The Analysis of Factors Influencing Indonesian Exchange Rate, Period 2011-2015

Journal

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ABSTRACT

This study analyzed the effect of simultaneous and partial variable inflation, interest rates, exports, imports and the money supply to the exchange rate by using multiple linear regression method. Data obtained from the official website of the Central Bureau of Statistics (BPS) and Bank Indonesia (BI). Testing data using classical assumption test to find out that the data used did not have a problem normality, Heterocedasticity, Autocorrelation, and Multicollinearity. Once the data passes classical assumption test later in the regression using linear regression.

The results of this study indicate that by simultaneous variable inflation, interest rates, exports, imports and the money supply significantly influence changes to the exchange rate. In partial only variable inflation, interest rates and the money supply affect exports and imports while the variable has no effect on the movement of the exchange rate.

Keywords: Inflation, interest rate, export, import, money supply, classical assumption test, multiple linear regression.

Introduction

Indonesia is one of the countries which is developing its economic growth. The country which its purpose is to form the better economy by doing the international trade. The International Trade which is done by a country is expected to be able to support the income and the revenue, especially in the economy sector. As we all know that Indonesia is an agrarian country which covers most of the seas, and the rest is lands. Indonesia becomes one of the country that is able to export its natural resources to improve its income on the economy sector.

The ability of a country to fulfill its needs is different from the other countries, therefore the International Trade is happened. A country which is involved in the International Trade measures its commodity value in the form of domestic or foreign currency known as the foreign exchange. The price of domestic currency of a country which is stated in the form of foreign currency called as the Exchange Rate.

According to Hady (2012) the exchange rate concept is the existence of the capital and the money flow in the form of foreign exchange or the foreign currency among the financial center in some countries which are getting bigger and faster, as if not recognizing its owner citizenship. The foreign exchange with the other countries is used in the International Trade to do the payment on the International transaction activities, in order to be easier.
The exchange rate of one country currency is the most important payment instrument for the economy of a country itself. The country which is joined in the International Trade concept uses the currency exchange rate system, it means that the country must synchronize the monetary system which its payment instrument to do the transaction by using the foreign exchange. The exchange rate or the foreign exchange shows on how much Rupiah is needed to get the foreign currency. The exchange rate of a country becomes the basis for the payment system especially the export and the import which has the essential payment on the economy. The foreign exchange rate according to Abimanyu (2004) is the currency price of a country which is relative to the other country currency, the reason is the system involves the two different countries so the balance point depends on the supply and demand of both currency.

Exchange rate is one of the macro variables which is important for the economy. According to Mishkin (1992) the exchange rate becomes important because it affects the domestic and foreign product price. If the currency value of a country is appreciated (its value relatively increases on other country currency), so the product price of a country will be more expensive in abroad and the product price of other country will be cheaper (with the assumption that the price level of both countries are constant), contrarily if the currency of a country is depreciated so the product price of a country will be cheaper in abroad and the foreign product price will be more expensive. The existence of the appreciation or depreciation of the country currency certainly effects on the country economic activities, therefore the currency exchange rate stability is absolutely needed to create the conducive condition for the economic activities.

There are lots of researches who are analyzing about factors influencing Indonesian exchange rate. But, most of them take a macroeconomics factor as a variables. This specification matters stimulate the Writer to conduct this research, which specifically analyze the factors influencing Indonesian exchange rate as a dependent variable, by using macroeconomics factor as a independent variable such as inflation, interest rate, export, import, and money supply.

In the previous research which are conducted by the earlier researchers, there are some indicators that are usually used, such as macroeconomics variables such as inflation, interest rate, export, import, money supply, GDP, BOP. Based on the research conducted by Misbahun (2006) the result of his result is inflation, interest rate, export, import and money supply significantly influence to Indonesian exchange rate.

While Noor (2011) stated that inflation rate, interest rate and money supply simultaneously has influence to the Indonesian exchange rate, and partially interest rate and money supply significantly influence to the Indonesian exchange rate. Muchlas on their research with the title “The Factors which Influence the Rupiah Exchange Rate to the United States of America Dollar post-crisis (2000-2010), stated that all independent variables such as inflation, interest rate level, money supply and BOP simultaneously influence to the movement of Rupiah to the United States America Dollar.

