

## **CHAPTER III**

### **METHODOLOGY RESEARCH**

#### **A. Object Research**

Based on the needs and objectives of the study, the object of research is the thing that underlies the selection, processing, and interpretation of all data and information relating to what is the purpose of the research.

The object examined in this study is Demand for Money (Conventional) in terms of the number of M1 (currency + deposit) and M2 (M1 + saving + time deposit) in the form of secondary data by selecting data based on Inflation, Exchange Rates and Tribes Interest is compared to Money Demand (Shari'ah) in terms of the amount of M1 (currency + deman deposit of wadi'ah deposits) and M2 (M1 + saving + deposit mudharabah) in the form of secondary data by selecting data based on Inflation, Exchange Rate, and also Shari'ah Return for the period January 2013 until February 2018.

#### **B. Types of Data**

In this study quantitative data which, according to the source, includes secondary data. Quantitative data is data that is tangible collection of numbers while secondary data is data obtained indirectly. Secondary data here uses sequential time data. The data used in this study are M1 data (currency + deposit), M2 (M1 + saving + time deposit), M1 (currency + deman deposit of wadi'ah deposit), M2 (M1 + saving + deposit mudharabah) , Inflation, Exchange Rates,

Interest Rates, and Shariah Returns. The entire data used in this study was obtained from Bank Indonesia, the Financial Services Authority, the Central Statistics Agency and the World Bank.

### **C. Technique of Collecting Data**

Data retrieval is done using secondary data providing data on data collection. Data is obtained from the official website of Bank Indonesia, the Financial Services Authority, the Central Bureau of Statistics and the World Bank and various other literature such as economic journals, books related to research, literature and reading scientific papers. Data is then compiled and processed in accordance with the interests and objectives of the study. The data used in this study include M1 (currency + deposit), M2 (M1 + saving + time deposit), M1 (currency + demand deposit of wadi'ah deposits), M2 (M1 + saving + deposit mudharabah), Inflation, Exchange Rates, Interest Rates, and Shariah Returns January 2013 to Februari 2018.

### **D. Variables and Operational Definition**

The variables used in the research along with their operational definitions are as follows:

- a. The conventional money supply component in the narrow sense (M1) is currency and demand deposits with conventional banks.
- b. The conventional money supply component in the broad sense (M2) is a component of M1, savings, and deposits in conventional banks.

- c. The Islamic money supply component in the narrow sense (M1ISL) is currency and wadiah demand deposits in Islamic banks.
- d. The Islamic money supply component in the broad sense (M2ISL) is M1ISL, Mudharabah savings, and Mudharabah Investment Deposits.
- e. Inflation (INF) is the inflation rate in the previous period with the base year of 2013.
- f. Exchange Rate (ER) is the price of a country's currency with a base year of 2013.
- g. Interest Rate (IR) is a 6-month deposit interest rate.
- h. Syari'ah (RS) Return is a refund rate at Syari'ah commercial bank in the form of an equivalent rate of Mudharabah return deposit.

#### **E. Estimation Method**

The problem in this study will be analyzed using Vector Autoregression (VAR) from the conventional money demand model and the demand for Islamic money proposed by Ascarya (2008) and earlier by Hasanah et al (2008). Then if the data used is stationary at the first difference, then using the VAR model will be combined with the error correction model to become the Vector Error Correction Model (VECM).

This study refers to the previous Ascarya, (2008) study which mathematically, the general model can be formulated as follows:

- 1) Demand for conventional real money balances, his research refers to the Goldfeld and Sichel models in Achsani et al (2005) are:

$$\log M1t = \Phi_0 + \Phi_1 \log EXCHRTEt + \Phi_2 INFt + \Phi_3 INTEREST\_RATEt + e_t$$

2) Best compared to the demand for Islamic money in the dual monetary system in Indonesia which refers to Kaleem (2000), by replacing the INTEREST INTEREST variable with RETURN SYARIAH. Which is formulated as follows:

$$\log M1ISLRt = \Phi_0 + \Phi_1 \log EXCHRTEt + \Phi_2 RS_t + \Phi_3 INF_t + e_t$$

Where:	M1	= Balance real money
	M1ISL	= Balance of Islamic real money
	EXCHANGE	= Exchange rate
	INF	= Inflation
	INTEREST_RATE	= Interest rates
	RS	= Sharia Return
	$e_t$	= Error Term

#### **F. Data Measuring Instrument**

In processing secondary data that has been collected, the author uses several statistical tools, such as: Microsoft Excel 2010 program and E-Views 7.0. Microsoft Excel 2010 for managing data related to creating tables and analysts. While using E-Views 7.0 the author uses it to process regression.

#### **G. Data Quality Test**

Test the quality of data used with basic analysis of time series data intended to obtain maximum results in vector autoregression testing. Sims (Enders, 2004) is

also called an atheistic method (not based on theory). The advantage of this method is to have a forecast for variables in VAR.

