

The factors affecting the rupiah exchange rate in Indonesia

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Abstract: This study to determine the money supply, interest rates, inflation, and imports toward rupiah exchange rates. The analysis method in this study used a quantitative approach that applies multiple regression models. Data used secondary data in the form of time series during the period of August 2016 until June 2019. The finding's results show that jointly money supply, interest rates, inflation, and imports have a significant effect on the rupiah exchange rate. While partially, the variable of money supply, interest rates, and imports has a positive and significant effect on the rupiah exchange rate. But the inflation rate has an insignificant effect on the Rupiah exchange rate. From the results of this study the government is expected to control the money supply and maintain the balance of payments by minimizing the amount of imports.

Keywords: rupiah exchange rates, money supply, interest rates, inflation, import.

JEL Classification: F40, N70.

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1. INTRODUCTION

Exchange rates that change will have an impact on changing prices of services and goods. In addition, changes in exchange rates can lead to appreciation and depreciation of currencies (Wilya, 2014). Strengthening or weakening the exchange rate is also influenced by the amount of currency offered and requested. Where when the currency experiences a lot of demand while supply is fixed or decreasing, it will result in an increase in the currency, and vice versa. The existence of an open economy also has an effect on the balance of payments in Indonesia which is related to trade flows, and capital flows.

Changes in exchange rates can occur in two opposite directions, namely strengthening or weakening. When other factors remain (*ceteris paribus*), the weakening of the rupiah exchange rate makes the price of domestic products change more cheaply for foreign parties and vice versa (Nopirin, 2000). The relationship of supply and demand will directly affect the sale and purchase in the international or so-called trade balance in the macro economy (Mankiw, 2008).

The data in Figure 1 show that the trend of exchange rate movement from August 2016 to June 2019. It can be observed that during this research period the exchange rate in 2017 is relatively stable from Rp. 13,319-13,572. The exchange rate is at the highest level in October 2018 of Rp.15,227 and the lowest is in September 2017 at Rp.12,889.

There are a number of factors that can affect changes in exchange rates, an example is inflation. Based on previous research, inflation has a significant influence on the rupiah exchange rate (Zarah & Yeni, 2018). The relationship between inflation and the exchange rate will be seen when the rupiah depreciates, so inflation will impact. Inflation will increase as a result of imports of raw materials from abroad by domestic companies which cause output prices to become expensive. When inflation is still mild, inflation can have a good effect because it drives the economy. However, inflation will have a bad effect when the level is already high so the government must try to maintain inflation with various policies.

