

CHAPTER IV

DATA ANALYSIS AND DISCUSSION

4.1 Variable Development

4.1.1 Oil Price Development

World energy production, especially oil, is controlled by cartel organization called Organization of Petroleum Exporting Countries (OPEC). When OPEC (as seller) have market power, they will be able to limit the supply and have a power to affect the price. There was phenomenon of the drastic decreasing of oil in the end of 2014 and in the beginning of 2015. OPEC maintained the production of oil in regular volume even when the world was flooded by oil and from the technology of shale. By maintaining the volume, they mean to decrease the price of oil to stop the production of shale because of the expensive production cost.

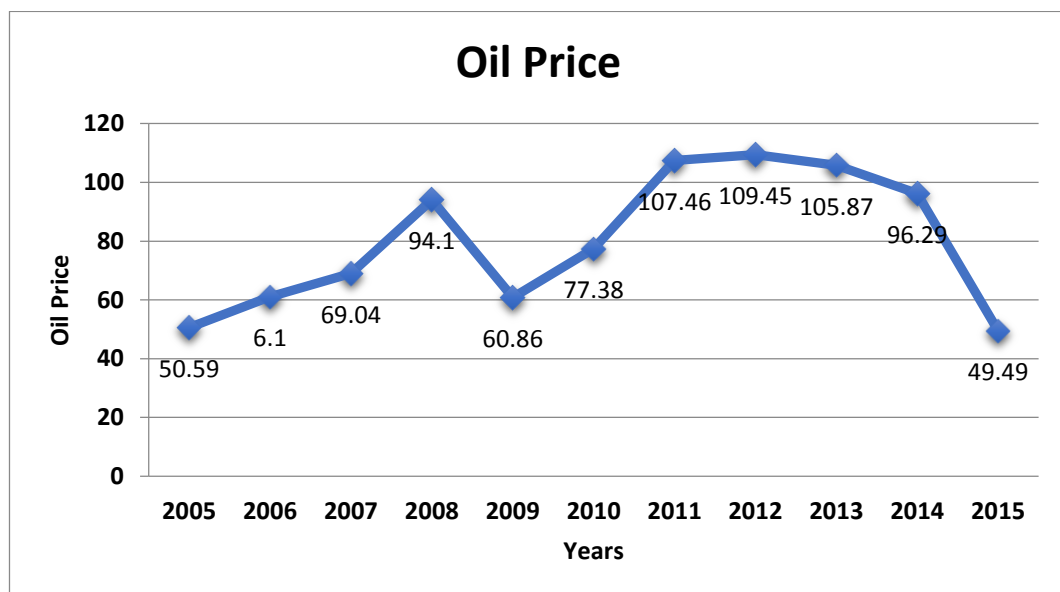
Beside the OPEC aim to maintain the price stable, OPEC act contrary in the decreasing of oil supply because of shale. This action finally can reject at least 150 billion oil investments with the higher cost in 2015 and there are many cutting that will come in the following years and it will affect oil supply in the future. Oil price shock is caused by several things.

According to the research of Chen (2009), there were 3 types of world oil price shock. First, the shock that occurred because of the decreasing of oil supply or as known as oil supply shock. This shock usually occurred by a country with oil

consume that depends on the oil supply in a country or oil supply from the group itself.

Moreover, the second shock occurred because of the increasing of oil demand globally. This type of shock is known as global demand shock. This condition often occurred, or in another word, this factor is the main cause of the price of oil suddenly increases.

While the third shock, it is occurred because of the increasing of oil supply in a small scale, for example only in a country or in a few groups. This shock is known as oil demand shock. The development of oil price fluctuation can be seen in the figure 4.1 below.



