

The Effect of FCF and Firm Size to Firm Value and IOS as Mediation Variable

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Abstract—This study aims to examine and analyze (1) the indirect effect of iFree Cash Flow on firm value through the investment Opportunity Set mediation. (2) the indirect effect of Company Size on firm value through the mediation of Investment Opportunity Set. This research was conducted on manufacturing companies listed on the Indonesia Stock Exchange (IDX) with a data period of 2014 to 2017. Data collection was carried out using purposive sampling techniques and population based on population criteria. Research sample companies and the number of research samples are 72 companies. Data analysis methods are Path Analysis and Sobel Test which are used to test the investment opportunity set mediation variables. The results showed that the investment opportunity set can mediate the effect of free cash flow and dividend policy on firm value.

Keywords: *firm value, investment opportunity set, firm size*

I. INTRODUCTION

Company value is represented by the share price of common stock, and this is a function of investment decisions, financing decisions and dividend decisions. Moeljadi show that the purpose of maximizing shareholder wealth can be achieved with a variety of financial decisions that are relevant and affect the value of the company [1]. In this case financial decisions include investment decisions (investment decisions), financing decisions (financing decisions) and dividend decisions (dividend decisions). Thus, corporate value can be created through investment decisions, funding decisions and strategic dividend policies. Investment decisions are basically independent, but once the investment decision is made, the investment financing is related to funding decisions [1]. In general, the investment made by the company is a business expansion in order to obtain sustainable benefits in the future. The need for company funds for expansion can be obtained from external funding sources (external financing) such as bonds and new shares issuance and internal funding sources (internal financing) such as retained earnings [1].

Company value is a market valuation of the company, in which capital market players or in this case investors will judge based on information obtained. Information about company growth that illustrates profitable investment opportunities at the future, often becomes a reference for investors in valuing companies. The investment opportunities that the company has are called the Investment Opportunity set (IOS). IOS provides

a broader picture of investment opportunities and this relates to the value of the company. The value of the company as a main objective to maximizing the welfare of shareholders [2]. The situation indicates the existence of investment opportunities related to the value of the company, and this depends on the amount of capital expenditure to take advantage of these investment opportunities. Gaver and Gaver states that investment selection is not only aimed at projects supported by research and development, but also shown by the company's ability to take advantage of these investment opportunities in generating profits [3]. Investment opportunity set (IOS) is the basis for determining the category of a company, which is a category of companies included in the growth category or the category does not grow. Thus the value of the company depends on the company's growth potential in the future.

In connection with investment opportunities (IOS), the utilization of investment opportunities requires funding with various alternative sources of funds. Companies that have high free cash flow tend to invest. But the question is whether high free cash flow will affect investors' perceptions of the company. In addition, the description of the size of the company will be considered by investors. This study attempts to measure the effect of free cash flow and firm size on firm value, by mediating the investment opportunity set (IOS).

The aims of this study are to examine and analyze:

- The indirect effect of free cash flow on firm value through the mediation of investment opportunity set.
- The indirect effect of firm size on firm value through the mediation of investment opportunity set.

The results of this study build a Financial Factor Analysis Model Design Manufacturing companies listed on the Indonesia Stock Exchange.

A. Firm Value

Tobin's Q ratio will describe the value of the company with the stock price indicator. Every change in stock price indicates a change in the value of the company [4].

Professor James Tobin in 1967 developed Tobin's Q ratio as a valuable concept of corporate value. Tobin's Q calculation will describe the value of the company with the stock price indicator. Every change in stock price indicates a change in the value of the company. Research conducted by Han and Wang,

Jraporn and Liu, Baros and Silveira uses the formulation of Tobin's Q. It is illustrating not only the calculation of market value of equity which is calculated at stock prices, but is also related to the use of debt as well as elements of inventory and current assets and total assets [5-7].

In the calculation of the Q ratio if it turns out that the result is greater than one ($Q > 1$), this means that the market values higher than the replacement value of the company's assets. In this case the investment in the company's assets generate profits that provide a higher value than the investment expenditure, this will stimulate new investment. Conversely, the Q ratio is smaller than one ($Q < 1$), this shows that the market is valuing lower than the replacement value of its assets. In this case the investment in assets does not produce adequate profits and the investment is not attractive to investors. Based on James Tobin's thought, that the incentive to create new investment capital is high when securities (stocks) provide future profits that can be sold at a price higher than the investment cost and this requires that the investment must be profitable.