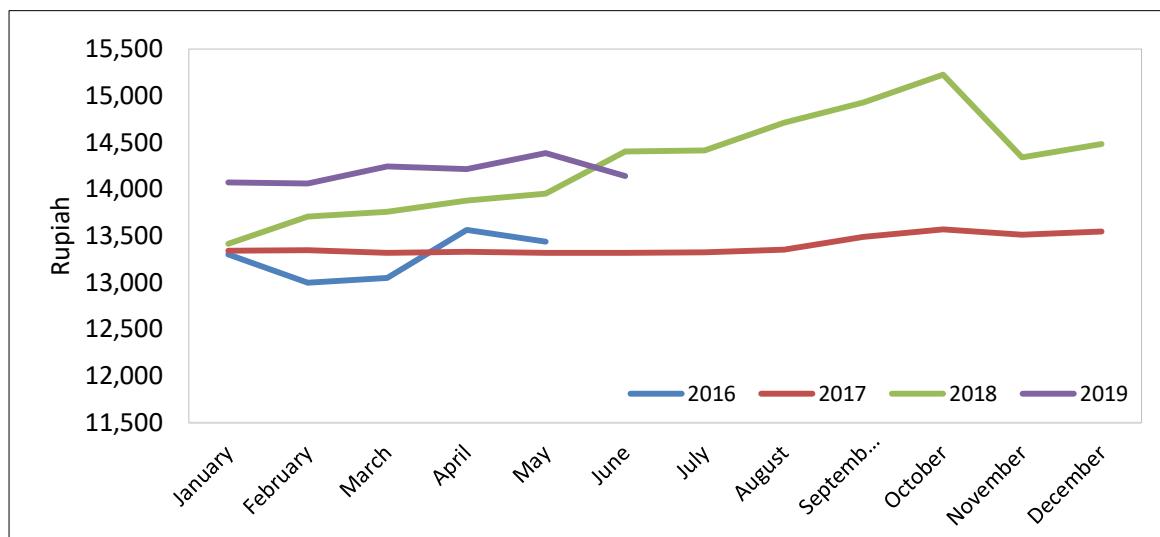


Figure 1. Rupiah exchange rate in Indonesia, 2016-2019

Source: Central Statistic Agency (Author calculation)

In addition, the money supply is also one of the factors causing changes in exchange rates (Atmadja, 2002). In achieving economic stability, the government will implement several policies, namely expansionary monetary policy. This policy is carried out by the government when the value of the currency has increased. In addition, the contractive monetary policy of the government is carried out when the currency declines which aims to reduce money supply.

Based on previous studies the relationship of inflation, interest rates and exchange rates do not have a significant correlation. Based on Noor (2011) changes in some information and factors will cause other adjustments. According to previous research, economic parameters that are commonly used to examine the exchange rate are interest rates, inflation, and the amount of money in circulation. Inflation rates affect the exchange rate, this is in line based on research from (Noor, 2011) namely in Asian countries, the inflation rate has a significant relationship to the exchange rate or exchange rate. In addition, interest rates and money supply also influence inflation.

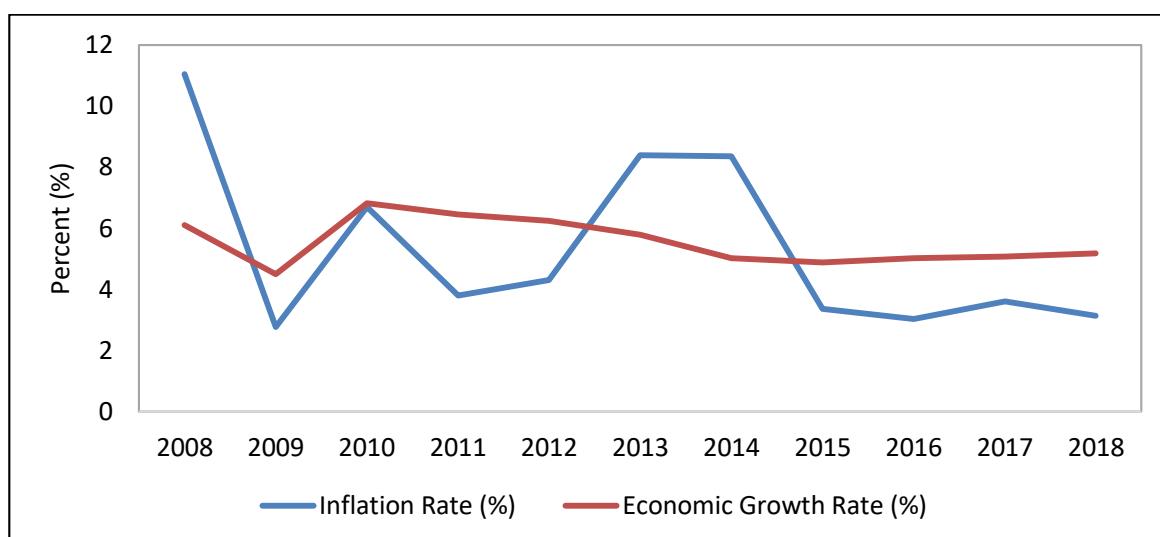


Figure 2. Report on inflation and economic growth.