Source: Secondary Data Processed, 2018

Figure 4.1 Development of Oil Price in 2005-2015

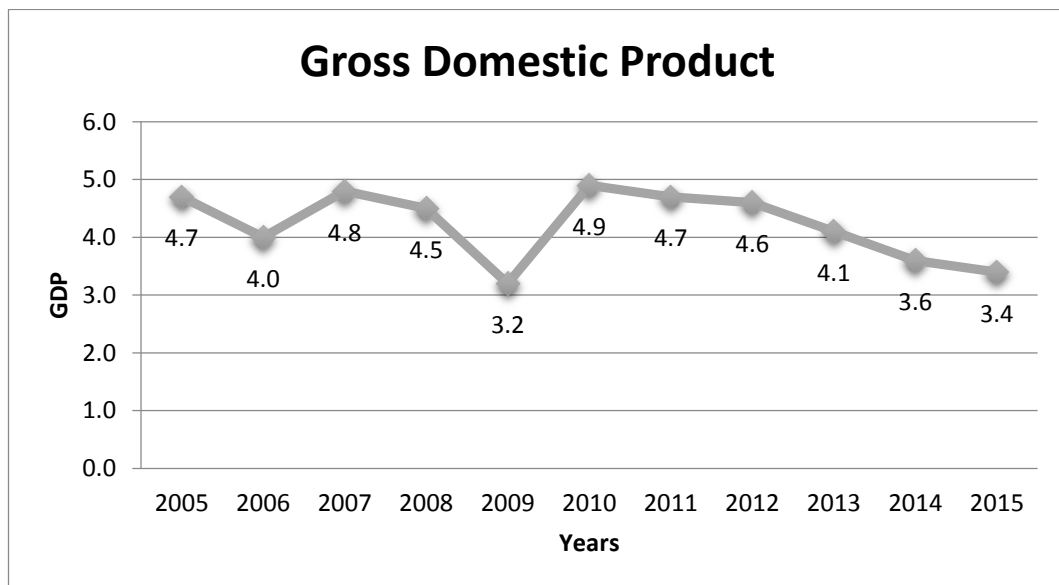
As shown in the graphic, the price of crude oil in 2005 was around 50.59 US\$/barrel. In 2006, it increased to 20.6% become 61 US\$/barrel, and then keep on

increasing until 2008. In 2009, the oil price decreased to 35.3% become 60.86 US\$/barrel. In the following years, it increased until the highest price in 2012 as 109.45 US\$/barrel. In 2013 until 2015 it decreased; thus, the price of oil in 2015 became 49.49 US\$/barrel.

4.1.2 Gross Domestic Product (GDP) Development

The fluctuation of oil price is inversely proportional with economic growth. This difference can be seen because in Indonesia, the contribution of *migas* (oil and gas) sector is still important in the forming of GDP, even the proportion is no longer big, which is only 8.5% from the total of GDP. These low proportions are also showed by small decomposition variance. Even though the contribution of oil and gas tend to be decreasing, the impact of oil price fluctuation will be permanent for the economic growth in Indonesia.

The development of GDP can be seen in the graphic below.



Source: Secondary Data Processed, 2018

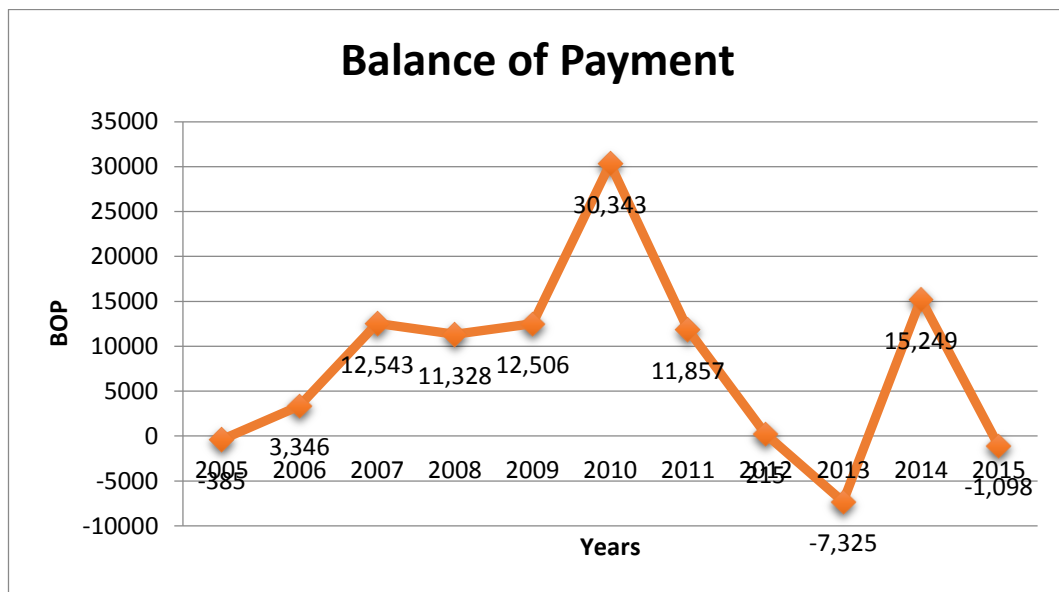
Figure 4.2 Gross Domestic Product (GDP) Development in 2005 – 2015