In research conducted by Thaddeus (2014) were written that inflation significantly influenced in long-term or short-term to the exchange rate. Research conducted by Handoko (2010) with the title “The Influence of the Inflation, Interest Rate, Net Export and Real GDP Growth on Rupiah Exchange Rate to the United States of America Dollar in the year 2006-2008”, the result of his study is all independent variables such as Inflation, Interest Rate, Net Export, and Real GDP simultaneously influenced to the Rupiah Exchange Rate.
As mentioned in the previous paragraphs, this research uses Indonesian Exchange Rate as a dependent variable (Y), while for the independent variables, this research uses five of macroeconomics variables such as Inflation, Interest Rate, Export, Import and Money Supply. This study aims to determine what factors that influence the exchange rate of Indonesia. The method used in this research are unit root test, multiple linear regression and classical assumption test.

**Literature Review**

The research done by Muchlas, Stie, Agus, Alamsyah, & Malang (2015) STIE Asia Malang which is entitled “The Factors which Influence the Rupiah Exchange Rate to the United States of America Dollar Post-Crisis (2000-2010)”. The dependent variable which is used is the movement of the Rupiah exchange rate to the United States of America Dollar. Meanwhile, the independent variable is the inflation, the interest rate level, money supply, GDP, BOP. The purpose of the research is the writer wanted to prove whether the dependent variable, the inflation, the interest rate level, the amount of the circulated money, GDP, BOP simultaneously or partially influence to the movement of Rupiah exchange rate to the United States of America Dollar. The data analysis tool uses the multiple linear regression analysis, it is the analysis to acknowledge the existence of the influence among one independent variable or more to one dependent variable. It used the classic assumption test and the auto-correlation test. The result of the research was that the independent variables namely the inflation, the interest rate level, money supply, and BOP altogether or simultaneously influence the movement of Rupiah to the United States of America Dollar. This matter emphasized that the macro components namely, the inflation, the interest rate level, money supply, BOP, are altogether or simultaneously needed the attention in making the policy on the exchange rate. Partially, the inflation, the interest rate level, the amount of the circulated money and BOP also influence the movement of Rupiah to the United States of America Dollar.

The next research done by Noor (2011) Winaya Mukti University was entitled “The Influence of the Inflation, the Interest Rate, and the Amount of the Circulated Money to the Exchange Rate”. The dependent variable used in the research was the exchange rate, while the independent variable used in the research were the inflation, the interest rate and money supply. Multiple regression was done in order to acknowledge on how far the variable influences of the inflation, the interest rate level and money supply to the exchange rate. The Granger causality test was also done in order to acknowledge the causality link. The result of the research was whether the inflation rate, the interest rate level and the money supply were partially used, so there was no any significant influences or the effect to the exchange rate change. By using the other way if it uses the integrated factor, so it will produce a significant result. For the interest rate level and the money supply had the causality relation with the exchange rate change, also the inflation rate.

The next research is the research done by Thaddeus Ofoegbunam, Nneka, Ebiringa (2014) which was entitled “The Exchange Rate, Inflation and Interest Rate Relationships: An Auto-regressive Distributed Lag Analysis”. The research used the auto-regressive distributed lag (ARDL) co-integration analysis. The research used the inflation, the interest rate and the exchange rate data in Nigeria (1971-2010). The result of the research showed that the inflation significantly influenced, in long-term or short-term, to the exchange rate, it meant that the inflation rate and the exchange rate had the positive relation so if the inflation in the country increased so the exchange rate would have decreased as well. And the interest rate was proven to
have the negative significant influence to the exchange rate. It meant that if the interest rate level was so the exchange rate of the country would be have been depreciated by the foreign currency.

The next research done by Handoko (2010) with the title of “The Influence of the Inflation, the Interest Rate, the Net Export and the Real GDP Growth on Rupiah Exchange Rate to the United States of America Dollar in the year 2006-2008”. The research used the descriptive statistic data analysis method and the multiple linear regression analysis. It used the classical assumption model testing which was done to count by using the F Test and t Test. Based on the F Test testing, it simultaneously showed that the four independent variables namely the inflation, the interest rate, the net export and the real GDP growth significantly influence to the dependent variable of Rupiah exchange rate to the United States of America Dollar. Meanwhile, based on the t Test testing, it proved that partially the four variables which were used namely, the inflation, the interest rate, the net export and the real GDP, only the inflation and the net export significantly influenced the exchange rate dependent variable.

The next research done by Misbahudin with the title of “Analysis Factor which Influence Rupiah Exchange Rate Before and After Free Floating Rate System is Applied”. The research used the ARCH GARCH method. The variable used in the research were the export, the import, the inflation, the interest rate, the GDP, and the money supply (M1). The result of the research was before applying the free floating exchange rate system, the export, the import, the inflation, the interest rate, the GDP, and money supply (M1) simultaneously had the significant influence on Rupiah exchange rate. Partially, the export, the import, the GDP and the money supply had the significant influence on Rupiah exchange rate.

