# THE INFLUENCE OF MACROECONOMIC INDICATOR ON CURRENCY EXCHANGE RATE
## (Study at Bank Indonesia Period of 2008-2015)

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***ABSTRAK***

*Tujuan penelitian ini adalah untuk mengetahui dan menjelaskan pengaruh inflasi, tingkat suku bunga, dan cadangan devisa sebagai indikator makro ekonomi terhadap nilai tukar Rupiah baik secara simultan maupun parsial. Jenis penelitian yang digunakan adalah explanatory research dengan pendekatan kuantitatif deskriptif. Populasi dalam penelitian ini adalah semua data yang dipublikasikan oleh Bank Indonesia tentang inflasi, tingkat suku bunga, cadangan devisa, dan nilai tukar Rupiah. Sampel dalam penelitian ini adalah data bulanan dari Bank Indonesia tentang inflasi, tingkat suku bunga, cadangan devisa, dan nilai tukar Rupiah periode 2008-2015, dengan total sampel 96 per variabel. Analisis data yang digunakan adalah analisis statistik regresi linier berganda dengan menggunakan program SPSS 21.0. Hasil uji simultan (uji F) dan parsial (uji t) menunjukan bahwa inflasi, tingkat suku bunga, dan cadangan devisa secara simultan dan parsial berpengaruh signifikan terhadap nilai tukar Rupiah.*

***Kata Kunci:*** ***Indikator Ekonomi Makro, Inflasi, Tingkat Suku Bunga, Cadangan Devisa, Nilai Tukar Rupiah.***

**ABSTRACT**

The purposes of this research are to know and explain the influence of inflation, interest rate, and international currency reserve as macroeconomic indicator on IDR exchange rate either simultaneously or partially. Type of the research is explanatory research with descriptive quantitative approach. Population of this research is all of the data released by Bank Indonesia about inflation, interest rate, international currency reserve, and IDR exchange rate. Sample of this research is monthly report data from Bank Indonesia about inflation, interest rate, international currency reserve, and IDR exchange rate period of 2008-2015, with the total sample are 96 of each variables. Data analysis technique used multiple linear regression statistical analysis with the program of SPSS 21.0. Result of simulant test (F test) and partial test (t test) show that inflation, interest rate, and international currency reserve simultaneously and partially have significant influence on IDR exchange rate.

**Keyword: Macroeconomic Indicator, Inflation, Interest Rate, International Currency Reserve, IDR Exchange Rate**

## INTRODUCTION

The capability of a country to fulfill the domestic needs is different with another country. International trade is such kind of economic cooperation with the purpose to fulfill the domestic needs which cannot be fulfilled by the domestic production. If a country join in international trade, it means that the country doing export and import activity. A country needs export and import management that relate with many currencies to make international trade running well.

Purchasing power affected by macroeconomic factor. Macroeconomic factors became important because it can influence the currency exchange rate. Three macroeconomic indicator which can influence the exchange rate, there are inflation, interest rate, and international currency reserve.

Inflation is general rise of goods price continuously and one of important macroeconomic indicator because it influences the society welfare in a country (Noor, 2011). High inflation in a country makes the price of goods production will be more expensive, so those goods will be less competitive in international trade. If inflation in a country higher than another countries, importing goods which cheaper will be more profitable. Changes in relative inflation rates can affect international trade activity, which influences the demand for and supply of currencies and therefore influences exchange rates (Madura, 2008: 89).

Based on Law number 23 Year 1999, Bank Indonesia as a central bank, independent state institution, and legal entity is fully autonomous in formulating and implementing role and function as monetary authority. Bank Indonesia can control the inflation using the interest rate. The example is when inflation is rising, then the demand of IDR is low, Bank Indonesia can increase the interest rate with the purpose to higher the demand of IDR.

Through Bank Indonesia, interest rate controlled at a certain level. When the interest rate is raised, it is expected can curb inflation and stabilize the exchange rate. Changes in relative interest rate affect investment in foreign securities, which influences the demand for and supply of currencies and therefore influence exchange rates (Madura, 2008: 90).

Not only inflation and interest rate that can influence currency exchange rate, but also international currency reserve too. International currency reserve is used as buffer of exchange rate stabilization in a country. Bank Indonesia does the intervention to the exchange rate uses international currency reserve (Rusdiana, 2011). Has been written in the Law of Bank Indonesia number 23 of 1999 as amended by Act 3 of 2004, based on article 13 of the law, Bank Indonesia has an authority to manage international currency reserve.

