

**Analysis of The Effect of Exchange Rates, E-Money and Interest Rates on The Amount
of Money Supply and Its Implications on The Inflation Level in Indonesia
2012-2017 Period**

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ABSTRACT

This study aims to find out and test the partial influence of exchange rate variables, Electronic Money (e-money), interest rates on money supply; and the partial effect of variable exchange rates, e-money, interest rates, and the amount of money supply toward the inflation rate. This research method is quantitative, with a type of causal research. The geographical scope of the study is Indonesia with a six-year period (2012-2017). Based on the periodization, by using monthly data, each variable has 72 data ($n = 72$), which is 6 years x 12 months. The data used was secondary data. The multiple linear regression analysis was used to test seven hypotheses all of which are bivariate models. The results show that the exchange rate (USD to IDR exchange rate) has a positive and significant effect on the money supply. E-money has a positive and significant effect on the money supply. Interest rates have a negative effect, but are not significant for the money supply. Exchange rates have a negative effect, but not significant to inflation. E-money has a negative effect but not significant on inflation. Interest rates have a positive effect but not significant on inflation. Money supply has a negative effect but not significant on inflation.

Keywords: exchange rate, e-money, money supply, interest rates, and inflation.

PRELIMINARY

1.1 Background

Inflation is one of the important factors in a country's economy. Changes are always sought at a low level and tend to be stable. Fluctuating inflation conditions can cause an economic unstable effect. High and volatile inflation can cause an increase in prices of goods and services in general and continuously will have implications for the hampered economic growth. As seen in Figure 1.1, for 31 years (1984-2014) Indonesia experienced fairly volatile inflation. Based on data from Bank Indonesia (BI) (2015), the lowest five inflation figures were in 1999 (2.01%), 2009 (2.78%), 2011 (3.79%), 2012 (4.3%), 1985 (4.31%). While the five highest inflation rates were 1998 (77.63%), 2005 (17.11%), 2001 (12.55%), 2008 (11.06%), and 2002 (10.03%). From the 31-year annual inflation data, the inflation rate is at least 2.01%, the maximum inflation rate is 77.63%, the average inflation rate is 10.0103%. The problem is that the standard deviation is high, which is 12,923, so this shows that the inflation rate in Indonesia for 31 years tends to fluctuate. The effect of the rupiah exchange rate on US Dollar (USD), electronic money (e-money), interest rates and the money supply is a determinant of the inflation rate

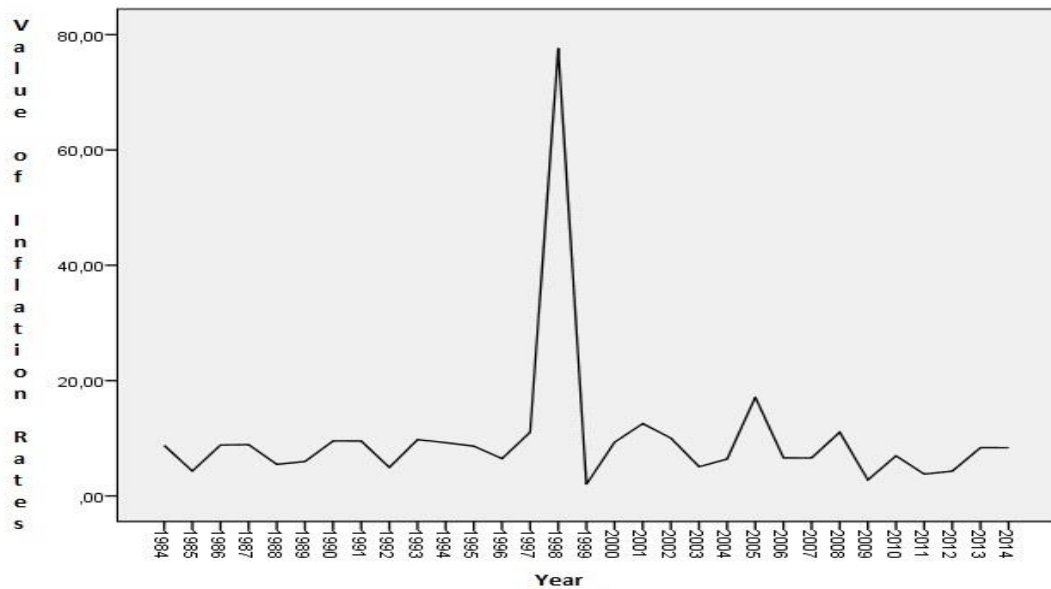


Figure 1. Indonesian Inflation Fluctuations (1984-2014)
Source: Reprocessed from Bank Indonesia (2015)

Besides the problem of inflation, an interesting variable from macroeconomics is the money supply. The money supply will affect the value of money implemented at the level of a product or service. When the amount of money supply is greater than the production of goods and services, there will be an increase in inflation, which means a decrease in the value of money. Conversely, if the amount of money supply is lower than the production of goods and services, then inflation will decrease, and the value of money will increase (Luwihadi & Arka, 2017). There are a number of factors that affect the money supply, including exchange rates, interest rates, and e-money. Based on this background it is interesting to examine the factors that influence inflation, and money supply. This is because inflation and money supply are two of a number of macroeconomic variables that are important to determine the determinants.

