

## CHAPTER III

### RESEARCH METHODOLOGY

#### A. Research Variables and Operational Definitions

##### 1. Data Collecting Method and Sources

The ultimate goal of this study is to explore the effect of selected macroeconomic variables on JII10 stock returns and to forecast the future value of JII10 stock returns. It uses secondary time series data starting from December 2007 to January 2013 from several sources. The following table represents research data and its sources:

**TABLE 3.1**

Data and Sources

No	Data	Source
1.	Closing price of JII10	<a href="http://www.duniainvestasi.com">www.duniainvestasi.com</a>
2.	Trading Volume	<a href="http://www.duniainvestasi.com">www.duniainvestasi.com</a>
3.	Brent Crude Oil Price	<a href="http://www.eia.gov">www.eia.gov</a>
4.	Costumer Price Index	Indonesian Monetary Statistic (SEKI) Bank Indonesia
5.	Interest Rate	Indonesian Monetary Statistic (SEKI) Bank Indonesia

Source: [www.duniainvestasi.com](http://www.duniainvestasi.com)

This study also obtains relevant information from official websites, magazines,

## B. Research Variables and Definitions

### 1. Research Variables

According to Sugiarto (2006), research variable is an attribute or characteristic of object or activity which has some varieties. Those varieties are determined by researcher to be observed and concluded. This research consists of two variables which are dependent and independent variable. Dependent variable of this research is stock returns while the independent variable of this research is inflation, interest rate and oil price.

### 2. Econometric Model

Econometric model is statistical model used in econometrics. It defines the statistical relationship between variables in particular phenomena. This study uses this following Econometric model:

Model 1:

$$Y_{1t} = \alpha_1 + \sum \beta_{1i} Y_{1t-i} + \sum \lambda_{1i} Y_{2t-i} + \sum \gamma_{1i} Y_{3t-i} + \sum \omega_{1i} Y_{4t-i} + \sum \phi_{1i} Y_{5t-i} + e_t$$

Model 2:

$$Y_{2t} = \alpha_2 + \sum \beta_{2i} Y_{2t-i} + \sum \lambda_{2i} Y_{3t-i} + \sum \gamma_{2i} Y_{4t-i} + \sum \omega_{2i} Y_{5t-i} + \sum \phi_{2i} Y_{5t-i} + e_t$$

$$Y_{3t} = \alpha_3 + \sum \beta_{3l} Y_{1t-l} + \sum \lambda_{3l} Y_{2t-l} + \sum \gamma_{3l} Y_{3t-l} + \sum \omega_{3l} Y_{4t-l} + \sum \phi_{4l} Y_{5t-1} + e_t$$

Model 4:

$$Y_{4t} = \alpha_4 + \sum \beta_{4l} Y_{1t-l} + \sum \lambda_{4l} Y_{2t-l} + \sum \gamma_{4l} Y_{3t-l} + \sum \omega_{4l} Y_{4t-l} + \sum \phi_{4l} Y_{5t-1} + e_t$$

Model 5:

$$Y_{5t} = \alpha_5 + \sum \beta_{5l} Y_{1t-l} + \sum \lambda_{5l} Y_{2t-l} + \sum \gamma_{5l} Y_{3t-l} + \sum \omega_{5l} Y_{4t-l} + \sum \phi_{5l} Y_{5t-1} + e_t$$

Where  $Y_1$  is Stock returns (RJII10),  $Y_2$  is Costumer price index (CPI),  $Y_3$  is Brent Oil price (OIL),  $Y_4$  is Bank Indonesia Interest rate (BIR),  $Y_5$  is Trading volume (VOL),  $e_t$  is Error term ( $t=1,2,3,4,5$ ),  $l$  is Lag length with  $l = 1,2,\dots, x$  and  $x$  is maximum lag.

The above equation derives this following *Vector Autoregressive order p VAR(p)* :

$$Z_t = \alpha_0 + \phi_1 Z_{t-1} + \phi_2 Z_{t-2} + \dots + \phi_p Z_{t-p} + e_t$$

Where  $p$  is predicted lag.

### 3. Operational Definitions

#### 1. Dependent Variable

Dependent variable is a variable that being described or influenced by other variables (independent variable). The dependent variable of this study is return on stock JII10 consists of 10 selected companies stocks. The value of JII10 stock returns is obtained by calculation of JII10s' closing price by using this following equation:

$$R_t = \ln(P_t) - \ln(P_{t-1})$$

Where  $R_t$  is return for month  $t$ ,  $P_t$  is closing price of JII10 stock for month  $t$  and  $P_{t-1}$  is closing price of JII10 stock for month  $t-1$  respectively.

## 2. Independent Variables

The independent variable is a variable that describe or influence other variable. This study uses these following independent variables: inflation, interest rate and oil price.

### a. Inflation

Inflation is a continuous increasing in general price level. Costumer price index is the representative of inflation that measures the average change in prices of goods and services in a particular period of time.

### b. Interest Rate

Bank Indonesia rate is used as the representative of interest rate which is nationally used as the monetary standard of Indonesian interest rate.

### c. Oil Price

Brent oil price becomes the representative for international oil price in this research.

### d. Trading Volume

Trading volume is the amount of tradable stock in certain period of time.

