CHAPTER III

RESEARCH METHOD

3.1. Population and Sample

The population of this research is the Islamic banks in Indonesia. The selection of the sample is using the purposive sampling method based on the availability of the data. The sample is Islamic banks in Indonesia that are listed in Bank of Indonesia in 2003-2014.

3.2. Data Collection Method

This study is a quantitative study using historical data resources. The type of data that is used is secondary data that are obtained from some sources, which are:

1. Economic growth quarterly data period Q1:2003-Q4:2014 from the website of Statistics Indonesia (BPS)
2. Islamic bank statistical data period Q1:2003-Q4:2014 from the website of Financial Service Authority (OJK)

3.3. Research Variables

3.3.1. Islamic Banking Development

One of the variables in this research is Islamic banking development which measured by financing (FINC) and deposit (DEPT)

a. Financing

The data of this variable are retrieved from the Islamic Commercial Bank and Islamic Business Unit Condensed Balance Sheet which is included in the Islamic Banking Statistics (IBS). Starting in May 2014, data of the IBS which is a collection of Sharia Commercial Bank (BUS) and Sharia Business Unit (UUS) data compiled source from the report of BUS-UUS based on PBI No.15/4/PBI/2013 about Report on Monetary and Financial System Stability of Sharia Commercial Banks and Sharia Business Unit. Previously report from BUS-UUS compiled based on PBI No. 26/5/PBI/2003 about Report of Sharia Commercial Banks Data Source: Bank Indonesia and Financial Services Authority unless mentioned otherwise.

1. The data used in the Islamic Banking Statistics is derived from the Islamic Bank and Islamic Rural Bank Reports unless mentioned otherwise.
2. Data downloading process; Data from Islamic Bank and Islamic Rural Bank Reports which submitted by the reporting banks to Bank Indonesia, is processed on the web server LBUS and BPRS. The difference in the processing time may result in variations of the data published compared to other published data. Therefore, readers are recommended to pay attention to the download time of data.
3. The amount of Islamic Commercial Bank and Islamic Business Unit data represents in billion rupiah while Islamic Rural Bank data

represents in million rupiah. Until June 2015, the data publication are also provided through OJK website (http://www.ojk.go.id) and BI website (http://www.bi.go.id)

a. Deposit

The data of deposit are retrieved from the depositor Funds Composition of Islamic Commercial Bank and Islamic Business Unit from the same source as financing data.

3.3.2. Economic Growth

Another variable in this research is economic growth which measured by gross domestic product (GDP) and gross fixed capital formulation (GFCF).

a. Gross Domestic Product (GDP)

The GDP data are retrieved from the website of Statistics Indonesia (BPS). In making the calculations, it follows established international standards. The international standard for measuring GDP is contained in the *System of National Accounts*, 1993, compiled by the International Monetary Fund, the European Commission, the Organization for Economic Cooperation and Development, the United Nations, and the World Bank. Besides that, it is already ruled by Act 16 year 1997.

b. Gross Fixed Capital Formation (GFCF)

The GFCG data are retrieved from the gross domestic product expenditure (GDP) report from the same source as GDP.

3.4. Analysis Technique

3.4.1. Model Specification

One of the most important issues in assessing the causality relation between Islamic banking and economic growth is how to obtain satisfactory empirical indicators of this issue. Proceeding from the literature review, this study has chosen, in line with Ali Al-qool, Okab, and Bashayreh (2014), relation between Islamic banking and economic growth may be specified through the following models:

a-Financing model:

$$LGDP_t = \gamma_0 + \gamma_1 LFINC_t + e_{1a} \quad (1\text{–a})$$

$$LFINC_t = \theta_0 + \theta_1 LGDP_t + e_{2a} \quad (1\text{–b})$$

$$LGFCF_t = \tau_0 + \tau_1 LFINC_t + e_{3a} \quad (1\text{–c})$$

$$LFINC_t = \chi_0 + \chi_1 LGFCF_t + e_{4a} \quad (1\text{–d})$$

b-Deposits model:

$$LGDP_t = \alpha_0 + \alpha_1 LDEPTt + e_{1b} \quad (2\text{–a})$$

$$LDEPT_t = \beta_0 + \beta_1 LGDPt + e_{2b} \quad (2\text{–b})$$

$$LGFCF_t = \upsilon_0 + \upsilon_1 LDEPTt + e_{3b} \quad (2\text{–c})$$

$$LDEPT_t = \varepsilon_0 + \varepsilon_1 LGFCFt + e_{4b} \quad (2\text{–d})$$

Where, LGDP and LGFCF are the natural logarithm of gross domestic product (GDP) and gross fixed capital formation (GFCF) as the indicators of economic growth. LFINC and LDEPT are the natural logarithm of total financing and total deposits respectively as a measure of Islamic banking development. ($\alpha's$, $\beta's$,$\varepsilon's$, $\delta's$, $\chi's$, $\tau's$,$\gamma's$,$\theta's$) are coefficients to be determined and(e_{1a}, e_{2a},e_{3a},e_{4a},e_{1b}, e_{2b},e_{3b},e_{4b}) error terms.

