

CHAPTER III

DATA AND RESEARCH METHODOLOGY

A. Research Objective and Data Type

The object in this study is Shariah Banking in Indonesia which has transparent financial reports and is published by Bank Indonesia and the Financial Services Authority through the website. Where Shariah Banking in Indonesia is a Sharia Bank or commonly referred to as Shariah Banking. In this study the risk analysis in Shariah banking in Indonesia is used, during the period January 2010 to August 2018. The usage of Monthly data based on technical statistic consideration related to limitation of publication, while the selection time period from 2010 until August 2018 based on the new phase of new normal of global economy where the global economy start to increase after its recession indicated by the growth of east Asian country and China economy. This new normal occurs after one cycle of business cycle (expansion, peak, recession, trough, and recovery phase). It is also based on 3 constructive years after the period after being issued Act of The Republic Indonesia Number 21 of 2008 concerning Shariah banking in Indonesia where the policy and government action for Shariah banking has been obtaining the results. The data obtained from Statistic Perbankan Syariah (SPS) Financial Services Authority (OJK) and other available resource.

B. Data Collection Method and Sources

The type of data used in this study is secondary data. This secondary data is in the form of times series for eight years, eight months, namely January 2010 to August 2018. The data are collected from several credible resources in Indonesia and International. The data used to obtain information about all variables in this study is secondary data obtained from the Financial Services Authority, Static Sharia Banking, Indonesian Economic and Financial Statistics released by Bank Indonesia. This study also obtains relevant information from many articles, books, journals, newspaper and others used as the reference.

C. Data Collecting Techniques

The technique of collecting data by means of documentation is the technique of collecting data through recording and utilization of other research institutions, financial reports, published reports and other reports relating to the problems in this study. The data collected are Financing to Deposit Ratio (FDR), Non Performing Financing (NPF) and The Operational Expenses to Operational Revenue (BOPO). Sources of data obtained from joint financial statements between Sharia Commercial Banks (BUS) and Sharia Business Units (UUS) are published by the Financial Services Authority and Bank Indonesia. Thus, this type of research is quantitative research with secondary data in the form of time series.

D. Operational Definition of Researched Variables

The definition of these variables is as follows:

a. Financing to Deposit Ratio (FDR)

FDR is a ratio that assesses the liquidity of Islamic banks by dividing the total funding channeled by the total third party funds collected. The FDR variable between the ratios of the total amount of financing with the funds from third party. FDR in Shariah Banking is used to measure the capabilities of Shariah Banking to meet the repayment of deposits that have matured to its depositors and can meet the financing request submitted without a delay. If the FDR ratio increases, it means that the total funding provided by the bank exceeds the funds collected from the community. This variable has the potential to cause liquidity risk for Shariah Banking. Formulated as follows:

$$FDR = \frac{\textit{Total Financing}}{\textit{Total Third Party Funds collected}} \times 100\% \dots \dots \dots (1)$$

b. Non Performing Financing (NPF)

NPF is the amount of bad credit classified as not smooth, doubtful based on Bank Indonesia provisions concerning the quality of production assets. This variable is the ratio between the ratio of total financing that is problematic to the total financing provided by Shariah Banking. NPF is a non-performing financing consisting of financing classified based on lack of transparency and doubt. Usually the NPF value is the result of the failure of the debtor to fulfill

its obligations to Shariah Banking. Bank Indonesia gave a 5% limit on Shariah Banking NPF. Therefore the NPF variable has the potential to cause credit risk. If the smaller NPF value will reduce the potential for a crisis in Shariah Banking Formulated as follows:

$$NPF = \frac{\text{Non Performing Financing}}{\text{Total Financing}} \times 100\% \dots \dots \dots (2)$$

c. The Operational Expenses to Operational revenue (BOPO)