The Q ratio is difficult to calculate accurately because estimating the cost of replacing company assets is not easy to do, other than that the debt market value is difficult to observe. Instead, book values can be used for cases like this with a lower degree of accuracy [8].

B. Investment Opportunity Set and Firm Value

Investment opportunity set (IOS) is the basis for determining the category of a company, which is a category of companies included in the growth category or the category does not grow. Thus the value of the company depends on the company's growth potential in the future. The company's growth rate can then be described as an investment opportunity [9-11].

Hutchinson and Gul showed that there was a negative relationship between growth (as measured by IOS) and firm value, the relationship was weakened by corporate governance moderating variables [12]. Research conducted by Hasnawati shows investment decisions (both realized investments and future investment opportunities) have a significant positive effect on firm value [13]. While research by Dehning, Richardson, Stratopoulos shows the effect of investment in information technology is to increase the value of the company [14]. This result was also reinforced by Widjanarko in his dissertation showing that company growth had a significant positive effect on firm value [15]. Further dissertation from Efni showed that investment decisions had a significant positive direct effect on firm value [16]. Yuliani in her dissertation showed that IOS had a significant positive effect on firm value [17]. Widjanarko in his research showed that company growth had a significant positive effect on firm value [15]. Aisjah in her research showed that the growth rate in related and unrelated diversified companies had no effect on firm value [18].

C. Free Cash Flow

Richardson found that free cash flow is an important cash flow to manage the assets owned (including handling existing

debt) and finance the expected new investment [14,19-21]. There are three components to measure cash flow, namely: (1) measuring cash flow resulting from operating assets owned by the company, (2) measuring investment expenses that are important for managing operating assets, namely depreciation and amortization costs, and (3) measure the optimal level expected from new investments [14,19].

Thus, to measure the free cash flow generated from operating assets owned can be done by calculating operating cash flow reduced by depreciation & amortization expenses plus research and development expenses and minus new investment. In the finance literature many proxies are given for FCF so that they can provide strong evidence. Penman found a proxy for FCF which was calculated by basing on the cash flow obtained by the company minus the change in net operating assets [22]. Free cash flow can be negative if the number of changes in net operating assets is greater than operating profit. This happens because many companies invest their funds into assets. For free cash flow to have a positive value, it is necessary to invest cash into operations through the sale of financial assets and / or undertaking loans (financial obligation) [23].

Wild et.al. assert that positive free cash flow reflects the amount available for business activities after reserving for the funding and investment required to manage productive capacity at a standard level [24]. The flexibility of growth and finance depends on the availability of free cash flow. Measurement of free cash flow according to Wild et.al. is cash flow from operations reduced by net capital expenditures required to manage productive capacity with preferred stock dividends and ordinary stock dividends (assuming the prescribed payment policy), or by way of operating cash flow reduced by net capital expenditure then reduced with dividends that have been issued [24]. Shrieves et.al. measure free cash flow by operating profit after tax added by depreciation and amortization that has been issued in the year concerned and reduced by total net investment [25].

Ross et.al. found that the free cash flow hypothesis had important implications in the capital structure [8]. The existence of dividends would reduce free cash flow. The distribution of dividends will provide benefits to capital owners, on the other hand the distribution of dividends will reduce the funds owned by the company while also reducing the power of managers to make investments that are not useful.

Interest expense and debt have a greater impact compared to the existence of dividends in the use of funds by the manager. This is because the company will go bankrupt if unable to pay interest and debt. On the other hand, dividends will only have a small impact on managers because dividend payments do not have to be made. The decision to pay dividends is taken at a general meeting of shareholders.

D. Firm Size

The size of the company is used as a proxy for corporate political sensitivity and encouragement for managers to choose profits by reducing accounting procedures. *Ceteris paribus*, the larger the company the more likely the manager to choose

accounting procedures that suspend reported earnings from the present period to the future period [26].

Based on the previous studies, the research hypotheses are arranged as follows.

Hypothesis 1: The Investment Opportunity set mediates the effect of Free Cash Flow in increasing company value.

Hypothesis 2: The Investment Opportunity set mediates the effect of Company Size in increasing firm value.

II. METHODS

This research relates to financial decisions that include free cash flow, company size and investment opportunity set in relation to company value. This research is a confirmatory research that confirms the theory of the research object both for explanation and prediction.