Source: Central Statistic Agency (Author calculation)

Based on the BPS inflation report in December 2018, inflation is at 0.62%. Annual inflation in December was 3.13%. In addition, the core inflation rate was 3.07%. The state revenue budget prediction notes that the inflation rate is between 3.5%, while BI predicts inflation at 2.5% -4.5% so that the inflation rate in 2018 is inflation controlled and in line with expectations in the APBN and

BI projections at the beginning of the year. It can also be seen that in 2008, inflation experienced the highest level of 11.04%. However, it decreased in 2009 to 2.77%. 2009 was the year with the lowest inflation rate for 10 years from 2008 to 2018. Besides that, when compared to economic growth, the inflation rate was also lower. This indicates that the economy is moving towards a better direction. Increased inflation can cause export levels to decline due to high export prices. High inflation will result in state losses because foreign exchange has decreased as well as the supply of goods.

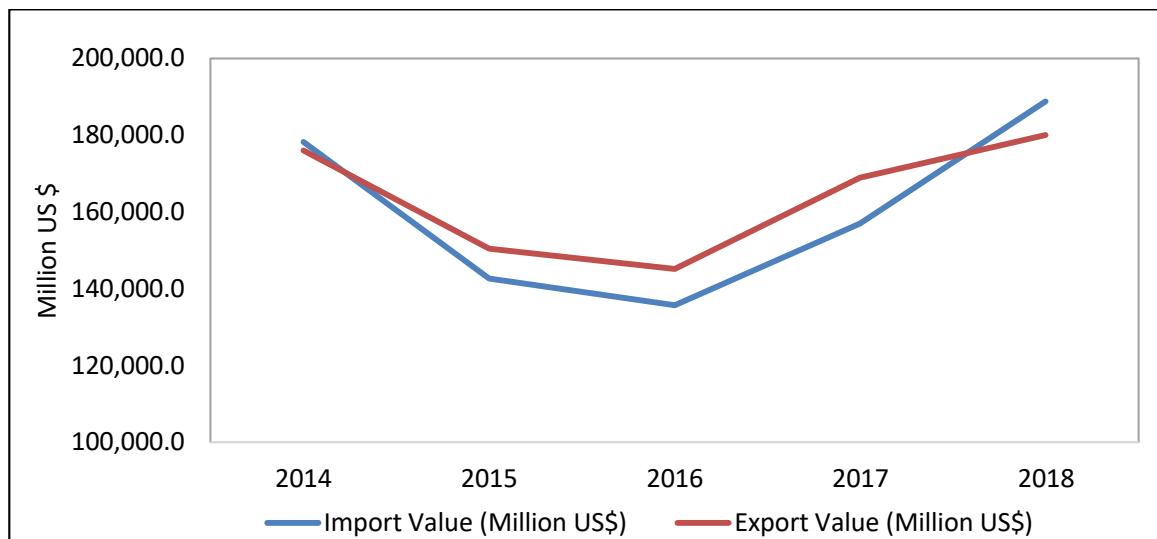


Figure 3. Indonesia's Trade Balance (Million US \$)

Source: Central Statistic Agency (Author calculation)

Figure 3 above explains that in 2014 the value of Indonesia's imports was US \$ 178,178.8 million. Decreased to US \$ 142,694.8 million in 2015 and decreased in 2016 to US \$ 135,652.9 million. The Central Statistics Agency (2016) explained that the factor of the decline was due to the decline in international market demand. Then it increased in 2017 to US \$ 156,985.6 million and increased again in 2018 valued at US \$ 188,711.2 million.

Indonesia's export value in 2014 was US \$ 175,980.0 million, down in 2015 to US \$ 150,366.3 million due to the decline in the oil and gas sector. In 2016 exports declined again to US \$ 145,186.2 million due to the same factors. Then rose to US \$ 168,828.2 million in 2016 and US \$ 180,012,715 million in 2017. The increase in 2016 and 2017 was caused by increased exports in both the oil and gas and non-oil sectors. The exchange rate that experiences appreciation or depreciation will affect the import and export of the country concerned. This effect is due to international trade transactions that still use USD.

