CHAPTER THREE
DATA AND RESEARCH METHODOLOGY

3.1 Preface

This chapter will elaborate data and data collection technique that may ensure originality and accuracy of data by presenting source of data collected and operational variables. In addition, confirmed research model, data management model and detail research methodology process will also be presented in details. This is to show how data will be placed in the model and run in the research process.

3.2 Data and Collection Technique

Population in this research is all Islamic banks in Indonesia, which are fallen under category of Islamic commercial banks and Islamic business units that exist between the period. The period of the research is 70 months starting from March 2004 up to December 2009. Data used in this research is secondary data from Indonesian Statistic on Economics and Finance of Bank Indonesia (SEKI-BI), Islamic Banking Statistics (SPS), Indonesian Banking Statistics (SPI) and Indonesian Statistics (BPS). Other supporting data for the whole thesis writing is cited from other sources such as annual report of major Islamic commercial banks in Indonesia.

a. Asset Growth

Asset growth is shown on monthly growth of Islamic banks' assets that depicts growth movement from month to month (70 months from March 2004 to December 2009). The data of Islamic Rural Banks' assets/asset growth is excluded to present a fair analysis. The growth data is in percentage format and treated as ready data in Eviews 4.1. This time series data is collected from Islamic Banking Statistics, Bank Indonesia, which is available on Bank Indonesia website, http://www.bi.go.id.

b. Human Capital

Number of human capital is derived from monthly total of people who work at Islamic commercial banks and Islamic banking units. This time series data is collected from Directorate of Islamic Banking using formal correspondence i.e. email and fax and formal visit. The data is actually available on Islamic Banking Statistics but not before the year 2005. Thus, the data before 2005 has to be obtained through special request to Islamic Banking Directorate of Bank Indonesia. The reason why March 2004 was taken as the starting period of the research is because it was the first month of Islamic banking data statistics separated from conventional banking statistics. The regulation on establishment of Islamic banking unit was stipulated under Bank Indonesia Regulation No. 6/24/PBI/2004 Concerning Commercial Bank Conducting Business Based on Islamic Principles. Since then, the statistical format of Islamic banking statistics adopted separation of data from conventional to Islamic bank. Therefore the rest of the data in the research model are matched to that period although originally the period was started from January 2003.

c. Office Branch and Channelling

The data of office branch and channelling is available on monthly report of Islamic Banking Statistics, free download data on Bank Indonesia's website. However, the website shows number of office branch and channelling that is combined with Islamic Rural Banks' offices thus the data has to be subtracted proportionately. Careful examination has been taken necessarily to avoid misrepresentation of data.

d. Interest Rate

Interest rate is quoted from Indonesian Statistic on Economics and Finance of Bank Indonesia (SEKI-BI), in this case it is monthly rate of Bank Indonesia Certificate.

e. Inflation Rate

As dependent variable, consumer price index in Indonesia is regarded as proxy of inflation rate. It is cited from Indonesian Statistic on Economics and Finance of Bank Indonesia (SEKI-BI).

f. Industrial Production Index

Monthly Industrial Production Index data is pooling of industry data, which is converted as index. The data is available at http://www.bps.go.id. The following Table 3.1 describes operational variables of the data. This is important as consideration for stationary of data in Eviews 4.1 software.

Table 3.1 Operational Variables

No.	Information	Source & Period of Data	Type of Data
1	Asset Growth	Islamic Banking Statistics, Bank Indonesia, 70 months starting from March 2004 up to December 2009	Originally numeric but transformed into percentage of growth
2	Number of Human Capital	Islamic Banking Statistics, Bank Indonesia, 70 months starting from March 2004 up to December 2009	Originally numeric but transformed into Logarithm Natural (LN)
3	Number of Office Branch and Channelling	Islamic Banking Statistics, Bank Indonesia, 70 months starting from March 2004 up to December 2009	Originally numeric but transformed into Logarithm Natural (LN)
4	Interest rate	Indonesian Statistic on Economics and Finance of Bank Indonesia (SEKI-BI), 70 months starting from March 2004 up to December 2009	Percentage
5	Inflation rate (Consumer Price Index)	Indonesian Statistic on Economics and Finance of Bank Indonesia (SEKI-BI), 70 months starting from March 2004 up to December 2009	Index and transformed into Logarithm Natural (LN)
6	Industrial Production Index	Industrial Production Index is cited from http://www.bps.go.id, 70 months starting from March 2004 up to December 2009	Index and transformed into Logarithm Natural (LN)