This research was conducted on research objects in the manufacturing sector. this research was conducted on companies listed on the Indonesia Stock Exchange. Determination of the study population is based on population criteria and uses a purposive sampling technique, where the samples obtained describe the characteristics of the population. The research period was 2014 to 2017 with 72 companies as samples, so the total research data was 288 data.

At the data analysis stage, measurements were taken on each of the research variables. As for the measurement of the variables used in this study, each variable has several proxies as follows:

- Free cash flow (X1), is an exogenous variable measured by FCF proxy.
- Company Size (X2), is an exogenous variable measured using Firm Size proxy.
- Investment Opportunity Set (Y1), is an endogenous variable as a mediating variable as measured by IOS proxy
- Company Value (Y2), is an endogenous variable measured using Tobin's Q ratio proxy.

A. Definition of Variable Operations

1) *Firm value:* Tobin's Q is a measure of company value that includes elements of equity, corporate debt, and involves the value of company assets. Research conducted by Chang & Wang, Jiraporn and Liu, Baros and Silveira using the formulation of Tobin's Q is as follows [6,7]:

$$\text{Tobin's Q} = \frac{(\text{OS} \times \text{P}) + (\text{D} + \text{I}) - \text{CA}}{\text{TA}}$$

2) *Investment opportunity set:* This ratio illustrates the value of capitalization of shares in the capital market. The calculation of the number of shares outstanding and stock prices illustrates the market's ability to assess internal funding sources namely equity [27-29].

$$\text{MVE/BVE ratio} = \frac{\text{Outstanding Share} \times \text{Share Price}}{\text{Total Equity}}$$

3) *Free Cash Flow (FCF):* FCF is defined as the total cash available for corporate funding activities after dividend payments. The amount of retained earnings is obtained from each company's balance sheet, depreciation and amortization of each company sourced from the income statement. FCF in this study uses a direct method that is operationalized [30].

$$\text{FCF} = \Delta \text{ retained Earnings} + \text{Depreciation} + \text{Amortization}$$

4) *Firm size:* The size of the company is used to determine the size of the company. To determine the scale of the company in this case using total assets as a measure. Data on total assets of each company is nominal data in rupiah, so the distribution of data is too large so that this indicator is made Ln.

$$\text{Size} = \text{Ln Total Asset}$$

B. Data Collection Sources and Methods

Data collected were sourced from secondary data. Secondary data was collected from statistical data with documentation techniques, namely financial statement data and share prices published by Indonesia Stock Exchange with a period of 2014 to 2017. The Category Data are pooling data, which is a combination of time series data and cross sectional data.

C. Data Analysis Method

This Research is using path analysis method. The relationship between complex variables that cannot be done using multiple regression. Path analysis diagrams can be described in the form of causal equations and are usually shown with more than one equation.

1) *Path analysis model:* The method of analysis in this study is to design a path analysis model shown in the following diagram.

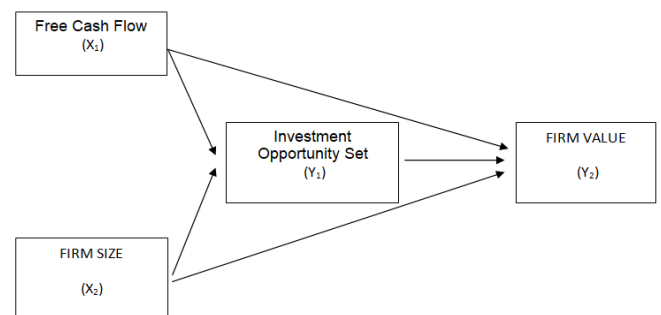


Fig. 1. Path analysis model.

The path diagram is a structural equation consisting of exogenous and endogenous variables. Exogenous variables in this study are Free cash flow (X₁), company size (X₂) is proxies. Whereas endogenous variables consist of Investment

Opportunity set (Y_1) and firm value (Y_2) proxies by Tobin's Q (Q ratio).

2) *Hypothesis test*: Testing the direct influence hypothesis is done by examining the coefficient (standardized) and significance (p) of each pathway on the direct effect. Testing the indirect effect is carried out on studies on the coefficient of indirect relationships. The significance of this indirect effect can be determined by testing the mediating model (variable intervening).