According to Madura (2006), in addition to inflation and import and export, interest rates are also a factor that affects the exchange rate. An increase in interest rates will result in increased demand for currencies. Increased interest rates have an influence on increasing economic growth due to high flows of funds. The central bank has a policy of controlling interest rates, the exchange rate of a currency will increase when the central bank can raise interest rates in the long run until there are other factors or when the central bank reduces interest rates. The BI 7-Day Repo Rate has been in effect since August 19, 2016, replacing the BI rate, which has an effect on the money market.

Research on the Rupiah Exchange Rate is very important to do, because in the global economy, inter-economic conditions become related. One of the links is reflected in the exchange rate. If the exchange rate of a country tends to be stable, then the uncertainty of the global economy can be minimized. This study uses monthly data for the period August 2016 to June 2019. The August 2016 period was chosen because there was a change in the interest rate method to the BI 7-Day Repo Rate in August 2016.

Based on the above background, the researcher aims to examine the factors that affect the exchange rate in Indonesia. Based on the description that has been described, it is felt that further

research needs to be carried out on the effect of the money supply, interest rates, inflation, and imports on the rupiah exchange rate.

2. LITERATURE REVIEW

Silitonga, Ishak & Mukhlis (2017) has conducted research with the title influence of exports, imports, and inflation against rupiah exchange rates in Indonesia using secondary data, and is time series in nature with quarterly periods from 2006 to 2017. The approach used in the research is quantitative with multiple linear regression models. The results of this study indicate that the inflation rate has no effect on the exchange rate. While exports and imports have a significant effect on the rupiah exchange rate.

The definition of an exchange rate is the amount of one currency from the exchange of one other currency or the price of one currency in an exchange currency (Fabozzi & Modigliani, 1996). Exchange rates have several types (Sukirno, 2011), namely:

- Selling rate, is the exchange rate that applies at a certain time for the sale of a certain foreign currency determined by the central bank.
- The buying rate, is the exchange rate that applies at a certain time for the purchase of a certain foreign currency determined by the central bank.
- Middle rate, is the buying and selling exchange rate against the rupiah currency determined by the central bank in a certain time period.

The money supply is the total value of circulation in the community or in the economy of a country. The money supply is classified into two according to Nilawati (2000), namely;

- Narrow Money (M1), namely the money supply in a narrow sense, for example demand deposits and currency.
- Broad Money (M2) is a money supply in a broad sense, consisting of narrow money plus time deposits.

Definition of interest rates according to Sukirno (2011) is the interest expressed as a presentation of capital. While Boediono (2014) explains that the interest rate is the price of the investment. There are two types of bank interest according to Sunariyah (2011), namely:

- Saving interest: the interest given to customers as a stimulus so that customers make deposits at the bank. For example demand deposits, savings or deposit interest.
- Loan interest: the interest customers must pay when borrowing money from a bank. For example credit interest.

BI 7-day interest rate (Reserve) Repo Rate is an interest rate policy that has been going on since August 19, 2016 replacing the BI rate. The 7-day BI Reserve (Repo Rate) has a shorter time span than the BI rate. The purpose of the policy change is to facilitate the control of the effectiveness of interest rates which results in the smooth lending to the public.

Inflation is a symptom when the general price level experiences a continuous increase (Sukirno, 2011). Inflation is caused by many factors for example excessive money supply, consumptive behavior, state budget deficit, etc. Inflation can result in reduced investment, increased interest rates, stunted development, unstable economic conditions, a balance of payments deficit, and decreased public welfare. Emerging market volatility poses a problem for central banks in controlling inflation. The target inflation rate is almost never achieved. One step toward achieving inflation close to the target objective is to improve the precision of inflation forecasting (Sharma, 2019).

The definition of import based on Law No.10 of 1995 is the activity of buying services or goods from abroad into the country officially through the trade process by fulfilling the applicable provisions or laws.

