CHAPTER III

RESEARCH METHODOLOGY

A. Research Object

The aims of the study are to find how's the money supply, exchange rate, interest rate, and gross domestic product affects the inflation in Indonesia from January 2010 - December 2017 in quarterly basis of data. Whereas all the variables that are used in the study as explained below:

The dependent variable is:

1. Inflation.

The independent variables are:

1. Money Supply.
2. Exchange rate.
3. Interest rate.
4. Gross Domestic Product.

B. Type of Data

This study used a quantitative methodology on its analysis. The quantitative data are secondary data in quarterly basis from January 2010 until December 2017. They are inflation, money supply, exchange rate, interest rate, and gross domestic product.

C. Collecting Data Technique.

Collecting data technique for this study is non-participant observation which collected by downloading monthly reports in SEKI of Bank Indonesia's website www.bi.go.id and BPS-Statistics Indonesia on www.bps.go.id

D. Operational Definition Of Research Variables.

The operational definition of research variables used in this study which become center of attention to be observed and measured are as follows :

The dependent Variable is:

1. Inflation

   Inflation is a rate where the overall general prices of the goods and services are rises, the data used in this study is drawn from the Indonesian Financial Statistics of Bank Indonesia in percent from 2010-2017 quarterly. In further discussion, Inflation will be shortened with INF.

The independent variables are:

1. Money Supply

   Money supply is done by buying or selling certificate to control the circulation of money in the public. In this study, the data is drawn from M2 in the central bank website in billions Rupiah from 2010-2017 in quarterly basis. In the further discussion, the money supply will be shortened with M2.

2. Exchange rate

The Exchange rate or the currency rate used in this study is Indonesian Rupiah (IDR) towards US dollar (USD) in periods 2010-2017 in quarterly basis. In further discussion, this Foreign Exchange rate will be shortened with ER.

3. Interest rate

Interest rate data used in this study is drawn from BI Rate in the Indonesian central bank website which measured in percent during 2010-2017 in quarterly basis. In further discussion, the interest rate will be shortened as BIR.

4. Gross Domestic Product.

Gross domestics product is the total market value of all final goods and services or output produced within a given period of time by factors of production located within a country. The one that uses for this study is gross domestic product deflator, it is a measure of the price level calculated as the ratio of nominal GDP to Real GDP times 100. The data is within periods 2010-2017 using percent measurement on a quarterly basis. In further discussion, this gross domestics product will be shortened with GDP.

E. Research Model

The study model use an econometrics model describes: How are the variables independent affect inflation rates both in short-run dynamics and long-run equilibrium simultaneously using error correction model (ECM) with denotations of variables as follows:

INF = Variable of inflation

LOG_M2 = Natural Logarithm of money supply

LOG_ER = Natural Logarithm of exchange rate.

BIR = Variable of BI rate

GDP = Variable of gross domestics product.

The Long-run Estimation using OLS

The equation below gives a long-run equilibrium. In this estimation, the variables are lagged 1 period to generate Error Correction term.

$$INF = C(1) + C(2)*LOG\_M2 + C(3)*LOG\_ER + C(4)*BIR + C(5)*GDP + Ut$$

Where:

C(1) = Constant

C(2) = Coefficient of money supply variable

C(3) = Coefficient of exchange rate variable

C(4) = Coefficient of interest rate variable

C(5) = Coefficient of gross domestics product variable

Ut = Residuals

The Error Correction Term

The error-correction term relates to the fact that last-periods deviation from a long-run equilibrium, the error, influences its short-run dynamics. The error correction term is generated from the OLS estimation with makes a residual series from estimation above. After getting the error correction term we should test it using Dickey-Fuller to test the stationary of the result of residuals.

The Error Correction Model Through Short-run Estimation

If the result of ECT above is stationary on the level, the next steps are putting the ECT on error correction model through short-run estimation. This model estimates the speed of dependent variable back to the equilibrium point after there are any changes in the variables. The estimation equation is using 1st difference both in the dependent variable and independent variables, exclude ECT as shown below:

D(INF) = C(1) + C(2)*D(LOG_M2) + C(3)*D(LOG_ER) +

C(4)*D(BIR) + C(5)*D(GDP) + C(6)*ECT(-1) + Ut

Where:

C(1) = Constant

C(2) = Coefficient of 1st difference of money supply variable

C(3) = Coefficient of 1st difference of exchange rate variable

C(4) = Coefficient of 1st difference of interest rate variable

C(5) = Coefficient of 1st difference of gross domestics product variable

C(6) = Coefficient of error correction term

Ut = Residuals

F. Methodology

The aim of this study is to examine four Independent variables affect the dependent variable which is inflation in the long-run and short-run. The methodology used in this study is an Error Correction Model (ECM).

Below are the procedures of time series analyses with Error Correction Model for this study:

1. Descriptive Statistics. To provide a brief summary through descriptive coefficient in the Mean, Median, Maximum, and Minimum value from the dataset.

2. Unit Root Test. To check the stationary status of the data set from each variable with an aim to avoid a spurious regression and autocorrelation problem. Engle and Granger suggested that on the variables supposed integrated in the same order for cointegration equation.

3. Cointegration Test

I. Long-run Estimation. The estimation is using Ordinary Least Square.

II. Error Correction Term Generating Testing. The error correction term is generated from the Long-run equation. The generating test of Error Correction Term is using Dickey-Fuller to test the stationary and the data are cointegrated.

4. Error Correction Model. The error correction model is found through short-run estimation to estimate the relationship of independent variables and dependent variable in the short-run.

5. Classical Assumption Test

I. Normality Test. The normality test is used to find out whether the residuals are normally distributed or not through the Jarque-Berra test.

II. Autocorrelation Test. The autocorrelation test is used to find out whether there is any correlation between variables Independent on the observation. If there is any correlation between independent variables on a regression it is called an autocorrelation problem make the parameter of estimation become spurious and not efficient.

III. Linearity Test. The test is done through Ramsey-Reset test to make sure that the model specification used is linear.

IV. Multicollinearity Test. To test whether the regression model has a correlation between independent variables, where is a good regression should not have a correlation between those independent variables. The method used is a partial method between independent variables with 0.85 *Rule of thumb*.

V. Heteroscedasticity Test. Heteroscedasticity is a regression problem where there is any uniformity of variance in the residual of an observation to the other and inconstancy of variance which make the regression or the OLS' variance is bias. The heteroscedasticity test is done through Breusch-Pagan-Godfrey

6. Statistics Test

I. T-Test. To test the validity of each independent influence towards the dependent variable.

II. F-Test. To test whether the independent variables jointly affect the dependent variable.

III. R^2 Interpretation. R^2 is the coefficient determination which shows how much percentage the model actually fitted regression line.