Macroeconomic indicator that can influence exchange rate is capital flows (Simorangkir and Suseno, 2004: 6). The higher of capital outflow, will increase the depreciation of exchange rate, the demand of foreign exchange will be higher too, and the higher of capital inflow, will increase the appreciation of exchange rate (Rusdiana, 2011). Indicator of capital flows in this research will presented by Indonesian international currency reserve.

Everyone needs to know the economic, politic, and social condition in daily activity, because everyone needs money, everyone has self-interest, and everyone lives with society. The economic condition about inflation, interest rate, international currency reserve, and exchange rate will be explained in this research.

## THEORETICAL FRAMEWORK

### Macro Economy

Macro economy is all things about important issues that have always faced in every country (Sukirno, 2010: 7). To manage macroeconomic problem, government uses fiscal and monetary policy. Government manages the tax and outcome as a fiscal policy and manages demand and supply of currency, and interest rate also as a monetary policy (Sukirno, 2010: 9).

### Inflation

Events that tend to encourage the rising level of prices are called inflation (Rusdiana, 2011). Inflation is the rise in general price of goods continuously (Rahardja and Manurung, 2008: 165). Sukirno (2010: 14) said that inflation can be defined as a process of rising price in an economy. Inflation happens in a long period of time, followed by decline in the real value (intrinsic) of a country's currency (Khalwaty, 2000: 5). Based on the definition, can be concluded that inflation is the general rise in goods price, happen continuously for a long time with decline in the real value (intrinsic) of the currency.

### Interest Rate

Interest rate is the amount of interest paid per unit of time that is referred to as a percentage of the amount of loan (Samuelson and Nordhaus, 2004: 190). The relative interest rate changes affect the investment in foreign securities, which in turn will

affect the demand and supply of foreign exchange, also the exchange rate (Handoko, 2010). The changes of domestic interest rates often called as the main factors that influence the exchange rate (Mishkin, 2008: 127). Based on the definition, can be concluded that interest rate is a price of loan per unit of time that can influence the exchange rate of currency.

**International Currency Reserve**

International currency reserve is one of the important monetary indicator which show the strength and weakness economy in a country (Putra, 2009). International currency reserve as a fund in the form of foreign exchange that owned by central bank in a country (Putra, 2009). International currency reserve used to keep the monetary stabilization in a country. The function of foreign exchange reserves held by a country can be used to maintain the stability of exchange rate and can be used to finance the deficit in the balance of payment (Gandhi, 2006: 1). Based on the definition, can be concluded that international currency reserve as a monetary indicator is the foreign exchange owned by central bank to keep the monetary stabilization.

**Exchange Rate**

Exchange rate is the price of one unit of foreign currency in the domestic currency, or it can be said the price of the domestic currency against foreign currencies (Simorangkir and Suseno, 2004: 4). Exchange rate is a price that has to pay by currency of the country to get foreign currency (Timotius, 2009). Basically the regulation of exchange rate has some main function such as to keep the stability of balance of payment, to keep the stability of domestic market, and as the monetary instrument (Widiastuti, 2011). Based on the definition, can be concluded that exchange rate is the price of domestic currency to get foreign currency and have a function to keep the monetary stabilization.

**Inflation and IDR Exchange Rate**

Theory about the relationship between inflation and exchange rate is Purchasing Power Parity (PPP) theory. The PPP theory not only provides an explanation of how relative inflation rates between two countries can influence an exchange rate, but also it also provides information that can be used to forecast exchange rate (Madura, 2008: 219). A country that experienced a rise in commodity prices will weaken its exchange rate against foreign currencies that are not experienced price increases.

**Interest Rate and IDR Exchange Rate**

The theory about the relationship between interest rate and exchange rate is Interest Power Parity (PPP) theory. When domestic real interest rate is rising, then domestic currency will appreciate. Otherwise, when domestic interest rate is rising to be expected inflation, then domestic currency will depreciate (Mishkin, 2008: 105).

**International Currency Reserve and IDR Exchange Rate**

If a country has high international currency reserves, the balance of payments will surplus. Balance of payments surplus this will make investors interested to invest in Indonesia. The previous research of Rusdiana (2011) proves that international currency reserve can influence on IDR exchange rate by capital flows. Based on that research, because of international currency reserve have a significant impact toward the IDR exchange rate, government manage the international currency reserve to save the IDR exchange rate.

**Hypothesis**

$H_1$: Inflation, interest rate, and international currency reserve simultaneously influence the IDR exchange rate.