Research Method

The methods of analysis being used in this research are unit root test, multiple linear regression and classical assumption tests. Unit root test is a test to make sure whether a variable of time series data is non-stationary. Non-activity of variable is a precondition for co-integration and all the series must be integrated. Multiple linear regression is used when there are two or more variables. The use of the multiple linear regression is to make the mathematical model from the influence of Inflation, Interest Rate, Export, Import and Money Supply. From that model, we can know how much influence of Inflation, Interest Rate, Export, Import and Money Supply to the Indonesian Exchange Rate. There are three different analysis in this multiple linear regression analysis, those are T-test, F-test and coefficient determinacy (R²).

There are two common types of unit root test. Those are Augmented Dickey-Fuller (ADF) test and Phillips-Perron (PP) test, but in this study, the unit root test used was Augmented Dickey-Fuller (ADF) test. The statistic of ADF test uses negative number. The higher the negative value indicates, the bigger the possibility of the hypothesis about the existence of a unit root at some level of confidence to be rejected. The number of lags of ADF test restricts the ADF itself by decreasing the ability of the test to reject the null of a unit root, because the increased number of lags entails the additional parameters estimation and a loss of freedom degree. The minimum number of residuals free from auto-correlation determines the number of lags.

F-test is used to test the overall equation regression whether all independent variables have an effect to the dependent variable. This analysis is used to test whether the variables of Inflation, Interest Rate, Export, Import and Money Supply.

Different with F-test, T-test is used to determine on how far the independent variables influence the dependent variable partially. This analysis is useful to determine the most influential independent variable.
Coefficient determinacy $R^2$ can be used to know how much is the contribution of all independent variables (X1, X2, X3, X4, and X5) in influencing the dependent variable (Y), while the rest is influenced by the other independent variable independent variable (X) which is not included in the model. A model can be said as good if the coefficient determinacy is equal to one or close to one Gujarati (2010).

The third method is classical assumption tests. Classical assumption tests is done to ensure that the data used in the research normally distributes and do not have any problem with multicollinearity, heteroskedasticity, and autocorrelation. Due to this research which uses time series data, all of the classical assumption tests mentioned before (normality, multicollinearity, heteroskedasticity, and autocorrelation) are necessary.

First classical assumption test is normality test. Normality test is used for knowing whether the data used are normal or not. Normality test is done by looking at the probability value. If the probability value is greater than $\alpha$ (alpha), it means that the error term is distributed normally. The principle of normality can be detected simply by looking at the probability value in the “Histogram □ Normality Test” result box.

The second test is called multicollinearity test. Multicollinearity test purpose is to test whether the correlation between independent variables exists or does not. If there is a high level (or even perfect) correlation between the independent variables in the form of regression model, so that the regression model will be stated as having multicollinear symptom (Suliyanto, 2011). This research uses Eviews 7 as the research tool. In Eviews 7, we can simply conclude whether the data used have multicollinearity problem or do not by doing the auxiliary regression to test all independent variable one by one to get the value of $R^2$ and get the “Variance Inflation Factor” test, and check the result table. If the numbers in the table show no number higher than 10, it means that the data used have no multicollinearity problem.

The third one is called heteroskedasticity test. Heteroskedasticity means that an unconstant variable variance is exist in a regression model. Otherwise, if there is a constant variable variance in regression model, this condition is called as homoscedasticity. If we use Eviews, heteroskedasticity test can be done simply by using White Heteroskedasticity test. After the result appears in the screen, we just have to look at the prob.Chi-Square value. If the value is greater than $\alpha$ (alpha), then data used have no heteroskedasticity problem.

The last classical assumption test is autocorrelation test. Autocorrelation can be defined as a correlation that happens to the elements of a bunch of observations which period is consecutively happened (if the data used is time series) or correlation between some contiguous places (if the data used is cross section). If the auto-correlation function dies off smoothly at a geometric rate and the partial auto-correlations were zero after one lag, then a first order auto-regressive model is appropriate.