As shown in figure 4.2, GDP in 2005 was around 4.7, in 2006 it decreased to 14.9% and became 4.0, and then it increased until 2007. In 2008 until 2009, the oil price decreased to 3.2. While in 2010, it increased to 4.9. Eventually, in the following years it decreased; thus, the GDP in 2015 became 3.4.

4.1.3 Balance of Payment (BOP) Development

Economy stability is the important factor in a country, whether developed country or developing country. International trade can be seen in the activity of goods and services trade and also foreign investment that cause the capital inflows and capital outflows. All of transaction should be recorded in balance of payment (BOP).

Balance of Payment (BOP) is a note that arranged systematically about all of the international economy transaction between one society of the country with another society in a country in a certain period. BOP consists of 5 main components which is: (1) Current Account Balance; (2). Capital reading; (3). Financial Balance Sheet; (4). Net Calculation Difference; and (5). Monetary Traffic. Every component is recorded with double entry book keeping system. The transaction recorded will result deviation of the country's foreign exchange reserves. BOP development can be seen in the figure 4.3 below.



Source: Secondary Data Processed, 2018

Figure 4.3 Balance of Payment (BOP) Development in 2005 – 2015

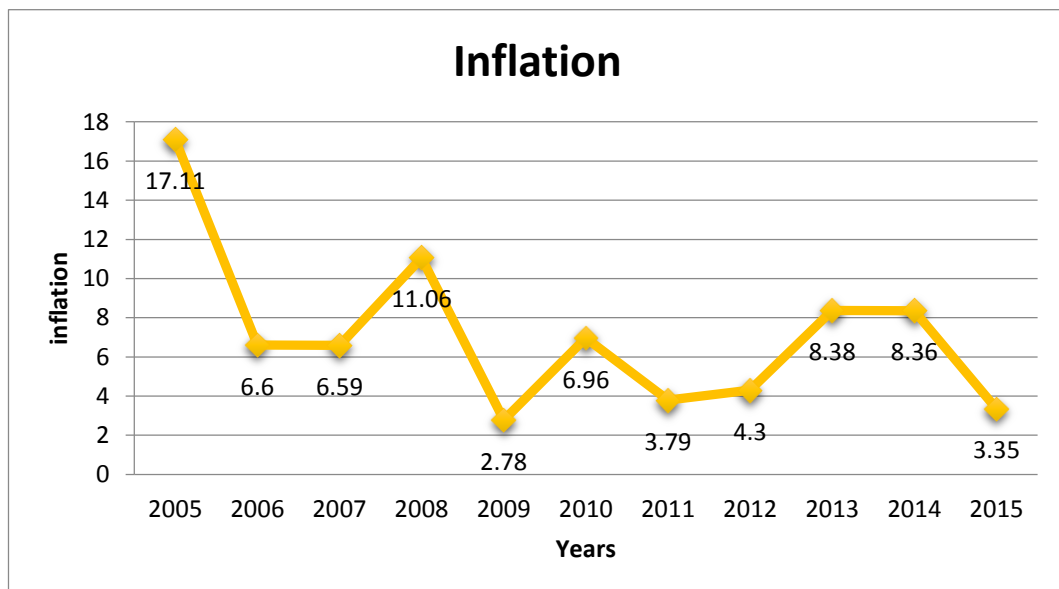
As shown in the Figure 4.3, BOP in 2005 was around -385, and then increased until 2010 which was 30,434, and then decreased until 2013 became -7.325. In 2014, it increased and in 2015 it decreased to -1.098.

