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# The Effect of Capital Structure and Firm Size on Firm Value Through Profitability as Intervening Variable

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## ABSTRACT

The aim of this study was to investigate the effect of capital structure and firm size on firm value through profitability as an intervening variable. This study was conducted among manufacturing companies in various industrial sectors in Indonesia Stock Exchange (IDX) during the period 2013-2017. The dependent variable was the value of the firm measured by PBV. The independent variables were the capital structure measured by DER and firm value measured by ln (total assets). Profitability as intervening variable was measured by ROA. This study used secondary data extracted from the financial statements of 17 public companies. Analysis was conducted using multiple regression of panel data, path analysis and sobel test. The results showed that firm size and capital structure had significant effect on profitability, while firm size, capital structure and profitability had significant effect on firm value. The results also showed that profitability was able to mediate the effect of firm size and capital structure on firm value.

**Keywords:** Firm Value, Profitability, Capital Structure, Firm Size, Intervening Variable

## 1. INTRODUCTION

In this modern times, human beings' needs are not only limited to meeting the basic needs, but also extended to the secondary needs that can support their activities and welfare, such as the need of vehicles, electronic goods, and travelling. Companies that are members of various industrial sectors in the Indonesia Stock Exchange (IDX) are engaged in industries that support these needs. The various industrial sectors meant in this study are the nine industrial sectors listed on the IDX. These sectors include automotive and components, textiles, electronics, and others. Table 1 shows the growth of the average stock prices of various industrial sectors over the past six years.

**Table 1.** The growth of stock prices among various industrial sectors

EoY	PRICE(IDR)	JKMISC		I/D
		INCREASE/DECLINE (IDR)	(%)	
2013	1.205,01	(131,51)	(9,84)	Decline
2014	1.307,07	102,06	8,47	Increase
2016	1.057,28	(249,79)	(19,11)	Decline
2016	1.370,63	313,35	29,64	Increase
2017	1.381,18	10,55	0,72	Increase
2018	1.394,43	13,25	0,96	Increase

The years of 2013 and 2015 were the worst years for these sectors due to an extraordinary decline in average stock prices. In 2016, the situation improved with an increase of 29.64%, but unfortunately the increase in the following years was only a very small figure (below 1%), even though companies in these sectors were producing life-support products that were very important for community activities [1].

The phenomenon that occurred in this various industrial sectors arises our interests to investigate the factors affecting the value of the company (or firm) in these sectors.

The up and down in stock prices reflects the value of the firm. Low stock prices indicate the low value of the firm, which means the low interest of investors to invest their funds in such firm. Conversely, high stock prices reflect investors' confidence in the firm, because it is considered having high value.

For firms that have already gone public, the value of the firm will be reflected in the market value of its stock price. The firm's high stock price will cause its value to increase. Maximizing the value of the firm is the main goal of every firm, because high firm value means increasing the owners' prosperity [2]. The higher the value of the firm will further increase the investors' interest to invest, so the firm can grow bigger or expand with the capital invested by investors.

Research about firm value has been done a lot, but they haven't produced consistent results yet. Some researches showed that profitability has positive and significant impact on firm value, which have been conducted by [3] and [5]. Research conducted by [6] and [7] showed that profitability did not have significant effect on firm value. Furthermore, another research showed positive and significant relationship between capital structure and firm value [6][8]. On contrary, based on the research results by Lubis et al. [9], capital structure did not affect firm value. Research conducted by [3] and [10] showed significant effect of firm size on firm value. In contrast, the results from the research by [8] showed that firm size had no significant effect on firm value.

Since there are still gaps in previous research on the factors that affect firm value, this study aimed to provide empirical evidence about the effect of firm size and capital structure on firm value. The novelty of this study is the use of profitability as a variable that intervenes the effect of capital structure and firm size on the value of manufacturing companies in various industrial sectors listed on the IDX during 2013-2017.

## **2. THEORETICAL BACKGROUND**

Firm value is the selling value of a firm as an active business [11]. Any increasing in stock price will cause an increase in the value of the firm. High firm value illustrates that the firm performance is good and can build some trust to investors about the prospect of the firm [5].