**Discussion**

*Unit Root Test*

Unit Root Test is to test whether all of the variables, namely Indonesia Exchange Rate as the dependent variable, inflation, interest rate, export, import and money supply as independent variables, are stationary or non-stationary. In order to continue to the next method, all those variables should be stationary.
Table 1

ADF Unit Root Test Results at Level, Trend and Intercept

<table>
<thead>
<tr>
<th>Null hypothesis</th>
<th>P-Value</th>
<th>Null Hypothesis</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y (EXR) is not stationary</td>
<td>0.9766</td>
<td>Do not reject</td>
<td>EXR is non-stationary</td>
</tr>
<tr>
<td>X1 (INF) is not stationary</td>
<td>0.0000*</td>
<td>Reject</td>
<td>INF is stationary</td>
</tr>
<tr>
<td>X2 (IR) is not stationary</td>
<td>0.7318</td>
<td>Do not reject</td>
<td>IR is non-stationary</td>
</tr>
<tr>
<td>X3 (EXPORT) is not stationary</td>
<td>0.8152</td>
<td>Do not reject</td>
<td>EXPORT is non-stationary</td>
</tr>
<tr>
<td>X4 (IMPORT) is not stationary</td>
<td>0.3108</td>
<td>Do not reject</td>
<td>IMPORT is non-stationary</td>
</tr>
<tr>
<td>X5 (MS) is not stationary</td>
<td>0.3909</td>
<td>Do not reject</td>
<td>MS is non-stationary</td>
</tr>
</tbody>
</table>

(*) means significant at 5% critical level

Table 1 shows the results of the Augmented Dickey-Fuller unit root tests at level that include trend and intercept in test equation. In order to continue to the next method, in this study, Multiple Linear Regression test, all of the variables should all be stationary. Therefore, Null hypothesis needs to be rejected. To reject the Null hypothesis, the p-value has to be lower than the critical value (5%). As we can see in Table 4.1, five variables, namely Indonesian Exchange Rate, Interest Rate, Export, Import and Money Supply, cannot reject the Null hypothesis, because the p-values of all those variables are higher than 5%. All those variables are non-stationary at level. There is only one variable that can reject the Null hypothesis at level, because the p-value of this variable, 0.0000, is lower than 5% which means that the variable is stationary. That variable is Inflation. Since not all of the variables can reject the Null hypothesis, unit root test at 1st difference is needed.

Table 2

ADF Unit Root Test Results at 1st Difference, Trend and Intercept
Table 2 shows the test results of Augmented Dickey-Fuller unit root test at 1\textsuperscript{st} difference that include trend and intercept in test equation. All of the six variables in this study, as we can see in Table 2, can reject the Null hypothesis, because the p-values of all the variables were lower than the critical value. Therefore, all of the six variables, namely Indonesian Exchange Rate, inflation, interest rate, exchange rate, export, import and money supply, were stationary at 1\textsuperscript{st} difference of ADF unit root test.

*Multiple Linear Regression*

The second method which will be the substance of the discussion is the result of the multiple linear regression. This research uses the multiple linear regression calculation to mathematically count the influence of the independent variable namely the inflation, the interest rate, the export, the import and money supply. The linear equation is:

\[(D)Y_t = \beta_0 + \beta_1 DX1_t + \beta_2 DX2_t + \beta_3 DX3_t + \beta_4 DX4_t + \beta_5 DX5_t + \mu\]

Where:

Y = Rupiah Exchange Rate
\(\beta_0\) = Constant
\(\beta_1\) - \(\beta_5\) = Coefficient Regression
\(\mu\) = Error
X1 = Inflation
X2 = Interest Rate
X3 = Export
X4= Import
X5= Money Supply

Table 3
Linear Equation

Dependent Variable: D (EXR)
Method: Least Squares
Date: 06/13/16   Time: 19:18
Sample: 2011M01 2015M12
Included observations: 60

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>D(INF)</td>
<td>-1.322945</td>
<td>0.537093</td>
<td>-2.463158</td>
<td>0.0170</td>
</tr>
<tr>
<td>D(IR)</td>
<td>6.647477</td>
<td>0.716425</td>
<td>9.278684</td>
<td>0.0000</td>
</tr>
<tr>
<td>D(EXPORT)</td>
<td>-0.098958</td>
<td>0.085348</td>
<td>-1.159471</td>
<td>0.2514</td>
</tr>
<tr>
<td>D(IMPORT)</td>
<td>-0.140289</td>
<td>0.063730</td>
<td>-2.201290</td>
<td>0.0320</td>
</tr>
<tr>
<td>D(MS)</td>
<td>0.633410</td>
<td>0.045014</td>
<td>14.07150</td>
<td>0.0000</td>
</tr>
<tr>
<td>C</td>
<td>2.505054</td>
<td>0.959714</td>
<td>2.610208</td>
<td>0.0117</td>
</tr>
</tbody>
</table>

\[ Y = 2.50 - 1.322INF + 6.647IR - 0.098EXPORT - 0.140IMPORT + 0.633MS \]

Based on the linear equation above, it can be interpreted as follows:

1. It can be seen that the inflation coefficient is -1,322, with the negative mark. It means that the inflation has the negative influence on Rupiah exchange rate. The number of -1,322 means that if the inflation increases for 1% so Rupiah exchange rate will decrease for -1,322 in the average (assume that the rest indepent variables are constant). And if the inflation decreases for 1% so Rupiah exchange rate will increase for -1,322 in the average
and the independent variable is constant.