1.2 Purpose of the Research

The purpose of the research is:

1. Effect of the exchange rate on the amount of money supply
2. Effect of e-money on the amount of money supply
3. Effect of interest rates on the amount of money supply
4. Effect of the exchange rates on the inflation rates
5. Effect of e-money on the inflation rates
6. Effect of interest rates on inflation rates
7. The effect of the money supply on the inflation rates

REVIEW OF RELATED LITERATURE

2.1 Exchange rates

Exchange rates is defined by Mankiw (2007: 128) as the unit rate level of the population of the two countries to trade with each other. Therefore, it could be defined as the amount of one currency that can be exchanged per unit of another currency, or the price of one currency in an item from another currency. An exchange rates is an exchange between two different currencies of each country. The exchange rates are a comparison of the value or price between the two currencies. While Triyono (2008) said that the exchange rates or foreign currency rates is the price of selling or buying foreign exchange. Indonesia since 1970 has implemented three exchange rates systems, namely: (i) Fixed exchange rates system (1970-1978), in order to maintain exchange rates stability at the set level, Bank Indonesia has actively intervened in the foreign currency market. (ii) Controlled floating systems (1978-July 1997), with this system, the government sets an indicative rate (limiter rates) and allows the exchange rate to move in the market with certain spreads. The government only intervenes if the volatile rate exceeds the upper or lower limit of the spread. (iii) Floating exchange system (August 14, 1997-now). The free-floating exchange rate system applies when the time of monetary crisis since the beginning of it. The policy is in the form of elimination of intervention in order to secure foreign exchange reserves, and at the same time adheres to a free-floating exchange rate system.

2.2 E-Money

Technological developments in the field of information and communication have an impact on new innovations emergency in electronic transactions. One of the electronic transactions is *e-money*. Although there are many definitions of *electronic-money (e-money)*, Morvari (2015) suggests the definition of *e-money* in simple language, namely the value stored in electronic devices or prepaid payment mechanisms that consumers can use. *E-money* is bought by consumers, then data on value of consumer money and every other equipment is directly connected to consumers from *e-money* devices or via POS (*Point of Sale*). *E-money* is one method / payment instrument that contains four elements, namely: (i) *e-money* is issued on the basis of the value of money held by the holder; (ii) the value of money is stored on electronic media such as *servers* or *chips*; (iii) *e-money* is used for traders who are not publishers of electronic money; (iv) the value of electronic money is deposited by the holder / owner and managed by the issuer of electronic money (Priyatama & Apriansah, 2010: 1). Basically, electronic money is divided into server-based (*online*) electronic money and chip-based electronic money (*offline*). Chip-based electronic money is commonly used for transactions that are intended to be carried out in a short time and the frequency is large, for example transportation. The server-based electronic money is usually used for online payment transactions through *web-browsers* (Widyastuti *et al.*, 2017).

2.3 Interest Rates

As stated by Amarasinghe (2015), financial theory explains that interest rates are a measure of time value of money and are one of the determinants of stock prices. Interest rates play a major role in the economy as one of the key macroeconomic variables which is categorized as cost of money. Interest rates are one of the monetary policies that play a role in anticipating the high inflation rate. The amount of interest rates is determined by each central bank in each country (Pardede *et al.*, 2016). The benchmark interest rate of Bank Indonesia (BI Rate) is a monetary policy set by Bank Indonesia which is a reference for banks to set interest rates on banking products such as savings, loans and deposits.

2.4 Money Supply

There are two understandings of money supply. In a narrow sense or narrow money, money supply only includes currency and demand deposits. Currency is money used as a legitimate payment instrument in the general public (M1), in this case paper money and coins. Demand deposits are money supply and are valid as a means of payment in certain circles, such as banking, and post offices, but can affect the money supply, such as checks, current accounts and money orders. Meanwhile, money in the broad sense includes currency, demand deposits, and quasi money. Quasi money is monetary system liability in the form of time deposits, savings in rupiah and balances of foreign exchange accounts belonging to the population (Luwihadi & Arka, 2017; Langi and Siwu, 2014). The circulation rate of money as one of the economic features is the main factor that fully defines the current economic situation and has a direct impact on the inflation rate. From this point of view, it is very important to regulate the interaction of inflation and the payment system (Taghiyev et al., 2016). The money supply, along with the inflation rate, is the main determinant of the high level of economic growth that is able to create jobs, reduce poverty, higher per capita income and living standards that lead to economic development (Phibian, 2010).