Exchange rates are related to all economic activities in a country that are related to other countries. According to (Krugman, 2003) the money supply has a positive influence on the exchange

rate. When the money supply increases, it pushes the domestic currency. Which means the value of the currency will decrease in value when the amount of money in circulation has increased.

Changing interest rates will have an impact on the exchange rate. The higher interest rates, the demand for money in the country will increase. Changing interest rates have a negative effect. Rising interest rates will increase expected financial investment returns which result in capital inflows into the country, then affect the strengthening of the domestic exchange rate (Atmaja, 2020 and Noor, 2011). In the other side, Inflation has a relationship where changes in the inflation rate can affect currency demand which has an impact on global trade patterns (Madura, 2006). In line with the law of purchasing power parity, the increase in the cost of services or goods has an impact on increasing foreign exchange demand or the inflation rate will have a positive impact on the exchange rate (Atmaja, 2020).

In an effort to meet the needs of both domestic goods and services, Indonesia still relies on raw materials by importing from other countries. Dependence on imports will cause exchange rate depreciation. The relationship of the number of imports with the rupiah exchange rate is positive, the increase in the value of imports causes the rupiah exchange rate to weaken because it is followed by an increase in foreign exchange that will be used to pay for imported goods (Agustin, 2009).

Fauzi (2016) in her study results indicate that the inflation rate, exports and imports, did not have a positive effect on the exchange rate. While interest rates, the money supply and economic growth have a positive effect on the rupiah exchange rate. Meanwhile, according to his research Nurul, Zainuri, Sebastiana (2017) with the title Effect of JUB, Interest Rates, Inflation, Exports, and Imports on Rupiah Exchange Rates on US Dollar. The research period is from 2005 to 2016. The results of the study indicate that all independent variables have a positive effect on the exchange rate. In the study of Zumrotudz, Zarah and Yeni (2018) with the title Influence of the Amount of Export Value and Inflation Rate on the Rupiah Exchange Rates 2009-2016 shows that inflation significantly affects the exchange rate while exports do not have a significant effect on the exchange rate.

3. MATERIALS AND METHODS

3.1. Data

Data to be used in this study is secondary data in 35 months of observation starting from August 2016 to June 2019. The type of data in this study is secondary data in the form of time series from the period August 2016 to June 2019. Time series is data collected over a certain time span (Firdaus, 2011). The data source from Central Bureau of Statistics (BPS), Bank of Indonesia, and the Ministry of Trade.

3.2. Model Specification

Data analysis techniques require a pattern that is used to manage the results of research that has been carried out. The technique that researchers used in this study is quantitative descriptive analysis. The definition of quantitative descriptive analysis is an analysis that explains data by drawing conclusions from data in the form of numbers and then converted into sentence or words (Suharsimi, 2006). Descriptive statistics are the technique chosen by the researchers in this study. The estimation method used ordinary least squares (OLS) was chosen as a form of the regression estimate. OLS is a method used to project a regression line by reducing the number of error squares of each error per observation of that line. The form of the model used in this study are:

$$Y_t = a_0 + b_1 X_{1,t} + b_2 X_{2,t} + b_3 X_{3,t} + b_4 X_{4,t} + e_t \quad (1)$$

Where: Y is Rupiah exchange rate; X_1 is money supply; X_2 is interest rate; X_3 is inflation; X_4 is import; a is constant coefficient; b_1 b_2 b_3 b_4 is parameter coefficient; e is confounding variables that represent all other factors beyond the variables studied. The data description and variable measurement we have present as follow:

Table 1. Data Description and variable

Variable	Description	Unit	Source
Exchange rates (Y)	The exchange rate of one country's currency against another country. The data used in the current study is the exchange rate of Indonesia (Rupiah) against the United States currency (Dollar) expressed in IDR / USD.	Rupiah per Dollar	Ministry of trade
Interest rates (X_1)	Interest rates are securities issued by the central bank as an effort to control the money supply (Triyono, 2008).	Percent	Ministry of trade
Inflation rate (X_2)	Inflation is an increase in prices of general goods that takes place on an ongoing basis. The data that researchers use is the inflation rate based on the Consumer Price Index (CPI).	Percent	BPS
Import (X_3)	Imports is the total input of trade results from out of the country during a certain period.	US\$ million	Ministry of Trade
Money supply (X_4)	The money supply in the narrow sense (M1) is demand deposits and currency which the public uses as a transaction tool (Triyono, 2008).	Rupiah	Bank of Indonesia