2. The interest rate coefficient for 6.64 with the positive mark. It means that the interest rate has the positive influence on Rupiah exchange rate. The number of 6.64 means if the increase rate increases for 1% so Rupiah exchange rate will increase for 6.64 in the average with the assumption that the independent variable is constant. And if the interest rate decreases for 1% so Rupiah exchange rate will decrease 6.64 in the average with assumption that the independent variable is constant.

3. The export coefficient is for 0.098 with the negative mark. It means that the export has the negative influence on Rupiah exchange rate. The number of -0.098 means if the export increases for 1$ so Rupiah exchange rate will decrease for -0.098 in average with the assumption that the independent variable is constant. And if the export is having the decrease for 1$ so Rupiah exchange rate will increase for -0.098 in average with the independent variable assumption is constant.

4. The import coefficient for -0.140 with the negative mark. It means that the import has the negative influence on Rupiah exchange rate. The number of -0.140 means if the import increases for 1$ so Rupiah exchange rate will decrease -0.140 in average with the assumption that the independent variable is constant. And if the import decreases for 1$ so Rupiah exchange rate increases for -0.014 in average with the assumption that the independent variable is constant.

5. The money supply is for 0.633 with the positive mark. It means that the amount of the circulated money has the positive influence on Rupiah exchange rate. The number of 0.633 means that if the amount of the circulated money increases Rp 1 so Rupiah exchange rate will increase for 0.633 in average with the assumption that the independent variable is constant. And if the amount of the circulate money is having the decrease for Rp 1 so Rupiah exchange rate will decrease for 0.633 in average with the assumption that the independent variable is constant.

6. The “C” in the table 4.1 is the constanta of those equation. The number of those constanta is 2.50. It means that there is no independent variable in this research, Rupiah exchange rate is equal to 2.50.

\textit{F-Test}

\textit{F}-test is used to test the overall equation regression whether all independent variables have an effect to the dependent variable. This analysis is used to test whether the variable Rupiah Exchange Rate, Inflation, Interest Rate, Export, Import, Money Supply.

\begin{table}
\centering
\caption{Lower Part of Multiple Linear Regression Equation Table (F-Test)}
\begin{tabular}{|l|c|c|}
\hline
R-squared & 0.971475 & Mean dependent var & 9.278147 \\
\hline
Adjusted R- & 0.968834 & S.D. dependent & 0.162543 \\
\hline
\end{tabular}
\end{table}
If we want to see the result of F-test, we can see it directly in the left bottom of the lower part of the multiple linear regression equation table (Table 4.4). As we can see from the Table 4.4, the probability value (F-statistic) shows number 0.000000. It means that all independent variables (\(X_1\)-\(X_5\)) are perfectly influencing the dependent variable (\(Y\)).

**T-Test**

T-test is done to determine the significancy level of each independent variable (\(X\)). The significancy level of each variable should fulfill the standard, so that those variables can be said as “significantly influence” the dependent variable (\(Y\)). The acceptable value is the T-value which should be less than the \(\alpha\) (alpha). The \(\alpha\) (alpha) is vary, there are \(\alpha\) (alpha) 1%, 5%, and 10%. The T-value should be less than either 1%, 5%, or 10%. The T-value can be seen from the probability values on the right side of the upper part of multiple linear regression equation table (see Table 5 below).

### Table 5

Upper Part of Multiple Linear Regression Equation Table

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>INF</td>
<td>-1.322945</td>
<td>0.537093</td>
<td>-2.463158</td>
<td>0.0170</td>
</tr>
<tr>
<td>IR</td>
<td>6.647477</td>
<td>0.716425</td>
<td>9.278684</td>
<td>0.0000</td>
</tr>
<tr>
<td>EXPORT</td>
<td>-0.098958</td>
<td>0.085348</td>
<td>-1.159471</td>
<td>0.2514</td>
</tr>
<tr>
<td>IMPORT</td>
<td>-0.140289</td>
<td>0.063730</td>
<td>-2.201290</td>
<td>0.0320</td>
</tr>
<tr>
<td>MS</td>
<td>0.633410</td>
<td>0.045014</td>
<td>14.07150</td>
<td>0.0000</td>
</tr>
<tr>
<td>C</td>
<td>2.505054</td>
<td>0.959714</td>
<td>2.610208</td>
<td>0.0117</td>
</tr>
</tbody>
</table>
As we can see from Table 4.5, the T-value is on the right side of the table. Each row represents the value of each independent variable (X). As we can see, there some values which can be categorized as significant, and some cannot be. The T-value of INFLATION, INTEREST RATE, IMPORT and MONEY SUPPLY are 0.0170, 0.0000, 0.0320, 0.0000. Those values are definitely lower than α (alpha) 5% (0.05). But, in total of rupiah exchange rate, the T-value is lower than 10% α (alpha). So, in the end we can conclude that INFLATION, INTEREST RATE, IMPORT and MONEY SUPPLY are statistically significant in EXCHANGE RATE.