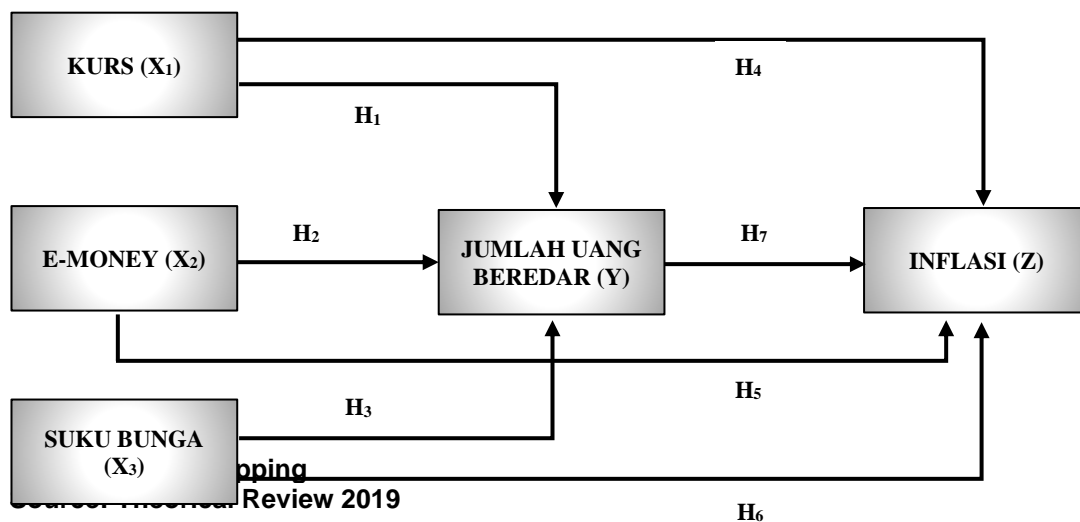
2.5 Inflation Rates

Conventionally inflation is defined as "a persistent rise in the general level of goods and services in the economy over a period of time" (Uwubanmwun & Eghosa, 2015). Inflation is defined as a continuous increase in the general level of prices of goods and services in the economy over a period of time. Mankiw (2006) defines inflation as a tendency for prices to rise in general and continuously. According to Putong (Pamungkas, 2010) inflation occurs due to the lack of synchronization between the commodity procurement program (product, price determination, printing money and so on) and the level of income owned by the community. From this definition it appears that the price increase of only one or two items cannot be called inflation, if the increase is widespread or results in an increase in prices for other goods (www.bi.go.id).

Previous Research

1. Research by Tabi, H.N.; & Ondoa, H.A. (2011) under the title "Inflation, Money and Economic Growth in Cameroon". The results of the study indicate that an increase in the money supply increases economic growth and that growth causes inflation; However, an increase in the money supply does not always increase inflation.
2. Research by Langi, T.M.; Masinambow, V.; & Siwu, H. (2014) under the title "Analysis of the Effect of BI Interest Rate, Circulating Money Amount and Exchange Rate on Inflation Rate in Indonesia". The results of the study indicate that interest rates have a positive and significant effect on the inflation rate. Meanwhile the money supply, and the exchange rate of Rp against USD have a positive effect but not significant on the inflation rate in Indonesia.
3. Research by Luwihadi, N.L.A; & Arka, S. (2017) under the title "Determinants of Circulating Money Amount and Inflation Rate in Indonesia for the Period 1984-2014. The results show that interest rates have a negative and significant effect on the money supply, the USD exchange rates have a positive and significant effect on the money supply, interest rates have a positive and significant effect on the inflation rate, the USD exchange rate has a positive and significant effect on inflation and the money supply has no effect significant to the inflation rate.

Mind Mapping



Research Hypothesis:

- H1: Exchange rates have a positive effect on the amount of money supply
- H2: E-money affects the amount of money supply
- H3: Interest rates have negative effect on the amount of money supply
- H4: Exchange rates have a negative effect on the inflation rate
- H5: Exchange rates have a negative effect on the inflation rate
- H6: Interest rates have negative effect on the inflation rate
- H7: The money supply has a positive effect on the inflation rate

Research Method

This research approach is quantitative, with a type of causal research. Causal research is research that examines causal relationships between two or more variables, so that it can explain the impact of changes in the value variation in an independent variable on changes in value variation in one or more dependent variables (Sugiyono, 2013: 62). From the two quantitative methods namely experiments and surveys, this study used a survey method (Sugiyono, 2013: 13) using secondary data. The geographical scope of the research is Indonesia. The research location is in Jakarta, especially at Bank Indonesia (BI) which is located at Jalan MH Thamrin No. 2 Jakarta, as well as at the Central Statistics Agency or Badan Pusat Statistik (BPS) which is located at Jalan Doktor Sutomo Number 6-8, Central Jakarta.