## **H. Hypothesis and Data Analysis**

### **a. Vector Auto Regression (VAR)**

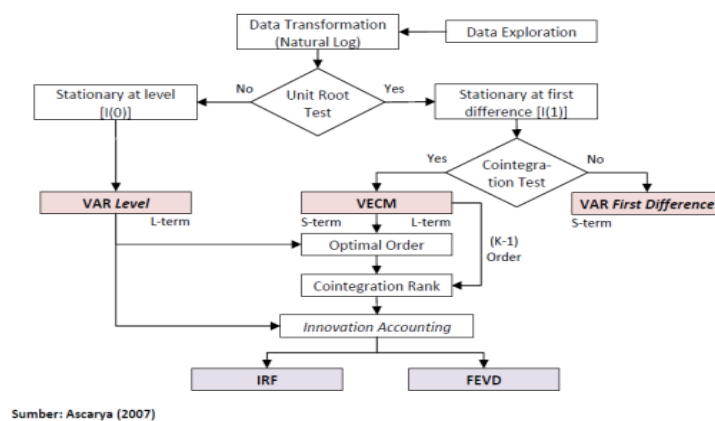
According to Ascarya (2009), the Vector Autoregression or VAR method is a non-structural approach (as opposed to a structural approach, as in simultaneous equations) which describes a relationship that "causes each other" (causality) between variables in the system. This method began to be developed by Sims in 1980 which assumed that all variables in the model were endogenous (determined in the model) so that this method was referred to as an a-theoretical model (not based on theory).

This is done because there are often situations where economic theory alone cannot capture (not rich enough to provide specifications) precisely and completely dynamic relationships between variables. If the data is not stationary at its level, then the data must be transformed (first difference) to get stationary data. Long-term relationships are lost in transformation. To continue to get a long-term relationship, the VAR model will be modified to become a Vector Error Correction Model (VECM), if there is cointegration in the model.

Some of the advantages of the VAR method are compared to other econometric methods, including:

1. The VAR method is free from various limitations of frequently emerging economic theories, such as the spurious phenomenon of endogeneity and exogeneity, because it works based on data;
2. VAR builds models simultaneously in a complex system (multivariate), so that it can capture the relationship of the whole variable in the equation;
3. The multivariate VAR test can avoid parameters that are biased due to the exclusion of relevant variables;
4. The VAR test can detect the relationship between variables in a system of equations, by making all variables as endogenous;
5. The VAR method is simple, when one does not need to worry about which variables are endogenous and which variables are exogenous;
6. The VAR method is simple, because the usual OLS method can be applied to each equation separately; and
7. The forecast estimation results obtained through the VAR method are in many cases better than the estimation results from more complex simultaneous equation models. Meanwhile, some of the weaknesses of the VAR method include:
  - The VAR model is considered to be theoretical, because it uses less information than previous theories, unlike simultaneous equation models, where the inclusion and expenditure of certain variables play an important role in model identification;
  - The VAR model is not suitable for policy analysis, due to overestimation (forecast);

- The selection of lag length is the biggest challenge, especially when there are too many variables with long lags, so there are too long parameters that will reduce the degree of freedom and require a large sample size;
- All variables must be stationary. If not, the data must be correctly transformed (for example, taken by the first difference). The long-term relationships needed in the analysis will be lost in transformation; and
- The Impulse Response Function, which is the core of the analysis using the VAR method, is still debated by researchers. Here is the flow of the VAR model in the form of a chart:



**Figure 3.1**  
Concept of VAR and VECM Method

Based on the flow chart above, the VAR analysis requires several tests including: Stationarity Test (Root Test Unit), VAR Model Stability Test, Optimum Lag Test, Cointegration Test, VECM Model (Long Term), Impulse Response Function (IRF) Analysis, and Analysis of Forecast Error Variance Decomposition (FEVD).

## 1. Stationary Test

Stationarity testing can be done to see the behavior of data. Stationarity test can be done using the ADF method in accordance with the form of the trend of determination contained by each variable. Stationary results will lead to the use of VAR with a simple model. While non-stationary variables increase the likelihood of the existence of cointegration relationships between variables.

## 2. Stability Test of VAR Model

The stability of the VAR model can be seen in the modulus values possessed by each variable. The VAR model is said to be stable if the modulus value is at a radius of  $<1$ , and is unstable if the modulus value is  $> 1$ . If the greatest Modulus value is less than one and is at the optimal point, the composition is already in optimal position and the VAR model is stable.

## 3. Optimum Lag Test

Optimum lag determination is useful to eliminate problems in autocorrelation in a VAR system. To determine the optimal amount of lag can be done using several criteria, among others: Akaike Information Criteria (AIC), Schwarz Information Criterion (SIC), Hannan-Quinn Information Criterion (HQ). However, in providing stability and consistent value the optimum lag length generally uses SIC.

## 4. Cointegration Test

Cointegration tests are conducted to find out whether there will be a balance in the long term, that is, there is a similarity in ratio and stability of relations between



the variables in this study or not. In this study cointegration tests were carried out using the Johansen's Cointegration Test method.

#### 5. VAR Model Estimation

The estimation of the VAR model requires data to be stationary. The estimation of the VAR model starts with determining the range of the optimal lag (3rd VAR stage).

#### 6. Causality Test

Causality tests are conducted to determine whether an endogenous variable is treated as an exogenous variable. Causality tests can be done with various methods including the Granger's Causality method and the Error correction Model Causality.

#### 7. Analysis of Impuls Response Function (IRF)

IRF in VAR is used to see the impact of changes from one variable to changes to other variables dynamically. IRF is an application vector moving average which aims to look at traces of the current and future responses of a variable to the shock of a particular variable. The form of IRF analysis is generally represented in graphical form.

## 8. Analysis of Forecast Error Variance Decomposition (FEVD)

The method used to see how changes in a variable indicated by the variance error change are influenced by other variables. This analysis is used to calculate how much influence random shocks from certain variables on endogenous variables. With this method, we can see the strength and strength of each variable in influencing other variables over a long period of time.