3.3 Research Hypotheses

The hypothesis is to test whether all internal and external factors such as number of office branch and channelling, number of human capital, interest rate, inflation, and industrial production index give impact to the assets growth of Islamic banks for the period of 70 months from March 2004 to December 2009. Therefore the hypotheses are as stated below.

First of all, null hypothesis and alternative hypothesis state whether bi-directional causality exist between asset growth and industrial production index.

H_0 = Industrial production index does not Granger cause asset growth of Islamic banks in Indonesia

H_1 = Industrial production index does Granger cause asset growth of Islamic banks in Indonesia

After that, null hypothesis and alternative hypothesis state all internal factors i.e. number of office branch and channelling and number of human capital.

H_0 = Number of office branch and channelling does not give impact to asset growth of Islamic banks in Indonesia

H_2 = Number of office branch and channelling gives impact to asset growth of Islamic banks in Indonesia

and,

H_0 = Number of human capital does not give impact to asset growth of Islamic banks in Indonesia

H_3 = Number of human capital gives impact to asset growth of Islamic banks in Indonesia

Furthermore, the external factors are investigated i.e. interest rate, inflation, and industrial production index. Below is the null hypothesis and alternative hypothesis for the following research questions:

H_0 = Interest rate does not give impact to asset growth of Islamic banks in Indonesia

H_4 = Interest rate gives impact to asset growth of Islamic banks in Indonesia

and,

H_0 = Inflation does not give impact to asset growth of Islamic banks in Indonesia

H_5 = Inflation gives impact to asset growth of Islamic banks in Indonesia

and,

H_0 = Industrial Production Index does not give impact to asset growth of Islamic banks in Indonesia

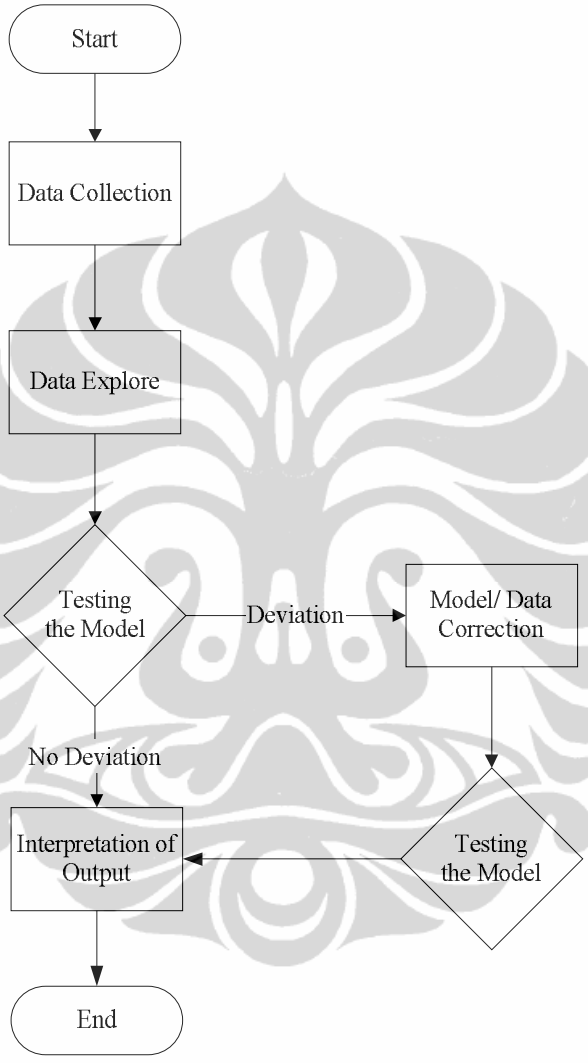
H_6 = Industrial Production Index gives impact to asset growth of Islamic banks in Indonesia