The hypotheses in this study are as follows:

- The amount of money in circulation has a positive effect on changes in the Rupiah exchange rate.
- Interest Rates have a negative influence on changes in Rupiah exchange rates.
- Inflation has a positive influence on changes in the Rupiah exchange rate.
- The amount of imports has a positive effect on changes in the Rupiah exchange rate.

4. RESULT AND DISCUSSION

4.1. Result

The coefficient of determination indicates the ability of the independent variable in explaining the dependent variable. The value of R^2 is 0.753. So it can be concluded that the ability of independent such as variables of money supply, interest rates, inflation, and imports can explain the dependent variable i.e. exchange rate is 75.3 percent, while 24.7 percent can be explained by other variables not examined. Furthermore, The significance level used is 0.05 and with degree of freedom ($k-1$) and ($n-k$) namely (5-1) and (35-5), with f-table value of 2.690 and f-test of 26.960 and a probability value of f-test being below the level of significance so that H_0 is rejected and H_a is accepted, which means jointly the independent variables affect the dependent variable.

Partially, the money supply effect on the exchange rate, the hypothesis test 1 is performed using the t-test. Can be seen from Table 2, the constant value of money supply is 0.000025 and the significance value is 0.000. The significance level used is 5% while the value of d-f is from the number of observations minus the variable ($n-k$) that is (35-5). The t table value seen was 2,032 while the t count was 4.271 with a positive coefficient. Based on the results, the calculated t value has a value greater than t table and the money supply significance level is below the significance level so that H_0 is rejected and accepts H_a . So the conclusion is that there is a significant influence of JUB on the exchange rate.

The effect of interest rates on the exchange rate, the hypothesis test 2 was performed using

the t-test. The t table value seen was 2.032 while the t count was 3.818 with a positive coefficient. Based on the results, the value of t-test arithmetic has a value greater than t-table and the level of significance of interest rates is below the level of significance. So the conclusion is that there is no significant effect of interest rates on the exchange rate. During the study period, the interest rate did not experience significant changes so it did not affect the exchange rate. Differences in interest rates in various countries due to differences in estimates of each level of inflation between countries.

The effect of inflation on the exchange rate, the hypothesis test 3 was performed using the t-test. Can be seen from Table 2, the constant value of inflation is -231,607 and the significance value is 0.281. Based on the results, the value of t arithmetic has a value smaller than t table and the level of significance of inflation above the level of significance so that H0 is accepted and rejects Ha. So the conclusion is that there is no significant effect of inflation on the exchange rate. This insignificant effect may be due to Indonesia applying a controlled floating exchange rate.

The effect of imports on the exchange rate, the hypothesis test 4 was performed using t-test. The significance level used is 5% while the value of d-f is from the number of observations minus the variable (n-k) that is (35-5). The t table value seen was 2,032 while the t count was 2.974 with a positive coefficient. Based on the results, the calculated t value has a value greater than t table and the level of significance of imports is below the significance level So the conclusion is that there is a significant effect of imports on the exchange rate. This might be because during the research period the demand for Indonesian goods declined, followed by a slowdown in the Indonesian economy that affected the rupiah exchange rate, where the value of imports was less than the value of exports.

4.2. Discussion

Table 2 shows that the probability value of money supply, Interest Rate and Import is smaller than 0.05 (alpha = 5%). Statistically the variable of money supply, interest rate, and import have a significant influence on the rupiah exchange rate against the US dollar, while the probability value of the inflation variable is 0.218, greater than 0.05 (alpha = 5%). This means that the inflation variable does not have a statistically significant effect on the exchange rate of the rupiah against the US dollar.