4.1.4 Inflation Development

One of macroeconomy indicators that is used to measure the stability of economy of a country is inflation. The changes in this indicator will affect the economic growth dynamics. In economy perspective, inflation is monetary phenomenon in a country where the ups and downs of inflation tend to affect economic turmoil. Inflation is a phenomenon where the level of price increase continuously. The increasing of one or two goods cannot be included as inflation

unless those increases are getting wider or affect other goods to be increase in the price.

As the usual things happens in developing countries, inflation in Indonesia is caused by things like economic structural if it is compared with the monetary policies things. Thus, we can say that the impact of cost push inflation is bigger than demand pull inflation. It is the same with what happened in Indonesia when the next monetary crisis became economy crisis, inflation in Indonesia was triggered by the increases of import commodity prices (imported inflation) and the increase of foreign debt was because of the depreciation of rupiah's exchange rate to US Dollar and another currency. Thus, to control the inflation we have to stabilize the rupiah exchange rate to foreign currency, especially US Dollar. The inflation development can be seen in this Figure 4.4 below.



Source: Secondary Data Processed, 2018

Figure 4.4 Inflation Development in 2005 – 2015

As shown in the figure 4.4, inflation in 2005 was around 17.11%. In 2006 and 2007, it decreased and in 2008 it increased to 11.06%. In 2009, it decreased and the increase happened again in 2013 and 2014. Eventually, in 2015 it became 3.35%.

4.2 Inferential Statistic

4.2.1 Stationarity Test

To fulfill the assumption in causality test and VAR, it needs to pass the stationarity test. The stationarity test used in this research was unit root test with Augmented Dickey Fuller Test (ADF) method.

Table 4.1
ADF Statistic

Variable	Original Data (P-value)	First Differencing Data (P-value)
Oil price	0.2704	0.0000
GDP	0.3140	0.0000
BOP	0.0000	0.0000
Inflation	0.0648	0.0000

Source: Secondary Data Processed, 2018

From Table 4.1 above, we can see the result of ADF test by comparing the critical value in Mackinnon table. ADF test that was conducted in the original data showed that there was no significant variable in the level of 10%, where the data had no stationer, but in inflation variable it was already stationer in the level of 1%. Next, ADF test was conducted in first derivative and it showed that all of variable was significant or rejected H0 in level of 5%. These variables did not have unit roots anymore and already stationer in the first derivative. From the result of this test, it can be assumed that all of the data was stationer; thus, the next test could be conducted.

4.2.2 Optimal Lag Length

To conduct causality and VAR test, to optimal lag length needs to be determined because the causality test and VAR test are very sensitive with the amount of optimal lag. In this research, the researcher determined the optimal lag length by looking at the lowest value of Akaike Information Criteria (AIC). The lag length in this research was from 0 until 3.

Table 4.2

AIC value in Lag 0 until 3

Lag	AIC Value
0	22.30556
1	20.31483*
2	20.60912
3	20.57184

Source: Secondary Data Processed, 2018

Based on Yable 4.2, AIC value for oil price was in lag 0 which was 22.30556. The result of lag 1 was 20.31483, lag 2 was 20.60912 and the last is lag 3 was 20.57184. While the optimal AIC value for oil price in lag 1 was 20.31483. Thus, the optimal lag length used in causality test and VAR analysis test for oil price was 1.

4.2.3 Causality Test

In this test, the researcher wanted to see the causal relationship between world crude oil price with Indonesia's macroeconomy which were GDP, BOP, and inflation. The result of causality test could be known by looking at the probability value. The decision criteria used was H0 is rejected if the probability is less than 10% (in this research, level of 10% is used). If H0 is rejected, causal relationship can be obtained. While the lag length used was suitable with the lag test result that had been done before which was lag 1.

In this research, causality test aims to know the world crude oil price variable that affect macroeconomy or world crude oil price variable that act as a leading indicator for macroeconomy. We can see the value of Fstat and probability for each H0 in Granger test below.