$H_2$: Inflation, interest rate, and international currency reserve partially influence the IDR exchange rate.

## RESEARCH METHOD

**Type of Research**

The type of the research that would be uses in this research is explanatory research with descriptive quantitative approach.

**Research Location**

This research conducted in Bank Indonesia. There is some reason for selecting location of the research, as follows: Bank Indonesia as central bank has a job to keep the stabilization of rupiah; Bank Indonesia has monetary economic statistics data in Indonesia; Bank Indonesia has time series data about macro economy; Bank Indonesia has the data about inflation, interest rate, international currency reserve, and inflation.

**Operationalization of Variables**

**1. Inflation ($X_1$)**

Inflation is a rise in the price of general goods and services that occur continuously. The data rate of inflation used in this research is the monthly report data of inflation rate issued by Bank

Indonesia for eight years periods from 2008 to 2015 in the term of percent.

**2. Interest Rate ($X_2$)**

Interest rate issued by Bank Indonesia is a one component that is used by the government to control the money supply. Data used in this research is the monthly report data of interest rate for eight years periods since 2008 until 2015 in a term of percent.

**3. International Currency Reserve ($X_3$)**

International currency reserve is the stock of foreign currency owned by a state and stored by central bank (Bank Indonesia) that can be used for international payment or transaction. Data used in this research is the monthly report data of international currency reserve which issued by Bank Indonesia for eight years periods from 2008 to 2015 in a term of million USD.

**4. IDR Exchange Rate (Y)**

IDR exchange rate is the price of Rupiah to get foreign currency. Data of exchange rate that referred to in this research is the IDR toward USD by using direct quotation which stated in IDR/USD. The data used is the middle rate in foreign exchange trading that recorded by Bank Indonesia with a monthly report data for eight years periods since 2008 until 2015 in units of IDR toward USD in a term of IDR.

**Population and Sample**

Population in this research is the publication that released by Bank Indonesia about inflation, interest rate, international currency reserve, and IDR exchange rate. This research uses purposive sampling. Based on sampling technique, the criteria of the samples are: Monthly report data from Bank Indonesia about inflation, interest rate, international currency reserve, and IDR exchange rate; Data for eight years period from 2008 to 2015, and total of samples of each variable are 96.

**Data Collection Technique**

This research uses secondary data. Secondary data that be used is time series data. This research uses documentary method in data collection technique. Documentary method is a method used to browse historical data. Secondary data refer to in this research are monthly report data about inflation, interest rate, international currency reserve, and IDR exchange rate from 2008 to 2015 which released by Bank Indonesia.

**Data Analysis Technique**

**1. Descriptive Statistical Analysis**

Analysis is grouping, arranging, manipulating, and cut-shorting data in order easy to read (Nazir, 2005: 358). Descriptive analysis is an activity to summarize raw and data in the large amount so that the result can be interpreted (Kuncoro, 2003: 172). Descriptive statistical analysis is a method that used to analyze data with describe or depict the data that has been collected without intending to make conclusions which apply to the public or generalizations (Sugiono, 2004: 169). This analysis is done by using statistical method.

**2. Classical Assumption Test**

In a research, the possibility of emergence of the problem in multiple linear regressions is often enough when check off the prediction models to a model that has been incorporated into a series of data. This problem is usually called as classic assumption test which includes testing normality, autocorrelation, heteroscedasticity, and multicollinearity (Rusdiana, 2011).

**3. Regression Equation**

**a. Multiple Regression Linear**

Data analysis technique that used in this research is multiple linear regressions. Regression model in this research is:

$Y = a + b_1X_1 + b_2X_2 + ... + bnXn + e$

Source: Gujarati (2007: 181)

**b. Coefficient of Determination ($R^2$)**

Coefficient of determination used to measure the effect of independent variables on the dependent variable whose value is between zero to one: $0 \leq R^2 \leq 1$.

**4. Hypothesis Test**

**a. Simultaneous Test (F-Test)**

F-test is to show if all independent variables that input into the regression model have influence simultaneously toward dependent variables

**b. Partial Test (t-Test)**

t-test is to show how far the influence of one independent variable toward dependent variable with assuming that the other independent variable are constant.

**RESULT AND ANALYSIS**

Based on the data of inflation ($X_1$), interest rate ($X_2$), international currency reserve ($X_3$), and IDR exchange rate (Y), there is descriptive statistic that be seen in Table 1.

