribution of 102,524 or had a positive effect on Capital Structure and its influence could not be ignored, so the size of the addition of tangible assets of the company had a large influence on the development of the company. With the existence of tangible assets owned by companies such as machinery, the opportunity for mining companies to expand their business and expand production.

For the result influence of tax variable on the capital structure that the probability of 0.2295 was obtained, this value was higher than = 5% (0.05). It could be concluded that H1 was rejected and accepted H0, meaning that the tax variable had no significant influence on the Capital Structure. It was concluded that the tax variable had a contribution of 0.497 or had a positive effect on the Capital Structure but the effect could be neglected, so the size of the company tax increase was in line with the addition of company profits or net income. When a company experienced an increase in profits, the corporate tax would increase and be followed by additions to the company's capital structure .

For the result influence of sales growth variable on the capital structure that the probability was 0.0786, this value was higher than α = 5% (0.05). It could be concluded that H1 was rejected and accepts H0, meaning that the sales growth variable had no significant influence on the Capital Structure. It was concluded that the sales growth variable had a contribution of 0.1631 or had a positive effect on the Capital Structure but the effect could be ignored, so the size of the company's sales growth was in line with the addition of company profits or net income. When a company experienced an increase in profits, this was triggered by an increase in sales growth, and was followed by an increase in the company's capital structure.

b. Simultaneous significance test (F test)

Simultaneous significance test or F test aimed to determine how much influence the independent variables (ROA, ISO, asset tangibility, tax, and sales growth) together with the dependent

variable (capital structure). Based on the results of processing in table 3, it could be concluded that F count> F table or 6.191> 2.82. That was the independent variables (ROA, IOS, Tangibility Asset, tax, and sales growth) simultaneously (simultaneously) significantly influenced the dependent variable (Capital Structure). Therefore H1 was proven by the Adjusted R-squared level of 0.6899 or 68%.

c. Test the coefficient of determination (R2)

Determination test aimed to find out how much the independent variable in this research that was able to explain the dependent variable. Based on table 3, the R2 value was 0.822. This value could be read 82% or close to number 1, which meant that the independent variables (ROA, IOS and Asset Tangibility, tax, sales growth) were quite strong in explaining the dependent variable, namely the capital structure.

4 Conclusion

Based on the results of data analysis and discussion that has been done in the previous sections. Then conclusions can be drawn for this study as follows:

1. From 5 (five) independent variables, there are 2 variables (IOS and tangibility assets) that have a significant influence and 3 variables (ROA, tax and sales growth) have a non-significant effect on capital structure
2. This model explains the relationship between the independent and dependent variables of 82% and 18% indicated and defined by the variables outside the model in this study
3. This research uses data specifically for mining companies only in Indonesia, so it is possible that it is not able to present the population adequately. So, for further research combined with other companies so that it can be more clarified

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