3.4 Research Process

The research process is started from identification of problem up to the test of hypothesis with details as follows:

a. Collecting Data of Islamic banks, conventional banks and macro economic variables from March 2004 to December 2009 (70-months period)
b. Exploring data to determine type of data and its characteristics i.e. numeric, percentage, index. Then the different data are transformed into logarithm natural
c. Testing model to check if any deviation on classical assumption. If there is, correction is to be made
d. Interpretation of output
e. Recommendation

Flowchart 3.1 Research Process Flowchart



3.5 Research Model

The focus of this research is to find out the impact of number of office branch and channelling and number of human capital as internal factors towards asset growth of Islamic bank. On the other side, the external factors to be investigated are interest rate, inflation and industrial production index on their impact to asset growth of Islamic bank.

After referring to previous studies and related theories, therefore the model can be formulated as follows:

Asset Growth: $\alpha + \beta 1ofc + \beta 2hr + \beta 3ir + \beta 4Infl + \beta 5ip + e$

Where;

α : constant

βi : coefficient, I = 1,2…..5

ofc : Office coefficient; number of office branch and channelling - in Logarithm Natural (LN)

hr : Human Capital - in Logarithm Natural (LN)

infl : Inflation is Customer Price Index – in Logarithm Natural (LN)

ip : Industrial Production Index – in Logarithm Natural (LN)