**Table 1. Descriptive Statistical Analysis**

| | N | Min | Max | Mean | Std.Dev. |
|---|---|---|---|---|---|
| X1 | 96 | ,20 | 1,01 | ,5186 | ,19441 |
| X2 | 96 | ,48 | ,79 | ,5865 | ,07985 |
| Ln_X3 | 96 | 10,82 | 11,73 | 11,3849 | ,28330 |
| Ln_Y | 96 | 9,05 | 9,59 | 9,2397 | ,14720 |
| Valid N (listwise) | 96 | | | | |

Appendix: SPSS 21.0.

Based on Table 1, it shows the lowest, highest, mean, and standart deviation value for inflation ($X_1$), interest rate ($X_2$), log natural of international currency reserve ($X_3$), and log natural of exchange rate (Y).

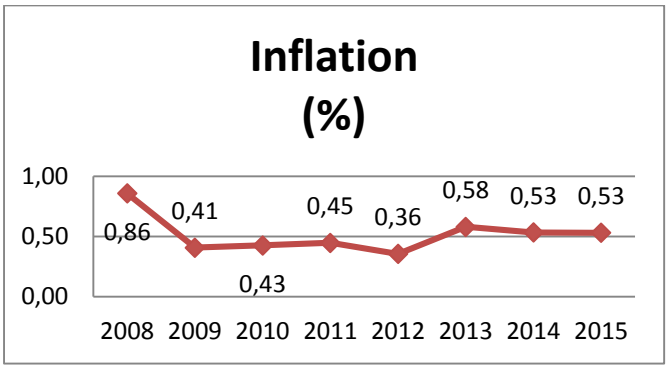


**Figure 1. Inflation of Indonesia 2008-2015**
Source: Bank Indonesia, 2016

Inflation fluctuation in Indonesia can be seen at Figure 1. Inflation in 2008 decreased in 2009. The inflation then increased continuously in 2010 and 2011. The inflation of Indonesia decreased 2012, then increased in 2013, but decreased again in 2014 and 2015.

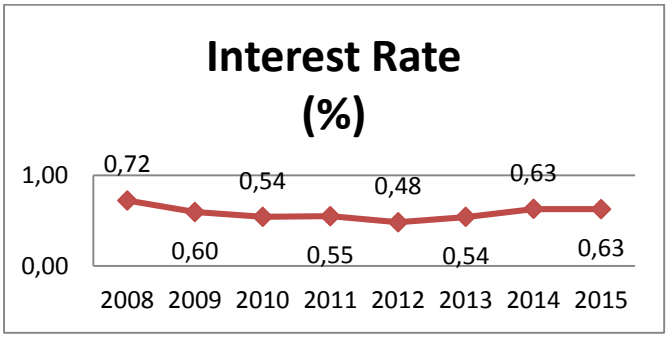


**Figure 2. Interest Rate of Indonesia 2008-2015**
Source: Bank Indonesia, 2016

Interest rate fluctuation in Indonesia can be seen at Figure 2. The high interest rate in 2008 decreased continuously in 2009 and 2010. Interest rate in 2010 stable in 0,54%, but it is increased in 2011. The interest rate decreased in 2012 but increased again in 2013 and 2014. The interest rate decreased in 2015.

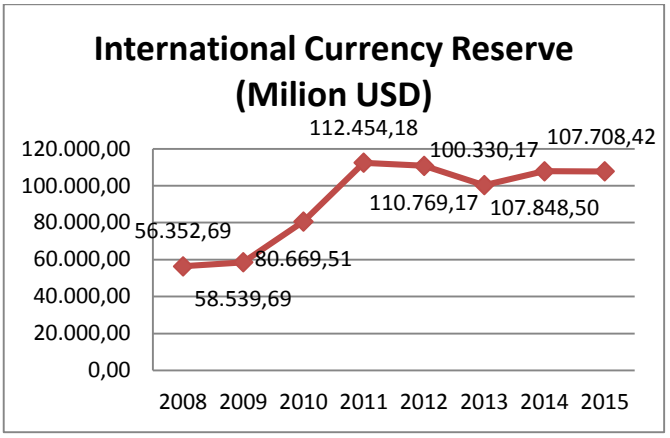


**Figure 3. International Currency Reserve of Indonesia 2008-2015**
Source: Bank Indonesia, 2016

International currency reserve fluctuation in Indonesia can be seen at Figure 3. Early in 2008 the international currency reserve of Indonesia continuously increased until 2011. The international currency reserve of Indonesia decreased in 2012 and 2013. The international currency reserve increased again in 2014, but decreased in 2015.

