CHAPTER III

RESEARCH METHODOLOGY

3.1 Type and Method of Data Collection

There are two types of data, primary and secondary. Both data has the same function in which they collected information to make a basic conclusion of a study. Primary data is obtained directly from its original source such as form an interview, polls of individuals or groups of people as well as the results of observations of an object, even or test results. Secondary data is obtained through an intermediary or indirectly from books, records, evidence, anything that are available and require researches to visit the library, research center, archives or read lots of book related to his or her research in order to obtain the data needed.

Based on the reading above, this study is using time series data which falls under secondary data from the year of 2009.Q1 until 2015.Q2. The time series data are obtained through the website monthly report from World Bank, *Bank Indonesia*, *Pusat Badan Statistik* and Trading Economics.

3.2 Operational Definition of Variables

Variables that are used in this study are inspired from a journal written by Ali Rama entitled *Analisis Kontribusi Perbankan Syariah Terhadap Pertumbuhan Ekonomi.* The variables are Gross Domestic Product (GDP), Total Investment (INV), Total Financing (TF), Inflation (I), Export (EX) and Import (IM).

$$GDP_t = \beta_0 + \beta_1 INV_t + \beta_2 TF_t + \beta_3 I_t + \beta_4 EX_t + \beta_5 IM_t + \varepsilon$$

- Gross Domestic Product (GDP) as economic growth.

- Total Investment (INV) represents Indonesia's investment.

- Total Financing (TF) represents Islamic Banking.

- Inflation (I) as inflation rate.

- Export (EX) and Import (IM) as openness of economy.

3.3 Analysis Method

Methods of analysis used in this study are multiple linear regression, stationarity test, error correction model (ECM) and statistical analysis (coefficient of determination, f test and t test).

3.3.1 Multiple Linear Regression

Multiple linear regression is a statistical analysis used to determine the effect of several independent variables on the dependent variable. The model of multiple linear regression used in this study is formulated as shown below:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 \log X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon$$

- Y represents GDP (dependent variable).

- β_0 is a constant.

- β_1 until β_5 is known as regression coefficient.

- X_1 until X_5 are the independent variables.

- X_1 represents Total Investment (INV).

- X_2 represents Total Financing (TF).

- X_3 represents Inflation (I).

- X_4 represents Export (EX).

- X_5 represents Import (IM).

- ε is standard error.

3.3.2 Statistical Analysis

3.3.2.1 Coefficient of Determination

The coefficient of determination or also known as R squared is a number that indicated the proportion of the variance in the dependent variable that is predicted from the independent variable ("Coefficient of Determination," 2017). In other words mean, how big the regression line describes the data.

3.3.2.2 F-test

F-test is a test conducted by comparing the result of F calculated with table F in order to see the effect of all independent variables on the dependent variables. If the probability is smaller than 0.05, it means there is a significant relationship between dependent and independent variables. Vice versa, if the probability is higher than 0.05, both dependent and independent variables are insignificant (Hidayat Anwar, 2013).

3.3.2.3 t- Test

In conducting a research, we have to create research hypothesis that can be divided into two categories; null and alternative hypothesis (Widarjono, 2013, p. 42). Null hypothesis (H_0) represents the confidence level of researcher in proving his or her research by using sample data. Alternative hypothesis (H_a) is the opposite of H_0. $T-$ test is a procedure in which the result of the samples can be used to verify the truth and the falsity of H_0. Problem in hypothesis test is to determine whether to use two-sided or one- sided test. Two- sided hypothesis test is chosen when we did not have strong theoretical basis in research and one-sided hypothesis test is use when strong theoretical basis is use in a research (p. 42).

Two sided hypothesis test:

$H_0 : \beta_1 = 0$

$H_a : \beta_1 \neq 0$

One- sided hypothesis test (positive):

$H_0 : \beta_1 = 0$

$H_0 : \beta_1 > 0$

One- sided hypothesis test (negative):

$H_0 : \beta_1 = 0$

$H_0 : \beta_1 < 0$

To calculate the value of t- statistic and to find the t- critical value from t-distribution table is by using α and degree of freedom by using the formula stated below. Compare the value of t- statistic with critical values and as for the result, if the value of t- statistic > the value of t- critical value, H_0 is rejected and H_a is accepted. If the value of t- statistic < the value of t- critical value, H_0 is not rejected.

$$t = \frac{\hat{\beta}_1 - \beta_1}{se(\hat{\beta}_1)}$$

Diagram 3.1 Mathematical Equation to Find the Value of t

3.3.3 Classical Assumption Test

Classical assumption test is conducted in conjunction with the process of regression that measures taken in the classical assumption test using the same working step by regression. There are four assumption test that must be done on the regression model; normality, multicollinearity, heteroscedasticity and autocorrelation test.

3.3.3.1 Normality Test

Normality test is a test that was conducted to evaluate the distribution of the data on a group or variable data, whether the distribution of the data is normally distributed or not. Data with more than 30 (n >30) can be assumed as normal distribution. The regression result can determine whether it contains

normal residual or not by looking at the probability of the result. If the probability is greater than 0.05 (> 0.05), then there is a presence of normal distribution. Vice versa, if the probability is less than 0.05 (0.05 <), there is no normal distribution.

3.3.3.2 Multicollinearity Test

Multicollinearity test is conducted to determine the relationship between some or all of the variables. If the model contains multicollinearity, then the model has a large standard errors and the coefficients cannot be estimated with high accuracy. There are ways to detect multicollinearity and one of them is by looking at the value of the determination coefficient. Widarjono (2013) stated, if the value of the determination coefficient is greater than 0.8 (> 0.8), it means the result has multicollinearity and vice versa and when most of the problem largely effected by multicollinearity, then it has no effect on the study.

3.3.3.3 Heteroscedasticity Test

Heteroscedasticity test occurs when there is a disturbance that appears in the regression function that has a variant that does not comply with the OLS estimators and inefficient both in small samples and large samples (but still unbiased and consistent). One of the ways to detect heteroscedasticity problem is by using Park test with t test. The criteria of the test is when t test < t table, then between the independent variables, no heteroscedasticity will be effected, the rest or regression model with variance residual is homogenous and vice versa. Other than that, we can also use white test to determine the presence of heteroscedasticity by comparing the probability of chi- square value with degree

of error. If chi- square is less than then the degree of error (chi- square < degree of error), it contains heteroscedasticity. When chi- square > degree of error, it does not contain any heteroscedasticity (Widarjono, 2013).

3.3.3.4 Autocorrelation Test

Autocorrelation test is to determine the correlation between disorders that are no longer efficient to estimators in small samples or models with large samples. The presence of autocorrelation can be detect by using Durbin- Watson test (DW). The result is then will be compared with F table. When the result of DW is smaller than F table (DW < F table), then there is no autocorrelation in the regression and vice versa.

3.3.4 Unit Root Test

In statistics and econometrics, the unit root test is used to test whether the time series data used in a study is stationary or not. Augmented Dickey- Fuller test is commonly used in unit root test. Another similar test with same function is known as Phillips- Perron test where both indicate the presence of a unit root null hypothesis (Ariyoso, 2009).

3.3.5 Error Correction Mechanism (ECM)

ECM is an analysis of time series data with variables that have a dependency or often referred as cointegration. ECM method used to balance short run economic relationship variables that have a balance/ long run economic relationship (Marwadi Muhammad Chalik, 2014).