3) *Analysis of mediation variables: Testing*. The mediation variable testing method uses the multiplication method, which uses the Sobel test through hypothesis testing [31]. The standard deviation of indirect effect (multiplication) refers to MacKinnon in Solimun [31].

$\sigma_{ab} = \text{SQRT}(\sigma_a^2 a^2 + \sigma_b^2 b^2)$. This formulation shows that a and b are path coefficients. Z_value, calculated by the combined coefficient not directly with the standard error or standard deviation.

$$z_value = (a \times b) / \text{SQRT}(b^2 \times SE_a^2 + a^2 \times SE_b^2)$$

Z_value is a measure of mediation variables in the Sobel Test. Z_value shows the level of significance of the indirect effect of independent variables on the dependent variable through mediating variables. If the Z-value in absolute price = 1.96 or the level of statistical significance p-value = 0.05, then this shows that the indirect effect of the independent variable on the dependent through mediating variables is significant at the 0.05 significance level.

III. RESULTS AND DISCUSSION

This research was conducted at PT. Indonesia Stock Exchange, namely several companies listed on the exchange as research samples. The research data were in the form of an annual report of a research sample company and stock prices with the study period from 2014 to 2017. The results of the study included a description of the research sample, presentation of research data, descriptive statistical analysis, and proof of hypothesis with inferential statistical analysis. Next is a comprehensive discussion of the results of research.

A. Checking Model Validity

TABLE I. R SQUARE (R^2) EXOGENOUS VARIABLES TO ENDOGENOUS VARIABLES [12,13].

No.	exogenous variables	endogenous variables	R Square (R^2) score
1.	FCF dan FS	MVE to BVE	0,402
2.	FCF, FS, MVE/BVE	Q ratio	0,839

The coefficient of total determination is calculated as follows [31]: $R^2_M = 1 - P_{e1}^2 - P_{e2}^2 - \dots - P_{ep}^2$

$$R^2_M = 1 - (0,402) - (0,839)$$

$$R^2_M = 1 - 0,337278$$

$$R^2_M = 0,662722$$

Based on the calculation of the total determination coefficient (R^2_M), then this shows the total diversity of data that can be explained by the research model is 66.27% or in other words the information contained in the data 66.27% can be explained by the model. While 13.73% is explained by other variables not included in the research model. Thus the total determination coefficient of 66.27% indicates that the research model is quite good.

The total determination coefficient of 66.27% shows the simultaneous influence of the variables FCF, FS and MVE / BVE on the Q ratio is 66.27%. While the influence of other variables not included in the research model is 13.73%.

1) Path analysis

a) Direct effect: The direct effect of the variables in the research model is the direct influence of the FCF and FS variables on MVE / BVE. Next is the direct influence of the FCF, FS and MVE / BVE variables on the Q ratio.

The following table shows the path coefficients of each variable.

TABLE II. PATH COEFFICIENT OF DIRECT EFFECT BETWEEN VARIABLES

No.	Direct effect between variables	Path coefficient	p-value	Result
1.	The effect of FCF (X_1) to Q ratio (Y_2)	0,096	0,001	Significant
2.	The effect of FS (X_2) to Q ratio (Y_2)	0,162	0,000	Significant
3.	The effect of FCF (X_1) to MVE/BVE (Y_1)	0,438	0,000	Significant
4.	The effect of FS (X_2) to MVE/BVE (Y_1)	0,347	0,000	Significant
5.	The effect of MVE/BE (Y_1) to Q ratio (Y_2)	0,772	0,000	Significant

Note: $\alpha = 0,05$

b) Indirect effect and proofing hypothesis: The indirect effect of the research variables are (1) the effect of Managerial Ownership on firm value through Leverage mediation variables, (2) the effect of Investment Opportunity Set on firm value through Leverage mediation variables.

Next is to test the indirect effect using the Sobel Test. Sobel Test is a mediation variable analysis tool that can be done by multiplying coefficients [31]. In this research model, testing the indirect effect of managerial ownership and IOS variables on firm value through leverage. Proving this indirect effect is done by the Sobel Test shown in the following calculation.

- Proof of Hypothesis of the Indirect Effect of FCF on the Q ratio through MVE / BVE

Z_value can be calculated with the following formulation.

$$Z_value = (a_1 \times b) / \text{SQRT}(b^2 \times SE_a^2 + a_1^2 \times SE_b^2)$$

Table 2 shows that the indirect effect of FCF on Q ratio through MVE / BVE by using the Sobel Test produces a Z-value of 6.64164 and this shows a Z-Value > 1.96 (Z-table for $\alpha = 0.05$ is 1.96). In conclusion the indirect effect of FCF on Q ratio through MVE / BVE is significant.