If we see the T-values of EXPORT, all of this variable value are quite high. We can see that the T-value of EXPORT is 0.2523. This variable value are much higher than α (alpha). So, we can conclude that EXPORT is not statistically significant in influencing EXCHANGE RATE.

**Coefficient Determinacy (R²)**

Coefficient determinacy R² can be used to know on how much the contribution of all independent variables (X1, X2, X3, X4, and X5) in influencing the dependent variable (Y) is, while the rest is influenced by the other independent variable independent variable (X) which is not included in the model. A model can be said as good if the coefficient determinacy is equal to one or close to one (Gujarati, 2010).

<table>
<thead>
<tr>
<th>Table 6</th>
<th>Lower Part of Multiple Linear Regression Table (R²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-squared</td>
<td>Mean dependent var</td>
</tr>
<tr>
<td>Adjusted R-squared</td>
<td>S.D. dependent var</td>
</tr>
<tr>
<td>S.E. of regression</td>
<td>Akaike info criterion</td>
</tr>
<tr>
<td>Sum squared resid</td>
<td>Schwarz criterion</td>
</tr>
<tr>
<td>Log likelihood</td>
<td>Hannan-Quinn criter</td>
</tr>
<tr>
<td>F-statistic</td>
<td>Durbin-watson stat</td>
</tr>
<tr>
<td>Prob(F-statistic)</td>
<td>0.000000</td>
</tr>
</tbody>
</table>

As we see in the table 4.6 above, the R-squared (R²) value is shown on the first row in the lower part of multiple linear regression equation table. As already highlighted, we can see that
the R-squared value is shown as 0.971475. This value means that all independent variables in this research (X1, X2, X3, X4, and X5) give contribution to the dependent variable (Y) 97% in total, while the rest 3% is explained by the other variable which is not include in this research, named as exogeneous variables.

**Normality Test**

Normality test is used for knowing whether the data we used are normally distributed or not. The term “normal” means that there is no extreme value in the error (μ). A data is categorized as passed the normality test when the probability value is greater than α (alpha).

**Table 7**

Normality Test Result

<table>
<thead>
<tr>
<th>Series: Residuals</th>
<th>Sample 2011M01 2015M12</th>
<th>Observations 60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>-3.28e-15</td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td>-0.000241</td>
<td></td>
</tr>
<tr>
<td>Maximum</td>
<td>0.076817</td>
<td></td>
</tr>
<tr>
<td>Minimum</td>
<td>-0.069718</td>
<td></td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>0.027452</td>
<td></td>
</tr>
<tr>
<td>Skewness</td>
<td>0.161774</td>
<td></td>
</tr>
<tr>
<td>Kurtosis</td>
<td>3.188433</td>
<td></td>
</tr>
<tr>
<td>Jarque-Bera</td>
<td>0.350475</td>
<td></td>
</tr>
<tr>
<td>Probability</td>
<td>0.839258</td>
<td></td>
</tr>
</tbody>
</table>

Based on the box in the Table 7 above, the number shown for the probability value is 0.839258. It means that the numbers are greater than any other 5% α (alpha). So, with 90% of confidence level, we can conclude that the error term in this regression model is normally distributed.

**Heteroskedasticity Test**

Heteroskedasticity means that an unconstant variable variance is exist in a regression model. Otherwise, if there is a constant variable variance in regression model, this condition is called as homoscedasticity.