Table 4.3

Fstat value and Probability in Granger test

Hypothesis	Lag 1	
	F stat	P-Value
GDP does not Granger Cause OIL PRICE	2.17547	0.0785
BOP does not Granger Cause OIL PRICE	0.64559	0.7308
INFLATION does not Granger Cause OIL PRICE	1.00729	0.4626

Source: Secondary Data Processed, 2018

As shown in the Table 4.3, it can be seen that oil price affected Indonesia's macroeconomy or had a causality relationship until lag 3 but the optimal lag was in lag 1 by looking at the significant probability in level of 10%. Thus, it can be said that the oil price granger cause to GDP in level of 10%.

4.2.4 VAR Analysis

Based on the methodology that had been explained before, VAR model analysis was conducted. The models that are formed is a bivariate model that is estimated with the smallest square method. In VAR model, macroeconomy was predicted based on the macroeconomy movement itself in the past (macroeconomy

lag) with the additional information about the movement of predictor variable in the past (variable predictor lag). Equation model were as follow:

- a. The impact of World Crude Oil Price with GDP

$$\text{GDP} = 0.915001\text{OILPRICE}$$

Based on the result of VAR estimates, it is known that world crude oil price variable can explained the diversity of GDP as 65.0025% (R-squared).

- b. The impact of World Crude Oil Price with BOP

$$\text{BOP} = 0.986484\text{OILPRICE}$$

Based on the result of VAR estimates, it is known that world crude oil price variable can explain the diversity of BOP as 62.0096% (R-squared).

- c. The impact of World Crude Oil Price with inflation

$$\text{INFLATION} = 0.931077\text{OILPRICE}$$

Based on the result of VAR estimates, it is known that world crude oil price variable can explain the diversity of inflation as 63.9390% (R-squared).

4.3 Discussion

4.3.1 The Impact of World Crude Oil Price on Gross Domestic Product (GDP)

Based on the analysis done above, the world crude oil price had positive impact on Gross Domestic Product (GDP). It means that the increasing of world crude oil price had impact on the GDP as well at those months and this process happened in 3 months. The relatively rapid shock transmission of oil prices on economic growth was certainly inseparable from the influence of the availability (supply) of oil as a raw material (input) for domestic production processes.

The result of this research was different with the assumption of Hamilton (1983, 1988, 1996) that stated the world crude oil price fluctuation has a negative impact on Gross Domestic Product (GDP). The reason is because Indonesia, the subsidy role in oil and gas sector is still important in GDP forming even though the proportion is small. Even though the subsidy in oil and gas sector tend to decrease, but the shock impact of crude oil price will permanently have an impact on Indonesia's GDP.

Indonesia become an importer country in world crude oil sector since 2004. Even though Indonesia is an importer country in world crude oil sector, Indonesia is also one of the producers and the refined oil will be exported abroad; thus, Indonesia will get profit by the increasing of crude oil price that will be followed with the increasing selling price of Indonesian Crude Price (ICP).

Moreover, the increasing of world crude oil price will increase the demand of another alternative energy source such as natural gas and coal as a superior export commodity in Indonesia.

4.3.2 The Impact of World Crude Oil Price on Balance of Payment (BOP)

Based on the analysis above, world oil prices had no effect on Balance of Payment (BOP). The high and low fluctuations in world oil prices did not affect the balance of payments in Indonesia. This was possible because the rising oil prices could depreciate the rupiah exchange rate, which would result in an improvement in Indonesia's balance of payments position even if only on a small scale.

4.3.3 The Impact of World Crude Oil Price on Inflation

Based on the analysis above, world crude oil price did not have big impact on inflation, in another word, world crude oil price had small impact on inflation. It was caused by the probability of fuel price that increased by the seller, for example Pertamina, Shell, and etc.

Besides that, Indonesia as an importer country of oil should obtain oil with the cheaper price. The government needed to see the price of fuel (*Bahan Bakar Minyak*) in a country. The decreasing of fuel price would have an impact on the decreasing of manufacture cost production. With the low-cost production, the product price would

decrease. Thus, the manufacture export and non-migas would be more competitive. Moreover, the transportation cost and energy cost would be cheaper and the result the inflation would be lower.