3.4.2. Econometric Technique

The econometric technique applied in this research consists of three sequential steps. First is to test the stationarity of GDP, GFCF, FINC and DEPT series. Second is to detect the existence of co-integration relation between variables. Third is to analyze the Granger causality between economic growth and Islamic banking development in Indonesia.

a. Unit Root Test

To get unbiased results in time series analysis, all-time series under concerned should not contain unit root (stationary). As Granger and Newbold (1974), states that if a series have unit root this leads to produce spurious result. In order to test for stationary, this research employed Augmented Dickey-Fuller (ADF) test (Dickey & Fuller, 1979). ADF utilized with the inclusion of a constant and a trend for each time series variable. In ADF, researcher tested the null hypothesis that the series have unit root (non-stationary), against the

alternative one that the series is stationary (have no unit root) by comparing the calculated ADF τ (tua)-statistics value with the critical τ-statistics value obtained from McKinnon's Table (Enders, 1995; Gujarati, 1995). Non stationary series leads to difference the time series until stationary is achieved, if the non-stationary time series become stationary after differences it (d) times, then we can say that the series is integrated of order (d), i.e. I(d) (Kennedy, 1996; Katos, 2004).

b. Co-Integration Test

The Johansen approach developed by Johansen and Jesulius (1990) and Johansen (1991) used to investigate the possible long-run relation existence between the study variables. Johansen approach uses two test statistics, as suggested by Johansen (1988) and Oseterwald-Lenum (1992) to determine the number of co-integrating vectors. These are the trace test and the maximum Eigen value test, represented by equation (3) and (4).

$$\lambda_{trace}(r) = -T + \sum_{i=(r+1)}^{n} ln(1 - \lambda i) \quad (3)$$

$$\lambda_{max}(r, r+1) = -T\, ln(1-\lambda_{r+1}) \quad (4)$$

Where λ_i is the ith shows the estimated values of the characteristic roots, in assuming that the series are I(1). T, is the number of observations and r, is the rank of the vector matrix.

This research tested the null hypothesis of Trace test that there is at most (*r)* co-integrated relation against the alternative one that there are more than (*r)* co-integrated relations. In other words, a rejection of the null hypothesis means that there are more than (*r)* co-integrated relations. The Trace test rejects the null hypothesis if the trace statistics exceeds the critical value. On the other hand, we test the null that there is *(r)* co-integrated relation versus (*r+1)* co-integrated relations. The test rejects the null hypothesis if the Eigen value test statistics exceeds the respective critical value. If the null hypothesis for both statistics is rejected, this indicates that there is one co-integrated relation among the variables under testing.

c. Granger Causality based on VECM Framework

Granger causality concept (Granger, 1969; 1980) states that if two variables (say: X, Y) are co-integrated than each is individually integrated of order one, i.e. I(1). Then either X causes Y if and only if the past values of X help to predict the changes of Y or Y causes X if and only if the past values of Y help to predict the changes of X. This test has the aim to know whether there is short-run causality between variables and also the direction of causality. Assuming the presence of co-integrating vector among the variables in finance and deposits models, the Granger causality test based on the VECM can be formulated as follows:

a-Financing model:

$$\Delta LGDP_t = \gamma_0 + \sum_{i=1}^{p} \gamma_1 \Delta LGDP_{t-i} + \sum_{i=1}^{p} \gamma_2 \Delta LFINC_{t-i} + \delta_1 ECT_{t-1} + u_t \quad (5\text{–a})$$

$$\Delta LFINC_t = \theta_0 + \sum_{i=1}^{p} \theta_1 \Delta LFINC_{t-i} + \sum_{i=1}^{p} \theta_2 \Delta LGDP_{t-i} + \delta_2 ECT_{t-1} + u_t \quad (5\text{–b})$$