**TABLE 3.2**  
Operational Definitions Research Variables

No	Variable	Definition	Scale
1.	Stock Returns	Profit results when the price of a stock held by investor rises above its purchase price.	Ratio
2.	Inflation	Inflation is the continuous increasing in general price level.	Ratio
3.	Brent Oil Price	Brent international oil price	Ratio
4.	Bank Indonesia Interest Rate	BI Rate	Ratio
5.	Trading Volume	The amount of tradable stock in certain period of time	Ratio

Source: Relevant Journals and Books

### C. Research Sample

Population is compilation of elements. Which will becomes core focus in a study while sample becomes a part of population. The population of this study is listed in Jakarta Islamic Index (JII) since year 2008 until. Those companies are chosen regarding their liquidity, *shariah* acceptability and market acceptability. The samples are 10 selected companies which are listed in Jakarta Islamic Index (JII) since year 2008 until 2012. Those years involves of Indonesian economic recovery moment after global financial crisis in 2008. Judgment sampling method is used in this research. It takes samples in accordance to pre-determined criteria mentioned

1. The selected companies are public company that is listed in Jakarta Islamic Index continuously since 2008-2012.
2. The selected companies represent almost sectors available in the index.
3. The selected companies have strong fundamental basis.

From total population of 30 companies, this study takes 10 companies that fulfill the sample criteria. Table 3.3 describes the list of companies selected in this research:

**TABLE 3.3**  
The List of Sample Companies

No	Code	Sector	Company
1.	PTBA	Mining	Tambang Batubara Bukit Asam Ltd
2.	TINS	Mining	Timah Indonesia Ltd
3.	ANTM	Mining	Aneka Tambang Ltd
4.	TLKM	Telecommunication	Telekomunikasi Indonesia Ltd
5.	UNTR	Infrastructures	United Tractor Ltd
6.	KLBF	Pharmacy	Kalbe Farma Ltd
7.	INTP	Chemical Industry	Indocement Tunggul Prakasa Ltd
8.	SMGR	Chemical Industry	Semen Gresik Ltd
9.	AALI	Agriculture	Astra Agro Lestari Ltd
10.	UNVR	Consumption Industry	Unilever Indonesia Ltd

#### **D. Descriptive Statistics**

The descriptive statistics supposed to figure out research data. The descriptive statistics analysis in this research consists of these following procedures:

- a. Examining the value of Mean (average)  
To defines the average value of data observation.
- b. Examining the value of Maximum  
To defines the maximum value of data observation.
- c. Examining the value of Minimum  
To defines the minimum value of data observation.

#### **E. Unit Root Test and Covariance Matrix**

According to Thomas (1997), Unit root test supposed to figure out the stationary of research data. The null hypothesis is tested by Augmented Dickey-Fuller test. The ADF test defines the existence of unit root in the research data. Supposed in a *random walk model* equation:

$$Y_t = \rho Y_{t-1} + \mu_t$$

Where  $Y$  is the observed variable,  $t$  is period of time,  $\rho$  is coefficient and  $e$  is error term

Where  $\delta$  is  $(\rho - 1)$  with  $\Delta$  as its first difference and the regression comes with this following hypothesis:

$H_0 = \delta = 0$  Means the unit roots exist and the data is not stationer.

$H_1 = \delta < 0$  Means the unit roots not exist and the data is stationer.

The existence of units root implies spurious behavior in the data and after the stationary of research data is known the linearity of research data testing will be conducted through cointegration test.

#### **F. Johansen-Juselius Cointegration Test**

Cointegration test consists of two ways first Residual based test and second, Maximum likelihood based test. Engle-Granger test becomes the representative of residual based test, while Johansen -Juselius becomes the representative of likelihood based test. This study will use Johansen-Juselius test to observe the existence of cointegration vectors in the non stationary time series data where the Null hypothesis is supposed have no cointegration among the variables. Furthermore, the Vector Autoregressive (VAR) is used to examine the existence of multivariate cointegration among the variables.

According to Irawan (2005), Vector Autoregressive (VAR) becomes an equation system where in every variable is a linear function of the constanta and its





development behavior that apparently more obvious in short-run rather than in long-run.

### **G. Granger Causality Test**

According to Granger (1988), the existence of cointegrating vectors implies that granger causality exists at least in one direction. A granger variable causes the other variable only if it assists its future value. In cointegrated series variables might be share similar stochastic trends. This research will conducts Granger causality test to look for directional relationship among variables.

Gujarati (2003) stated that, there are three Granger interpretations first, unidirectional causality, second, bilateral causality and third independence causality. Unidirectional causality occurs if dependent variable lag coefficient is significant while all independent variable lag coefficient is zero. Bilateral causality occurs if all lag coefficient of both dependent and independent variables are significant and the lag variable is not zero. Independent causality occurs only if all lag coefficient of both dependent and independent variables are zero.

### **H. Variance Decomposition and Impulse Response Analysis**

According to Sims (1992) in Ajija (2007) impulse response function (IRF) illustrates the expectation of future period from variable forecast deviation due to other variable innovation effects. It exposes the existence of shock variable to other

decomposition becomes an instrument of VAR that separate the estimated variable to be shock variable or innovation variable, where it assumes that the innovation variable do not correlate each others. The variance decomposition analysis provides information of the movement of shock variable to certain variables and so to another