Profitability shows the ability of a firm to generate profits for investors and is generally reflected in the financial condition of the firm [5]. Another perspective said about profitability as the ratio which can be used to determine the firm's ability to generate profit [12]. The implementation of signaling theory provides the information about profitability or the amount of profit obtained from the assets used.

According to Riyanto [13], firm size is a description of the size of a firm that is shown in total sales, average sales, and total assets. The size of this firm generally influences investors' decisions to invest [14].

Capital structure is defined as a balance in using the firm capital and foreign capital. The firm capital is obtained from retained earnings and also share ownership, while foreign capital can be obtained from the debt [15]. The trade-off theory states that there is a balance between the benefits derived from debt-financing and the possibility of problems arisen from potential bankruptcy [16].

### **2.1 Research Hypothesis**

#### *2.1.1 The Effect of Firm Size on Profitability*

Firm size explains how effective a firm in using working capital that comes from the firm assets in order to achieve maximum firm value. By having a large resources, the firm can carry out the desired investment activities with the aim of expanding market share, so that the firm profits will increase. The research conducted by Laksitaputri [17] showed that firm size has positive effect on profitability.

H<sub>1</sub>: Firm size has positive effect on profitability

#### *2.1.2 The Effect of Capital Structure on Profitability*

Capital structure is the company's strategy for financing operations and overall growth by utilizing various sources of fund. firms can increase profits by making a balance

between the use of external and internal capital. The previous study showed that capital structure has positive effect on profitability [18]

H<sub>2</sub>: Capital structure has positive effect on profitability

#### *2.1.3 The Effect of Firm Size on Firm Value*

Firm size is assessed from the total assets that can be used to seize profitable investment opportunities, such as expanding prospective of market share. The research conducted by Hardinis [19] showed that firm size has positive effect on firm value.

H<sub>3</sub>: Firm size has positive effect on firm value

#### *2.1.4 The Effect of Capital Structure on Firm Value*

Funding the firm operations by using debt can save tax obligations, so that shareholders will get a greater net profit. However, usually the firm will prioritize the payment of obligations to creditors rather than the generation of profitability to investors, so this can reduce investors' confidence to invest in the firm. Thus, the value of the firm will decrease. Research conducted by Faidah [20] showed that capital structure has negative and significant effect on firm value.

H<sub>4</sub>: Capital structure has negative effect on firm value

#### *2.1.5 The Effect of Profitability on Firm Value*

The growth of ROA shows that the firm prospects are getting better, because it means that there is a potential for increased profits by the firm. If the demand of firm shares experiences an increase, it will indirectly lead to an increase in the price of these shares in capital market. Previous research showed that profitability had positive and significant effect on firm value [21].

H<sub>5</sub>: Profitability has positive effect on firm value

#### *2.1.6 The Effect of Firm Size on Firm Value with Profitability as Intervening Variable*

Firms with large assets will try to get large profits by optimally utilizing their assets. The larger the size of the firm will tend to increase investors' trust to invest in the firm. Previous research showed that profitability can significantly mediate the magnitude of firm size effect on firm value [20] [17].

H<sub>6</sub>: Profitability mediates the effect of firm size on firm value

### 2.1.7 The Effect of Capital Structure on Firm Value with Profitability as Intervening Variable

The use of debt to increase market share can cause the increase of profitability. This is consistent with the balance theory and is supported by Laksitaputri's research [17]. When profitability increases, it will lead to an increase of capital structure. And then, the value of the firm will also increase, since it gives a positive signal to investors about good firm performance. Previous research showed that profitability is able to mediate the effect of capital structure on firm value.

H7: Profitability mediates the effect of capital structure on firm value

## 3. RESEARCH METHOD

### 3.1 Population and Sample

Population in this study was manufacturing firms in various industrial sectors listed in the Indonesia Stock Exchange (IDX) during the period 2013-2017. As sample selection method, we used the purposive sampling, of which 17 firms were acquired as samples.