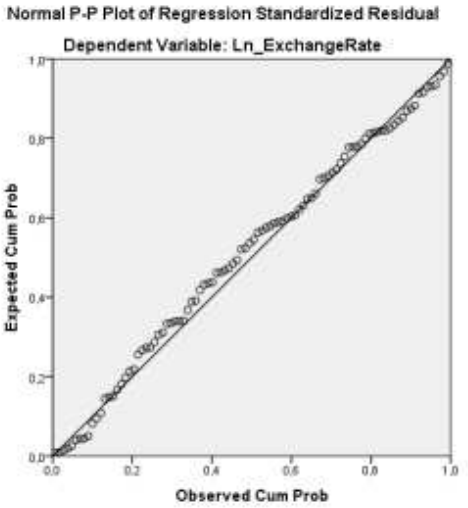


**Figure 4. Result of Normality Test**
Source: SPSS 21.0.

Figure 4 shows the normality test. The data is spread around the diagonal line and follow the direction of the diagonal line. Based on Figure 4, the assumption of normality is accepted

**Table 2. Result of Autocorrelation Test**

| Model | Durbin-Watson |
|---|---|
| 1 | ,140 |

Source: SPSS 21.0.

Based on Table 2, n = 96, k = 3 (independent variables), dU value is 1,7326 and dL value 1,6039. Table 8 show the value of Durbin-Watson test is

0,140. DW in between 0 and dL, 0<DW<dL, 0<0,140<1,6039. It can be conclude that there is no autocorrelation.

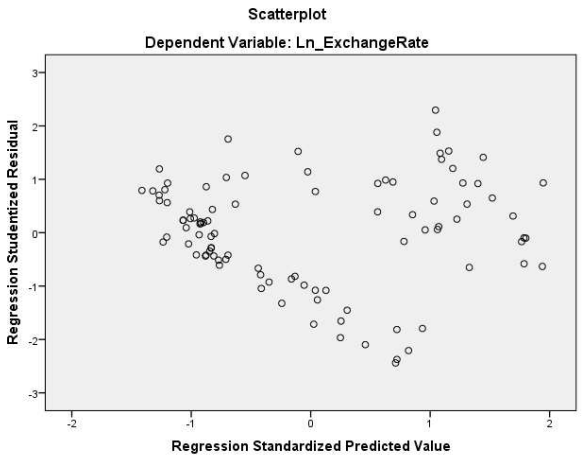


**Figure 5. Result of Heteroscedasticity Test**
Source: SPSS 21.0.

Figure 5 shows that there is no specific pattern likes dots spread (wavy, wound, then narrows). It can be conclude that there is no heteroscedasticity.

**Table 3. Result of Multicollinearity Test**

| Model | | Collinearity Statistics | |
|---|---|---|---|
| | | Tolerance | VIF |
| 1 | (Constant) | | |
| | X1 | ,394 | 2,536 |
| | X2 | ,344 | 2,909 |
| | Ln_X3 | ,765 | 1,307 |

Source: SPSS 21.0.

Based on the result, can be concluded that overall the tolerance value > 0.10 and overall the VIF < 10, so there is no multicolinearity between all independent variables.

**Table 4. Result of Multiple Regression Linear**

| Model | | Unstandardized Coefficients | | Standardized Coefficients |
|---|---|---|---|---|
| | | B | Std. Error | Beta |
| 1 | (Constant) | 5,254 | ,572 | |
| | X1 | -,275 | ,092 | -,364 |
| | X2 | 1,848 | ,239 | 1,003 |
| | Ln_X3 | ,267 | ,045 | ,515 |

Source: SPSS 21.0
Based on Table 4, the regression model is:
$Y = 5{,}254 - 0{,}275\ X_1 + 1{,}848\ X_2 + 0{,}267\ X_3$

The constant value is 5,254 means that the exchange rate will increase as big as 5,254 with the assumption inflation, interest rate, and international currency reserve are constant.

**Table 5. Result of Coefficient of Determination**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | ,683[a] | ,467 | ,450 | ,10921 |

Source: SPSS 21.0.

Table 5 show that the value of Adjusted $R^2$ is 0,450. Means that 45% IDR exchange rate variable influenced by its independent variables, there are inflation ($X_1$), interest rate ($X_2$), and international currency reserve ($X_3$). The other hand, 55% IDR exchange rate variable influenced by the other variable that not used in this research. Presentation of coefficient of determination can conclude it is low because lower than 50%.