Table 2. Model Estimation Result

Variable	Description	Coefficient	t-test	Prob.
C	Constanta	7781,144	12,696	0,000
X ₁	Money Supply	2,55E-005	4,271	0,000
X ₂	Interest rate	317,185	3,818	0,001
X ₃	Inflation	-231,607	-1,258	0,218
X ₄	Import	0,080	2,974	0,006
Obs		35		
R ²		0,782		
R ² adjusted		0,753		
f-test		26,960		

Source: Author calculation

The money supply is the variable that has the most coefficient value influencing the dependent variable (exchange rate). The money supply has a significant and positive influence, which means that an increase in the money supply will affect the decline in domestic interest rates, thereby reducing the domestic currency. This result is based on the theory of Krugman (2003), namely the value of a currency will decrease in value when the money supply has increased. The results of this study are in line with data from the Ministry of Trade that during the study period, the average money supply increased each month. This increase was due to an increase in transactions by the public so that the central bank increased the circulation of money.

Can be seen from the results of the study, changes in interest rates have no significant or

significant effect on changes in exchange rates. The results of this study are consistent with the research of El Yudha & Hadi (2009) which states that the effect of changes in interest rates is not significant to the exchange rate. During the research period, the interest rate did not experience significant changes so it did not affect the exchange rate. In addition, according to the theory of the International Fisher Effect (IFE) which explains that differences in interest rates in various countries due to differences in estimates of each level of inflation between countries. However, high interest rates are not a guarantee of a strengthening exchange rate in the country. In a number of conditions, it was found that the interest rate in this case the 7-day BI (Reserve) Repo Rate did not significantly affect the bank interest rates, so the impact on the exchange rate was also not significant. This is because, that interest rates from Bank Indonesia are only an appeal, and do not have to follow it. Whereas the more influential rupiah exchange rate is bank interest rates which directly impacts the economy (Arfiani, 2019).

Based on the results of the study, inflation does not have a significant effect on the exchange rate. The results of this study support the research of Fitri & Purbadharma (2015) which explains that there is no significant influence between inflation and the exchange rate. This insignificant effect is because Indonesia applies a controlled floating exchange rate. According to Sartono (2012) many elements affect the exchange rate besides inflation, such as import export activities, market forces and others. The government will respond to an increase in inflation by giving monetary policy in the form of raising imports or raising interest rates so that interest rates do not have a significant effect on the exchange rate.

Imports have a positive and significant effect on the exchange rate. The results of this study are the same as previous research by Nurul & Sebastiana (2017) which explains that when the value of imports experiences an increase it will affect the increase in the exchange rate ie the rupiah will strengthen against the US dollar, as well as the opposite when imports decline then the value of the exchange will also decrease so that the value the US dollar strengthened against the value of the rupiah. The coefficient value of import has the smallest influence of other factors on the exchange rate. This was influenced when the research was conducted, the demand for Indonesian state goods decreased followed by a slowdown in the Indonesian economy so that it affected the rupiah exchange rate where the value of imports was less than the value of exports.

5. CONCLUSIONS

The conclusions from the study results on the effect of the money supply, interest rates, inflation, and imports on the rupiah exchange rate i.e. (i) jointly the money supply, interest rates, inflation, and imports affect the exchange rate; (ii) partially, the money supply, interest rates and imports has a positive and significant effect on the rupiah exchange rate; while inflation has a negative and not significant effect on the rupiah exchange rate in Indonesia.

The government is expected to continue implementing policies regarding the supervision of the money supply so that it will encourage a more stable exchange rate such as restricting printing of new money, or withdrawing old money. In addition, the central bank is also expected to continue to implement and be consistent in controlling the money supply through political instruments, namely the open market. On the other hand, the government is expected to keep the balance of payments balanced by limiting the number of imports so that the amount becomes smaller and encouraging an increase in the rupiah exchange rate.

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