BOPO used in this study BOPO of Shariah Banking in Indonesia in percentage form. BOPO is used as a variable because it can control operational costs against operating income in the banking sector and can show how much risk is faced by banks. Formulated as follows:

$$OER = \frac{\text{Total Operating Expenses}}{\text{Total Operating Revenue}} \times 100\% \dots \dots \dots (3)$$

E. Research Estimation Method

The problem in this study will be analyzed by using Vector Autoregression (VAR) from the risk of Shariah Banking. Then if the data used stationary at the first difference, then using 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:

Risk on Shariah Banking, which is formulated as follows:

$$FDR = \Phi_0 + \Phi_1 NPF + \Phi_2 BOPO$$

$$NPF = \Phi_0 + \Phi_1 BOPO + \Phi_2 FDR$$

$$BOPO = \Phi_0 + \Phi_1 FDR + \Phi_2 NPF$$

Where:

FDR = Financing to Deposit Ratio

NPF = Non Performing Financing

BOPO = The Operational Expenses to Operational Revenue

F. Research Model and Analysis Method

Data analysis technique is a technique used to analyze data and at the same time in testing (Febianda, 2016). In this study, the data analysis technique uses parametric inferential statistical techniques using the Vector Error Correction Model (VECM) method, which is to determine the relationship in the short term and the long-term relationship between each variable. In accordance with the design of the study, the steps in the data analysis technique in this study are as follows:

1. Stationary Data Test

The first step that must be done in the VECM estimation is to test stationary data. Data can be declared stationary if the time series data has a tendency to move towards the average. According to Kuncoro (2004) that data is stationary when it drawn against time. It will often pass through the horizontal

axis and autocorrelation will decrease regularly for a considerable lag. Data can be said to be stationary if it meets the following two conditions:

- a. The average covariance is constant over time
- b. Covariance between two data sequences depends on lags between the two periods.

According to Basuki (2017) the test method used to test data stationarity is the ADF (Augmented Dick Fuller) test using a real level of five percent. If the t-ADF value is smaller than the critical value of MacKinnon, it can be concluded that the data used is stationary or does not contain unit roots. The testing of the roots of this unit is carried out at the level up to first difference. Because most do not pass the data level, therefore a first difference test is necessary.

2. Lag Length Criteria

Time (lag) in economics is used to explain the dependence of one variable on another (Gujarati, 1995). Determination of lag length is done to determine parameter estimates in VECM. In the VECM estimation the causality relationship is strongly influenced by lag length. In addition, Basuki & Yuliadi (2015) also explained that if the lag entered is too short, it is feared that the resulting estimate is inaccurate. Conversely, if the lag entered is too long, it will produce inefficient estimation results. The determination of optimum lag length can be done using Eviews software.

3. Stability Test of VAR Models

Before testing VAR estimation, a stability test must first be carried out. According to Basuki & Yuliadi (2015) the stability of the model needs to be tested because it will affect the results of IRF (Impulse Response Function) and VCD (Variance Decomposition). If stability is not tested, the results of the IRF and VDC analysis are invalid. A VAR system can be said to be stable or fulfill a stability test if the value of the entire root or root has a modulus smaller than one. In this study, it is known that the modulus value is less than one, which means that this study gets the results from IRF and VDC analysis is valid.