### 3.2 Operationalization of Variables

**Table 2.** The Definitions of Variable Operationalization

Variable	Definition	Proxy	Measurement	Scale
Firm Value	The ratio between market prices and book prices	PBV	$\frac{\text{Market Price per Share}}{\text{Book Value per Share}}$ [21]	Ratio
Profitability	The company's capability to earn profits by optimizing the utilization of company assets	ROA	$\frac{\text{Net Income}}{\text{Total Assets}}$ [22]	Ratio
Firm Size	Size of company assets	SIZE	Ln (Total Assets) [2]	Ratio
Capital Structure	The ratio between the use of own capital and the use of foreign capital	DER	$\frac{\text{Total Liabilities}}{\text{Total Equity}}$ [6]	Ratio

The dependent variable is firm value, while the independent variables are capital structure and firm size, along with profitability as an intervening variable.

### 3.3 Data Analysis

#### 3.3.1 Multiple Linear Regression of Panel Data

Three methods used in modeling panel data [22] are shown as follows:

1. **Common Effect**, is used when there is no differences between individuals and differences between time, due to having the same intercept ( $\alpha$ ) and slope ( $\beta$ ). The model is formulated as follow:  $Y_{it} = \alpha_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \dots + \beta_n X_{nit} + \epsilon_{it}$  (1)

2. **Fixed Effect**, is used whenever there is possibly a problem of omitted-variables, such as a change in the intercept in time-series or cross-section data. The model is formulated as follow:  $Y_{it} = \alpha_1 + \alpha_2 D_2 + \dots + \alpha_n D_n + \beta_1 X_{1it} + \dots + \beta_n X_{nit} + \epsilon_{it}$ , (2)

3. **Random Effect**. This model increases the efficiency in the least square process by calculating the error of time-series and cross-section data. The model is formulated as follow:  $Y_{it} = \alpha_0 + \beta_1 X_{1it} + \dots + \beta_n X_{nit} + \epsilon_{it} + \mu_{it}$  (3)

The selection of the best model from the three estimation models mentioned above was conducted by the Chow-Test, the Housman-Test, and the Lagrange Multiplier-Test.

#### 3.3.2 Path Analysis and Sobel Test

"Path analysis is a technique for analyzing the cause and effect relationships occurred in multiple regression if the independent variable affects the dependent variable directly and indirectly "[23]. Sobel test is used to show the significant impact of the mediating variable generated on the path analysis. The sobel test is conducted by testing the power of the indirect effect of the independent variables  $X_1$  and  $X_2$  on the dependent variable  $Y$  through the mediating variable  $Z$ . The indirect influence is calculated by multiplying the paths [28] as follows:

$$X_1 \rightarrow Z (a), \quad Z \rightarrow Y (b), \quad X_2 \rightarrow Z (c), \quad Z \rightarrow Y (d).$$

The standard errors of indirect effect  $s_{ab}$  and  $s_{cd}$  are calculated by using the formulas as follows:

$$s_{ab} = \sqrt{b^2 s_a^2 + a^2 s_b^2 + s_a^2 s_b^2} \quad (\text{path 1}) \quad \text{and} \quad s_{cd} = \sqrt{d^2 s_c^2 + c^2 s_d^2 + s_c^2 s_d^2} \quad (\text{path 2}) \quad (4)$$

t-statistics values are calculated by using the following formula:  $t = \frac{ab}{s_{ab}}$  and  $t = \frac{cd}{s_{cd}}$ . (5)

## 4. RESULT AND DISCUSSION

### 4.1 Model Selection Results

The selection of model 1 and model 2 was conducted by using the Chow-Test, Housman-Test and LM-Test. The results were as follows:

**Table 3.** Model Selection Results

	Chow Cross section F. Prob	Hausman Cross Section Random Prob.	Lm (cross Section Breusch Pagan Prob)	Best Model Selected
Model 1	0,0000	0,7312	0,0000	Random effect
Model 2	0,0000	0,2563	0,0000	Random Effect

Based on the results of the Chow-Test, Hausman-Test and LM-Test, the best estimation obtained for both model 1 and model 2 were the Random Effect model as follows:

$$\text{Model 1: } ROA_{it} = \alpha_0 + \beta_1 \text{SIZE}_{1it} + \beta_2 \text{DER}_{2it} + \varepsilon_{1t} + \mu_{1t} \quad (6)$$

$$\text{Model 2: } \text{PBV}_{it} = \alpha_1 + \beta_3 \text{SIZE}_{1it} + \beta_4 \text{DER}_{2it} + \varepsilon_{2t} + \mu_{2t} \quad (7)$$

### 4.2 Test of Goodness of the Model

The determination test resulted from Model 1 showed that capital structure and firm size had a contribution of 4.7% in explaining the profitability (ROA), while Model 2 showed that capital structure, firm size, and profitability contributed only 37% in explaining PBV.