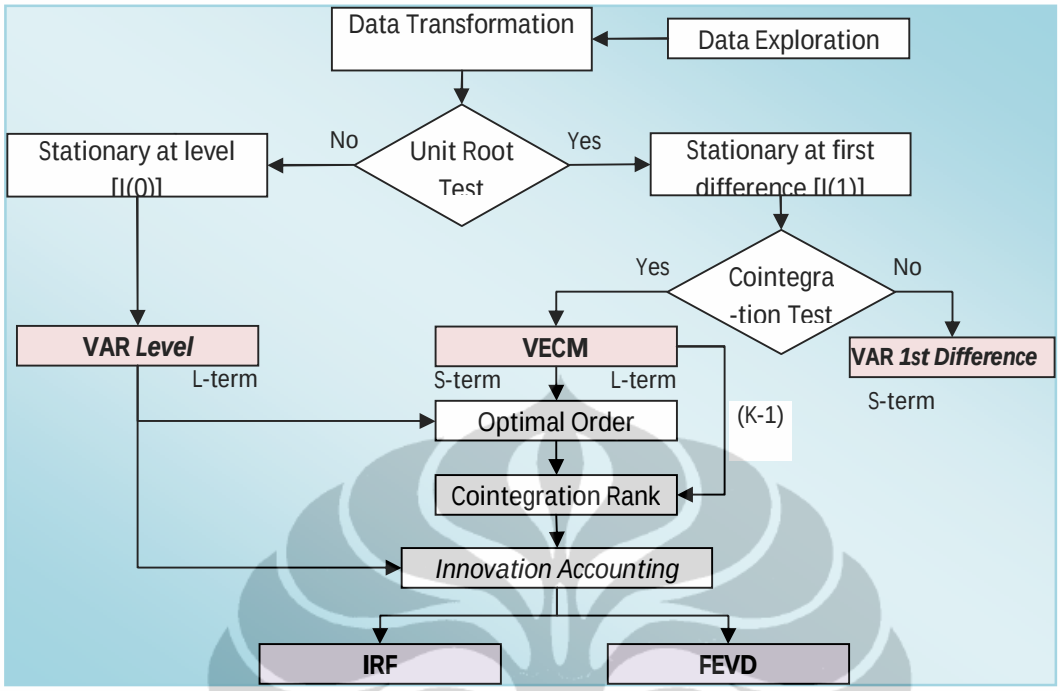
3.6 Research Methodology

The method employed is Granger Causality test, which is conducted to examine bi-directional causality between asset growth and industrial production index. Granger causality (Granger, 1969) analyses to what extent the change of past values of one variable accounts for later variation of other variables. Therefore, Granger causality exists between variables *yt* and *xt*, if by using the past values of variable *yt*, the variable *xt* can be predicted with a better accuracy, and relating to a case when past values of variables *yt* are not being used, with an assumption that other variables stay unchanged. Granger Causality Test usually analyses two variables together, testing their interaction. All of the possible permutations of the two variables are:

- Unidirectional Granger causality from variables *yt* to variables *xt*,
- Unidirectional Granger causality from variables *xt* to variables *yt*,
- Bi-directional casualty,
- No causality.

To ascertain the output, VAR and VECM analysis are presented in the format of Impulse Response Function (IRF) and Forecast Error Variance Decomposition (FEVD). The following flowchart explains how Vector Auto Regression (VAR) and Vector Error Correction Method (VECM) works on the model:

Flowchart 3.2 VAR and VECM Flowchart Process



Source: Ascarya (2007) in Ascarya et.al (2008)

This method is run using Eviews 4.1 software, in which the process is illustrated on the above flowchart. The flowchart explains steps from the beginning to the end of the process. The following is the narration of each step:

a. Data Exploration; ensuring characteristics of each data. It has been explained above that some data are not in percentage format such as number of human capital and number of office branch and channelling. Data in percentage format is asset growth, interest rate, inflation and industrial production index. Understanding each characteristic of this data is important to decide whether they need to be transformed.

b. Data Transformation; converting data that are not in percentage format to percentage format by typing it one by one in the software such as: *lnhr=loghr, lnofc=logofc, lninfl=loginfl, lnip=logip*. However, in this case, number of human capital and number of office branch and channelling data are transformed manually using logarithm natural (ln).

c. Unit Root Test; conducting unit root test to find out if at which state data is stationer, at Level or First Difference. There are several types of tests i.e. Augmented Dickey-Fuller (ADF), Dickey-Fuller GLS,

Phillips-Perron (PP), etc. The tests are conducted primarily on ADF and PP. if the data is not stationer at Level therefore, testing for unit root is conducted at First Difference. This is repeated for Phillips-Perron test to find out unit root outputs according to Phillips-Perron.

d. VAR Stability Testing Model

This stability test is to find out if the model is stable and at which lag structure. VAR model is said to be stable if all values of the modulus are stated less than one (<1) at which point of lag (i.e. lag 1-6, lag 1-7, lag 1-8).

e. Optimum Lag Test

This test is to check at which level lag is optimum. There are several criterions that denote the lag optimum level such as Schwarz Information Criterion (SC), Hannan-Quinn Information Criterion (HQ), and Akaike Information Criterion (AIC).

f. Co-integration Test

This is to check if there is co-integration at Level data. If this Level data has co-integration equation therefore the analysis is continued to VECM. Johansen Co-integration Rank Test will show *(**) sign on the test output. If the sign is shown on more than equation, therefore there is co-integration of data. Then VAR equation model is continued to VECM model to obtain a long-run equilibrium relationship.

g. Impulse Response Function (IRF)

There are two main formats of analysis in VECM such as Impulse Response Function (IRF), and Forecast Error Variance Decomposition (FEVD). IRF is vector moving-average application that has purpose to trace present and future response of one variable towards shocks from a particular variable.

h. Forecast Error Variance Decomposition (FEVD)

Another analysis of VECM is FEVD that has function to predict contribution of each variable towards shocks or changes in particular variable.