Variables that can influence exchange rate are relative inflation rate, relative interest rate, relative income levels, government controls, and expectation (Madura, 2008: 89). Based on Madura, the other variables that can influence exchange rate are income level, government control, and expectation. Widiastuti (2011) said the other variables that can influence the IDR exchange rate are balance of payment, income rate, rule and regulation, speculation, and rumor.

**Table 6. Result of Simultaneous Test (F-Test)**

| Model | | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | ,961 | 3 | ,320 | 26,867 | ,000[b] |
| | Residual | 1,097 | 92 | ,012 | | |
| | Total | 2,058 | 95 | | | |

Source: SPSS 21.0.

Based on Table 6, the value of F Sig. is 0,000 which < α = 0,05. It can be concluded that independent variables (inflation, interest rate, and international reserve) simultaneously influence on dependent variable (IDR exchange rate). The result in line with Rusdiana (2011) research which proves that inflation, interest rate, and international currency reserve simultaneously influence the IDR exchange rate.

**Table 7. Result of Partial Test (t-Test)**

| Model | | t | Sig. |
|---|---|---|---|
| 1 | (Constant) | 9,191 | ,000 |
| | Inflation | -3,001 | ,003 |
| | Interest_Rate | 7,723 | ,000 |
| | Ln_InternationalCurrencyReserve | 5,913 | ,000 |

Source: SPSS 21.0.

Based on Table 7, the value of t Sig. of inflation is 0,003, t Sig. of interest rate is 0,000, and t Sig. of

international currency reserve is 0,000 which < α = 0,05. It can be concluded that independent variables (inflation, interest rate, and international reserve) partially influence on dependent variable (IDR exchange rate).

Based on statistical calculation, inflation partially has negative and significant influence on IDR Exchange Rate. When the inflation is rise, the IDR exchange rate will be weak. When the inflation is decrease, the IDR exchange rate will be strong.

If the inflation is high, means that the price of general good is expensive. The demand of its currency will decrease, so the exchange rate of its currency will depreciate. The result support the Purchasing Power Parity (PPP) theory, which is explain that exchange rate of currency can be change by inflation of the country.

Based on statistical calculation, interest rate partially has positive and significant influence on IDR Exchange Rate. When the interest rate is rise, the IDR exchange rate will be strong. When the interest rate is decrease, the IDR exchange rate will be weak.

If interest rate is high, people will interest to invest their money in the term of its currency, so the demand of its currency will increase. That situation can make the exchange rate of its currency appreciate. The result of this research support Madura's idea which is changes in relative interest rate affect investment in foreign securities, which influences the demand for and supply of currencies and therefore influence exchange rates (2008: 90). The result of this research also support Interest Rate Parity (IRP) theory which is explain that interest rate can influence the exchange rate so both of them have to be manage, to know the differences of interest rate in two currencies.

Based on statistical calculation, international currency reserve partially has positive and significant influence on IDR Exchange Rate. When the international currency reserve is rise, the IDR exchange rate will be strong. When the international currency reserve is decrease, the IDR exchange rate will be weak.

The result of this research support Rachbini and Swidi's idea that international currency reserve must be maintained for the purposes of international transaction (2000: 113), which is need exchange rate for doing that. The result of this research also support Simorangkir and Suseno's idea, that macroeconomic indicator that can influence exchange rate is capital flows, which is seen by international currency reserve (2004: 6). The result in line with Rusdiana (2011) research which found out that international currency reserve has significant influence on IDR exchange rate.

## CONCLUSION AND SUGGESTION

### Conclusion

The research about the influence of inflation, interest rate, and international currency reserve period of 2008-2015 with uses multiple linear regression statistical analysis, there are some result and a conclusion as follows: Inflation, interest rate, and international currency reserve simultaneously has significant influence on IDR exchange rate; Inflation partially has negative and significant influence on IDR exchange rate; Interest rate and international currency reserve partially have positive and significant influence on IDR exchange rate.

### Suggestion

Based on the result that reach from the research and based on the conclusion, there are something that have to get attention relative to exchange rate, there are: Bank Indonesia as a central bank should manage the inflation and interest rate to keep the stabilization of macro economy especially the IDR exchange rate; Government could increase export and press import in managing international currency reserve that can influence the IDR exchange rate; Exporter and importer should to know the exchange rate, because to doing export and import activity usually used foreign currency; The next researcher could add another variables like net export, gross domestic product, foreign direct investment, and the other variable that influence on IDR exchange rate; The next researcher could add the time period of the research so hope can get the better result.

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