4. Co-Integration Test

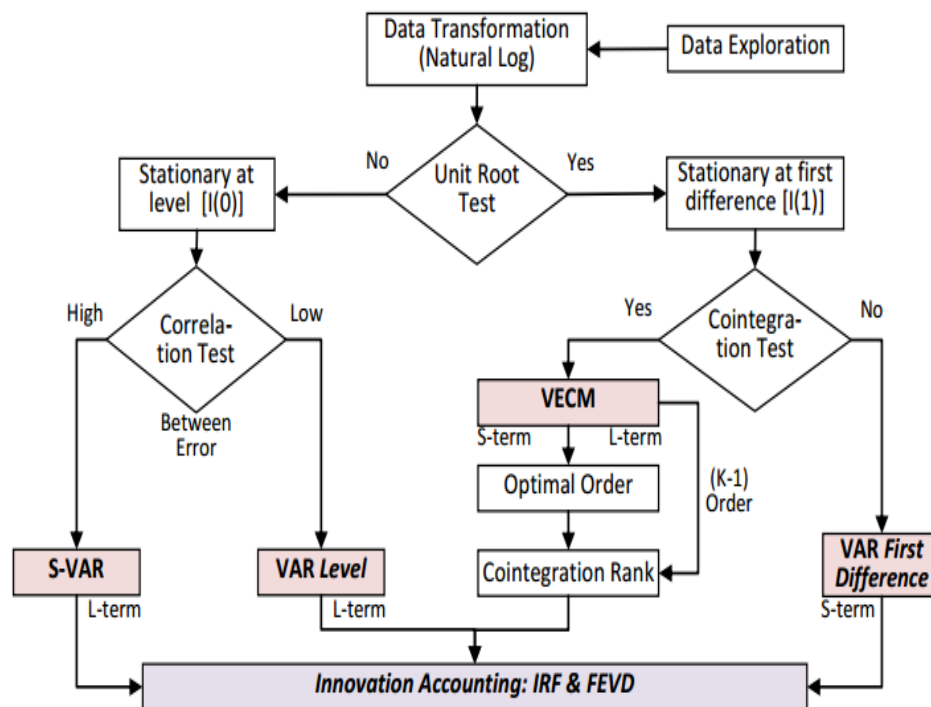
Cointegration test is the test intended to see whether there is a long-term relationship to each of the variables used in the study. In VECM estimation, cointegration test is very necessary to determine whether each variable has a relationship in the long term or not, if each of them does not have a cointegration relationship, then the VECM estimation does not apply. If the opposite, data has a relationship in the long term (cointegration), then VECM applies.

According to Basuki & Yuliadi (2017) as stated by Engle-Granger, the existence of non-stationary variables causes the possibility of a long-term relationship between variables in the system. Cointegration test is performed to determine the existence of the relationship between variables, especially in the

long term. If there were cointegration on the variables used in the model, it can be ascertained that there is a long-term relationship between the variables. The method that can be used to test the existence of this cointegration is the *johansen Cointegration* method.

5. Vector Error Correction Model (VECM)

The Vector Error Correction Model (VECM) is a derivative model of VAR (Vector Autoregression) or VAR. The difference between VAR and VECM is the VECM estimation, there is a cointegration relationship between each variable that indicates a long-term relationship (Basuki & Yuliadi, 2015). VECM is often referred to as a VAR design for non-stationary series that has a cointegration relationship. The VECM specification limits the relationship of endogenous variables in the long run to remain convergent in cointegration relationships. But still considers the existence of short-term relationships. The process for deciding on the VECM method can be seen in the picture below:



Source: Gujarati (2011)

FIGURE 3.1
Vector Error Correction Model (VECM)

6. Impulse Response Function (IRF)

The IRF analysis was conducted to check the shock response of each variable. Therefore, the effect of shock from one variable can explain clearly. The IRF results prove how long it takes from one variable to respond to the other variable.

7. Variance Decomposition (VDC)

VDC analysis aims to measure the size of the contribution or composition of the influence of each variable. VDC analysis will provide information about the magnitude and duration of the shock proportion of a

variable to the variable itself and to other variables. According to Basuki (2017) Variance decomposition aims to measure the magnitude of the contribution or composition of the influence of each independent variable on the dependent variable.

8. Granger's Causality Test

According to Basuki (2017) the Granger Causality Test can be done to see whether two variables have a reciprocal relationship or not. In other words, the variable have a causal relationship with other variables significantly, because each variable in a study has the opportunity to become an endogenous or exogenous variable. The bivariate causality test in this study used the VAR Pairwise Granger Causality Test and used a real level of five percent.