$$\Delta LGFCF_t = \tau_0 + \sum_{i=1}^{p} \tau_1 \Delta LGFCF_{t-i} + \sum_{i=1}^{p} \tau_2 \Delta LFINC_{t-i} + \delta_3 ECT_{t-1} + u_t \quad (5\text{–c})$$

$$\Delta LFINC_t = \chi_0 + \sum_{i=1}^{p} \chi_1 \Delta LFINC_{t-i} + \sum_{i=1}^{p} \chi_2 \Delta LGFCF_{t-i} + \delta_4 ECT_{t-1} + u_t \quad (5\text{–d})$$

b-Deposits model:

$$\Delta LGDP_t = \alpha_0 + \sum_{i=1}^{p} \alpha_1 \Delta LGDP_{t-i} + \sum_{i=1}^{p} \alpha_2 \Delta LDEPT_{t-i} + \delta_5 ECT_{t-1} + u_t \quad (6\text{–a})$$

$$\Delta LDEPT_t = \beta_0 + \sum_{i=1}^{p} \beta_1 \Delta LDEPT_{t-i} + \sum_{i=1}^{p} \beta_2 \Delta LDEPT_{t-i} + \delta_6 ECT_{t-1} + u_t \quad (6\text{–b})$$

$$\Delta LGFCF_t = \upsilon_0 + \sum_{i=1}^{p} \upsilon_1 \Delta LGFCF_{t-i} + \sum_{i=1}^{p} \upsilon_2 \Delta LDEPT_{t-i} + \delta_7 ECT_{t-1} + u_t \quad (6\text{–c})$$

$$\Delta LDEPT_t = \varepsilon_0 + \sum_{i=1}^{p} \varepsilon_1 \Delta LDEPT_{t-i} + \sum_{i=1}^{p} \varepsilon_2 \Delta LGFCF_{t-i} + \delta_8 ECT_{t-1} + u_t \quad (6\text{–d})$$

Where, LFINC and LDEPT are the natural log of total finance and total deposits of Islamic banking respectively. ECTt-1 is the error correction term contains the long-run information, since it is

derived from the long-run integrated relationship. (ut's) is the uncorrelated white noise residual. P is the optimal lag lengths. To investigate the long-run causality the following hypotheses are tested:

1. FINC does not Granger causes RGDP if H_0:$\gamma_2 = 0$ against the alternative Hα:$\gamma_2 \neq 0$ FINC Granger causes RGDP. (Equation 5-a);
2. RGDP does not Granger causes FINC if H_0:$\theta_2 = 0$ against the alternative Hα:$\theta_2 \neq 0$ RGDP Granger causes FINC. (Equation 5-b);
3. FINC does not Granger causes GFCF if H_0:$\tau_2 = 0$ against the alternative Hα:$\tau_2 \neq 0$ FINC Granger causes GFCF. (Equation 5-c);
4. GFCF does not Granger causes FINC if H_0:$\chi_2 = 0$ against the alternative Hα:$\chi_2 \neq 0$ GFCF Granger causes FINC. (Equation 5-d);
5. DEPT does not Granger causes RGDP if H_0:$\alpha_2 = 0$ against the alternative Hα:$_2 \neq 0$ DEPT Granger causes RGDP. (Equation 6-a);
6. RGDP does not Granger causes DEPT if H_0:$\beta_2 = 0$ against the alternative Hα:$\beta_2 \neq 0$ RGDP Granger causes DEPT. (Equation 6-b);

7. DEPT does not Granger causes GFCF if $H_0: \upsilon_2 = 0$ against the alternative $H\alpha: \upsilon_2 \neq 0$ DEPT Granger causes GFCF. (Equation 6-c);
8. GFCF does not Granger causes DEPT if $H_0: \varepsilon_2 = 0$ against the alternative $H\alpha: \varepsilon_2 \neq 0$ GFCF Granger causes DEPT. (Equation 6-d);

The magnitude and statistical significance of (δ's) in each ECT equation implies long-run causal relationship and measures the tendencies of each variable to return to the equilibrium. On other words the stability of long-run equilibrium can also be judged from the sign and significance of the ECT as if it is negatively significant, it shows convergence towards the equilibrium i.e. a stable long-run equilibrium, While the short-run relationships will be captured through the individual coefficients (*i.e.γ1, γ2, θ1, θ2, τ1, τ2, χ1, χ2, α1, α2, β1, β2,υ1, υ2, ε1, ε2*) of the difference terms. The Wald test of the explanatory variables indicates the short-run causal effects, and the direction of causality.