### 4.3 Statistical T-Test Results

For Model 1, the results of the statistical t-test were as follows:

**Table 4.** Results of Statistical t-tests on Profitability (ROA)

Variable	Coefficient	Std. Error	t-Statistic	Prob.	Result
LOG(SIZE)	3,634902	1,246422	2,916270	0,9946	Significant
LOG(DER)	-0,514368	0,147984	-3,475843	0,0008	significant

From Table 4, it can be seen that SIZE had positive and significant effect on profitability (ROA), while DER had significant effect on profitability in negative direction.

For Model 2, the results of t-test were as follows:

**Table 5.** Results of Statistical t tests on Firm Value (PBV).

Variable	Coefficient	Std. Error	t-Statistic	Prob.	Result
LOG(SIZE)	3,163801	0,910205	3,475923	0,0008	Significant
LOG(DER)	0,315230	0,094111	3,349567	0,0012	Significant
LOG(ROA)	0,331097	0,0202794	11,91261	0,0000	Significant

From the results presented in Table 5, it can be seen that firm size (SIZE), capital structure (DER), and Profitability (ROA) had positive and significant effect on firm value (PBV).

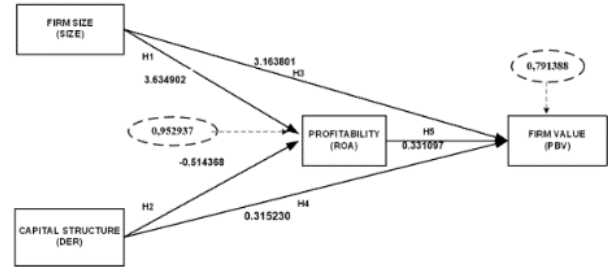
### 4.4 Hypothesis Test Results of Path Analysis

In this study, the effect of capital structure and firm size on firm value was mediated by profitability. The path coefficients for both models are displayed as follows:

**Table 6.** Path Coefficients Summary

Variable	Coefficient	Std. Error	t-Statistic	Prob.	Result
LOG(DER)→LOG(ROA)	-0,514368	0,147984	-3,475843	0,0008	significant
LOG(SIZE)→LOG(ROA)	3,634902	1,246422	2,916270	0,0046	significant
LOG(SIZE)→LOG(PBV)	3,163801	0,910205	3,475923	0,0008	significant
LOG(DER)→LOG(PBV)	0,315230	0,094111	3,349567	0,0012	significant
LOG(ROA)→LOG(PBV)	0,331097	0,0202794	11,91261	0,0000	significant

Based on Table 6. above, the path coefficients can be described as follows:



**Fig.** The paths coefficients of the model

### 4.5 The Results of Sobel Test in Detecting the Effect of Mediating Variable

The sobel test result is showed in Table 7 below:

**Table 7.** Sobel Test Result

	Indirect effect	Standard error of indirect effect	T_statistic (calculated)	Result
Path 1	SIZE→ROA = 3.634902 (a) ROA→PBV = 0.331097 (b)	S <sub>ab</sub> = 0,426283	t = $\frac{ab}{s_{ab}} = 2,823255$	Significant
Path 2	DER→ROA = -0.514368 (c) ROA→PBV = 0.331097 (d)	S <sub>cd</sub> = 0,051206	t = $\frac{cd}{s_{cd}} = -3,325893$	Significant

### 4.6 Discussion

#### 4.6.1 Test of the effect of firm size on profitability

Based on the results in Table 4, firm size (SIZE) had positive and significant effect on profitability (ROA). This finding fits the research of [17], which stated that firm size has positive effect on profitability. The consequence of this research is that management needs to improve its performance in the quality and quantity of all assets as an indicator of firm size, so that these assets can contribute maximally to increase the value of the firm.