- Proof of Hypothesis of the Indirect Effect of FS on Q Ratio Through MVE / BVE.

Z_value is calculated by the following formulation.

$$Z_value = (a_2 \times b) / \sqrt{b^2 \times SE_{a^2} + a_2^2 \times SE_b^2}$$

Table 4.3 shows that the indirect effect of FS on Q ratio through MVE / BVE with the Sobel Test resulted in a Z-value of 4.79988 which showed a Z-Value > 1.96 (the Z-table for $\alpha = 0.05$ was 1.96). In conclusion the indirect effect of the DPR on the Q ratio through MVE / BVE is significant.

TABLE III. SOBEL TEST FOR INDIRECT EFFECTS FCF AND FS TO Q RATIO WITH MVE/BVE AS MEDIATION VARIABLE

No	Indirect effect	Z	Result
1.	Indirect effect of FCF to Q ratio with MVE/BVE as mediation variable	6.64164	Significant
2.	Indirect effect of FS to Q ratio with MVE/BVE as mediation variable	4.79988	Significant

- Thus Hypothesis 1 which states that, investment opportunity set mediates the effect of free cash flow on firm value, is proven
- Thus Hypothesis 2 which states that the investment opportunity set mediates the effect of company size on firm value, is proven

The results of proof of hypothesis 1 apparently show that investment opportunity set mediates the effect of free cash flow on firm value. This is reinforced by the significant influence between free cash flow on investment opportunity set, besides the significant effect of free cash flow on company value. This shows that free cash flow as a sum of cash that can be invested in profitable projects can affect the value of the company. Utilization of investment opportunities affects investors' perceptions on the stock exchange. In this case the stock price as an element of company value is affected by the free cash flow that the company has. On the other hand, the use of free cash flow in the investment opportunity set is proven to affect the value of the company, this is reinforced by the effect of free cash flow on the investment opportunity set proved significant and the effect of investment opportunity set on the company's value is also proven significant.

The results of the hypothesis 2 shows that the size of the company significantly influences the value of the company by mediating the investment opportunity set. This is reinforced by the influence of company size on firm value is significant, and the influence of investment opportunity set on firm value is also significant. Company size is a description of the company's wealth related to the value of company assets. The size of the company shows that the company's wealth development and this shows the company's consistent investment in generating profits. This situation will be responded positively by investors so that the company's stock price has increased which reflects an increase in the value of the company. This is indicated by the influence of company size on firm value is significant. While the effect of the size of the company through the investment opportunity set on firm value is also significant.

IV. CONCLUSION

The influence of Free cash flow has a significant effect on the value of the company. This shows that free cash flow has a direct effect on the value of the company and this illustrates that capital market players respond to the condition of free cash flow in exploiting corporate investment opportunities. The effect of free cash flow on firm value is also significant when mediated by the investment opportunity set, this is indicated by the significant effect of investment opportunity set on firm value.

The effect of company size on firm value is significant. This shows that the size of the company responded positively by investors. Thus the size of the company affects investor perceptions of the company. The effect of company size on firm value by mediating the investment opportunity set was also significant.

Company management is expected to consider optimal free cash flow within the company. In addition, the courage of the company's management to use free cash flow is related to projects that benefit the company in the future. Thus the company's management can rearrange investment opportunities to reduce the possibility of the risk of error in the use of free cash flow. In addition, management needs to pay attention to the level of financial risk associated with the use of free cash flow by the company.

The company's decision to take advantage of profitable investment opportunities in the future can encourage corporate investment in conducting its business in a changing business and macroeconomic situation. The size of the investment opportunity set and the value of the company are determined by the share price. Investor pragmatism in the stock exchange is often a strong enough argument for the formation of the company's stock market price. This means that the formation of stock prices is much influenced by investor predictions of the company's external macro conditions, particularly macroeconomic conditions that are affected by global economic conditions. External macro conditions like this can be a strong argument for management to consider the company's external macro conditions in corporate financial decisions. Integration of strategies, objectives and internal company policies with predictions of macroeconomic conditions can provide adequate information for investors. Thus investors can make investment decisions with more comprehensive considerations.

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