**Table 8**

Heteroskedasticity Test Result

<table>
<thead>
<tr>
<th>Heteroskedasticity Test: White</th>
<th>F-statistic</th>
<th>Prob. F(20,39)</th>
<th>Prob. Chi-Square (20)</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-statistic</td>
<td>1.688506</td>
<td>0.0796</td>
<td>0.1131</td>
</tr>
<tr>
<td>Obs*R-squared</td>
<td>27.84394</td>
<td></td>
<td>0.1131</td>
</tr>
</tbody>
</table>
Same as normality test, we can determine whether the data used in the research is having heteroskedasticity problem or not from the probability value shown in the Eviews result box (in this case, “Heteroskedasticity Test: White” box). The data is categorized as having no heteroskedasticity problem when the number shown on Prob.Chi-Square value is greater than the 5% α (alpha). As already highlighted in the Table 4.6 above, we can see that the Prob.Chi-Square(20) value of the data used in this research is 0.1131. These numbers are greater than 5% α (alpha). So, with 90% of confidence level, we can conclude that the data used in this research has no heteroskedasticity problem, and appropriate to be used in this research.

**Autocorrelation Test**

Autocorrelation can be defined as a correlation that is happened to the elements of a bunch of observations which period is consecutively happened (if the data used is time series) or correlation between some contiguous places (if the data used is cross section).

Table 9

Autocorrelation Test

<table>
<thead>
<tr>
<th>Breusch-Godfrey Serial Correlation LM Test:</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-statistic</td>
</tr>
<tr>
<td>Obs*R-squared</td>
</tr>
</tbody>
</table>

A data is categorized as have no correlation problem when the Prob.Chi-Square(2) value is greater than the α (alpha). As already highlighted in the table 4.9, the Prob.Chi-Square(2) value is 0.7523. It means that the numbers are greater than the 5% α (alpha). So, we can conclude that the data is have no problem with autocorrelation in the regression model.

**Multicollinearity Test**

Multicollinearity means that there is the existence of a perfect or absolute linear relationship between some or all of the variables which describe the regression model. In short, the multicollinearity test aims to check whether the linear relationship between variables used in the research is exist or not.

Table 10

Regression Model Auxiliary for Multicollinearity Test Result
<table>
<thead>
<tr>
<th>Variable Dependent</th>
<th>$R^2$</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y(EXR)</td>
<td>0.971475</td>
<td></td>
</tr>
<tr>
<td>X1(INF)</td>
<td>0.014341</td>
<td>1.043124</td>
</tr>
<tr>
<td>X2(IR)</td>
<td>0.534491</td>
<td>2.148186</td>
</tr>
<tr>
<td>X3(EXPORT)</td>
<td>0.861777</td>
<td>7.234686</td>
</tr>
<tr>
<td>X4(IMPORT)</td>
<td>0.787633</td>
<td>4.70883</td>
</tr>
<tr>
<td>X5(MS)</td>
<td>0.754092</td>
<td>4.066561</td>
</tr>
</tbody>
</table>

Table 10 shows the result box of regression model auxiliary multicollinearity test on Eviews. A data that is categorized as having no multicollinearity problem is when the number shown on the Centered VIF row are less than 10. As we can see above, there is no single variable which number/value is higher than 10. So, it means that the regression model has no multicollinearity problem in it.

**Implication**

The exchange rate of a country is very important. The exchange rate becomes one of the important indicators in the economy of a country because it shows the stability or unstability economy condition of a country. The high and low of the exchange rate is affected by some factors, not only the internal factors but also the external ones of a country. The external factor which is happened in a country is the high of the supply and demand of a currency in a country. If the demand of the domestic currency is high enough, so there will be an indication that the domestic demand increases and the exchange rate be appreciated. Meanwhile, the internal factors are the inflation, the interest rate, the export, the import and the money supply (Hady, 2012).

Based on the data above which is used in this research, it can be seen that the inflation, the interest rate, the exchange, import and money supply variables simultaneously has the significant influence to the exchange rate or Rupiah exchange rate. While, the export variable show that do not have any significant influence to the exchange rate. Therefore, it can be concluded that Rupiah exchange rate change is influenced by those four variables namely, inflation, interest rate, import and the money supply (Hady, 2012).

The inflation is the condition where the price continually increases so it causes the price of the domestic goods increased. This condition will affect on the demand of the domestic goods in a country. The price of the domestic goods which has the too-high price impression will make the demand of the domestic goods decrease. The inflation is one of the independent variables in this research. It shows that the inflation has the negative relation on Rupiah exchange rate. From the result of regression, it can be seen that the inflation variable has the negative relation because of the minus mark (-). It means that if the inflation rate in Indonesia increases for 1% so Rupiah exchange rate will decrease or depreciated, according to the theory stated by Hady (2012). Hady (2012) explained that if the inflation in a country is getting higher so the domestic currency
exchange rate will be getting lower. It closely related to the theory of Purchasing Power Parity. The society in a country will tend to choose buying the import goods from another country when the inflation is happened in their country, because the prices of goods are expensive enough. Therefore, it is possible to import the cheaper price. When the demand of the import of a country is bigger than the export, so the demand of domestic currency will decrease which also makes the domestic currency depreciated.