#### 4.6.2 Test of the effect of capital structure on profitability

From the results of t-tests in Table 4, capital structure (DER) had significant effect but in negative direction on profitability (ROA). This result was contradictory to the research of [18], which stated that capital structure has positive and significant effect on profitability. However, this research is consistent with the research conducted by [17] stating that capital structure (DER) significantly affects profitability. The implication from this result is that management is expected to always strive in improving the performance of debt management in order to contribute better in enhancing firm values. In this case, management must strive to improve its competence in managing debt, so that the firm's capital structure is still in the optimal range.

#### 4.6.3 Test of the effect of firm size on firm value

The results of t-tests in Table 5 showed that firm size (SIZE) had significant effect in positive direction on firm value (PBV). This result is consistent with the research conducted by [19], which showed that firm size has significant effect on firm value in positive direction. On contrast, the research conducted by [17] showed that SIZE does not significantly affect firm value. The consequence of this research is that management must always be active in improving the performance of firm assets management as an indicator of firm size, so that these assets can contribute to increasing the value of the firm.

#### 4.6.4 Test of the effect of capital structure on firm value

The results of t-test in Table 5 showed that capital structure (DER) significantly affected firm value (PBV) in positive direction. This result is conform to the research of [19], which stated that capital structure has positive and significant effect on firm value.

#### 4.6.5 Test of the effect of profitability on firm value

The results of t-test in Table 5 showed that profitability (ROA) had significant effect in positive direction on firm value (PBV). This findings fits the research conducted by [24] and [25], which stated profitability has positive and significant effect on firm value. The logical consequence of this study is that management must continue to strive in increasing net income, because high profit indicates that the company has good prospect in the future. So, it can influence the investors to increase the demand for their shares, which will ultimately increase the firm value.

#### 4.6.6 Test of the effectiveness of profitability in mediating the effect of firm size on firm value

The Sobel test result in Table 7 Path 1 revealed that profitability (ROA) had significant effect in mediating the relationship between firm size and firm value. It implied that profitability could mediate the value of the firm that is influenced by firm size. This means that the greater the firm size is, the greater the firm's opportunity to increase its profitability, which in turn will increase investors' confidence to the firm. This result is consistent with the research conducted by [17], which stated that profitability can mediate the effect of firm size on firm value. On contrary, the result of this study is not consistent with previous studies conducted by [19], which stated that profitability is not capable in mediating the relationship between firm size and firm value.

#### 4.6.7 Test of the effectiveness of profitability in mediating capital structure on firm value

The Sobel test result in Table 7 Path 2 revealed that profitability (ROA) had significant effect in mediating the relationship between capital structure and firm value. This result is on contrary to the research conducted by [26], which stated that profitability cannot mediate the effect of capital structure on firm value. However, this research is consistent to the research conducted by [20] stating that profitability can function as a mediator between capital structure and firm value. The result showed that profitability is capable to mediate the effect of capital structure and firm size on firm value. The implication of this result is that capital structure and firm size must be optimized in order to generate profit. High profit will increase the value of the firm. In other word, good capital structure and large firm size have not been able to increase the value of the firm, if the firm profitability is in poor position. Therefore, it is recommended that management of the firms in various industrial sectors in IDX must manage their assets in such a way to optimize the capital structure in order to generate maximum profit. Firms that are able to maintain the achievement of high profitability will be trusted by investors, so that the value of the firm will always be high.

## 5. CONCLUSION

After conducting the research procedures starting from selecting the sample, selecting the model that best suits the data in the sample, as well as conducting a series of statistical tests in accordance with the selected model and research method, the conclusions of this study can be obtained as follows:

1. Firm size has positive and significant effect on profitability.
2. Capital structure has negative and significant effect on profitability.
3. Firm size has positive and significant effect on firm value.
4. The capital structure has positive and significant effect on firm value.
5. Profitability has positive and significant effect on firm value.
6. Profitability can significantly mediate the effect of firm size on firm value.
7. Profitability can significantly mediate the effect of capital structure on firm value.

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