The interest rate level variable in the result of regression which has been done shows the significant positive result, it means that the interest rate level variable has the significant positive result on the exchange rate. It is suitable to the theory of Hady (2012) stated that to obtain the big investment from the investor, so a country needs to improve the interest rate level. The theoretically reason is the investor will invest or save the fund in the form of foreign currency if the rate of return from outside (\(r_f\)) is, at least, equal or higher than the home country interest rate (\(i_h\)) (Hady, 2012). Therefore, to attract the desire of the foreign investor in investing their fund, a country will increase its interest rate when the investment which is accepted by a country is on the high-enough level so the domestic currency exchange rate will also be depreciated.

Import is shows the significant negative result which means that the import and rupiah exchange rate has the negative relation, when the import increases so exchange rate will decrease. This result is similar to the result which was done by Misbahudin (2008) stated that the import has the significant influencing to the rupiah exchange rate.

The money supply shows the significant positive result which means that the money supply and Rupiah exchange rate has the positive relation, when the money supply increases so exchange rate rupiah will increase as well. This result is similar to the result which was done by Muchlas, Stie, Agus, Alamsyah, & Malang (2015) stated that the inflation, the interest rate level, the money supply simultaneously influences significant on Rupiah exchange rate.

Based on the result of regression, there is one variable which is not significant, that is the export. The result of the regression shows different result with research done by Misbahudin (2008) stated that the export, the import, the inflation, the interest rate, the GDP and the money supply variables significantly influence on Rupiah exchange rate. This research is also different to the theory explained by Hady (2012) stated that the export and the import variables significantly influences on Rupiah exchange rate. It is possible to happen because in the period of data that used in this research the export in a bad condition. In that period the export of Indonesia has a decreasing continuously, so for that reason the export variable did not give any huge influence on rupiah exchange rate.
Graphic 11 shows the amount of the export in the last five years from 2011 to 2015. The result from the data collection can be the reason why the research is different with the other research. The result of the regression which was done in the last five years shows that the export did not give any significant influence to Indonesia exchange rate.

Based on the result of the regression from the five independent variables namely the inflation, the interest rate, the export, the import and the money supply, four from those five variables have the significant influence on Rupiah exchange rate, they are the inflation, the interest rate, import and the money supply variables. The export do not have any significant influence because at that period, the condition of Indonesian export was in bad condition. The condition of export was decreasing continuously, that is why export do not have any huge influence to the rupiah exchange rate. Therefore, the export activity did not give any significant influence on Rupiah exchange rate.

Conclusion

The exchange rate of a country becomes one of the important indicators to measure the stability of the country economy itself. The exchange rate is able to show on how stable of the country itself. The stability of the exchange rate is caused by some causes, they are the economy factor and the non-economy ones. The cause from the non-economy factor is the government supervision, the expectation, the speculation and the rumours (Hady, 2012), meanwhile the cause from the economy factor is the inflation rate, the interest rate, the export, the import and money supply (Hady, 2012).

The purpose of this research is to know on how big the influence of independent variable used in this research (the inflation, the interest rate, the export, the import and the money supply) gives the effect to the dependent variable (the exchange rate). After the researcher doing some
test on the obtained data form the official site of Central Bureau of Statistic and Bank of Indonesia, obtained some results:

- a. The Inflation Variable proves that it has the significant negative relation to Rupiah exchange, it means that when the inflation increase to 1% so Rupiah exchange rate will weaken or be depreciated to USD.

- b. The Interest Rate Variable proves that it has significant positive relation to Rupiah exchange rate, which means when the interest rate increases so Rupiah exchange rate will strengthen or be appreciated to USD.

- c. The interest rate variable proves that it has the significant positive relation to Rupiah exchange rate, which means when the interest rate increases so Rupiah exchange rate will increase or strengthen or be appreciated to USD.

- d. The Export Variable proves that it has no significant relation to Rupiah exchange rate variable, which means that in the data-time period, the export variable does not affects on Rupiah exchange rate.

- e. The Import Variable proves that it has significant negative relation to Rupiah exchange rate variable, which means when the import increases so Rupiah exchange rate will decrease or depreciated to USD.

- f. Money Supply Variable proves that it has the significant positive relation to Rupiah exchange rate variable, which means that if the amount of the circulated money increases so Rupiah exchange rate will also increase or strengthen or be appreciated to USD.

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