The Definition of Variable Operasional Independent Variable

1. Exchange Rates (X₁)

The data used in this study was the middle exchange rate of rupiah (Rp) against the United States currency (US dollar) (Syahtria et al., 2016) based on the middle exchange rate issued by Bank Indonesia (BI) (Irianto, 2002; Handiani, 2014). The data used in this study was monthly exchange rate data in units of rupiah (Rp.) for the period 2012-2017, so that the amount of data is 72 data (n

= 72). The data was obtained from the Indonesian Financial Economic Statistics or Statistik Ekonomi Keuangan Indonesia (SEKI) issued by Bank Indonesia, from the Bank Indonesia website (www.bi.go.id).

2. E-Money (X_2)

E-money in this study covers all transactions that use electronic devices in Indonesia, both using medium servers and chips, covering three segments (retail-payment, corporate e-payment, and wholesale a-payment). Data used in this study was e-money monthly data in units of rupiah (Rp) for the period 2012-2017, so the amount of data is 72 data ($n = 72$). The data was obtained from the Indonesian Financial Economic Statistics or Statistik Ekonomi Keuangan Indonesia (SEKI) issued by Bank Indonesia, from the site of Bank Indonesia.

3. Interest Rates (X_3)

The interest rate in this study is the interest rate represented by the value of the Bank Indonesia Interest Rate (SBI) or the one-month BI rate which is the benchmark for the interest rate of the fund. The data used in this study was the monthly BI rate data in percent units for the period 2012-2017, so the data amount is 72 data ($n = 72$). The data was obtained from the Indonesian Financial Economic Statistics or Statistik Ekonomi Keuangan Indonesia (SEKI) issued by Bank Indonesia, from the Bank Indonesia website (www.bi.go.id).

Dependent Variable

1. Amount of Money Supply (Y)

The money supply in this study is the money in the broad sense (M2), which means that the combination of M1 (currency and demand deposits) is added to quasi money. M2 money supply is assumed to be able to describe the economic liquidity of a country. The data used in this study is the monthly M2 in units of billions of rupiah for the period of 2012 to 2017, so that the amount of data is 72 ($n = 72$). The data is obtained from the Indonesian Financial Economic Statistics (SEKI) issued by Bank Indonesia, from the Bank Indonesia website (www.bi.go.id).

2. Inflation (Z)

The inflation rate namely the growth of the Consumer Price Index (CPI) used (Syahtria *et al.*, 2016). Data used is the monthly data on inflation in units of percent for the period of 2012 to 2017, so the amount of data is 72 ($n = 72$). The data is obtained from the Indonesian Financial Economic Statistics (SEKI) published by Bank Indonesia, from the Bank Indonesia website (www.bi.go.id) and / or the Central Statistics Agency (BPS) <https://www.bps.go.id/>

Analysis Method

Determination Coefficient Analysis

To find out how able of the model analysis to explain the variation of the dependent variable, the determination coefficient is seen. The determination coefficient is used to show the amount of contribution of variable X to variable Y. In the determination coefficient test, Ghozali recommends using the *adjusted R²* value when evaluating which regression model is best (Ghozali, 2012: 97). The determination coefficient value is between 0 (zero) and 1 (one). *Adjusted R²* value = 1, meaning that the independent variable is 100% able to explain the dependent variable and the model approach used is appropriate. If *adjusted R²* value = 0, meaning that the independent variable is not able to explain the dependent variable, or the independent variable in explaining the dependent variable is very limited. The higher the *adjusted R²* value or the value is closer to 1, the better the model used.

Analysis of Multiple Linear Regression

This study used multiple linear regression analysis (multiple regression analysis) (Haryono, 2017: 18). The multiple linear regression model in this study was compiled using standardized beta

values, considering that the seven hypothesis models of this study were partial. The following are multiple linear regression equation formulas which consist of two equations, namely dependent equation variables that are arranged based on problem formulation, research objectives, and research hypotheses, so that they have two equations, namely when the dependent variable is money supply (Y), and when the variable inflation dependent (Z):

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \epsilon$$
$$Z = \beta_0 + \beta_1 X_1 + \beta_4 Y + \beta_3 X_3 + \epsilon$$

Where;

Y	: Money supply
Z	: Inflation
β_0	: Coefficient of constants
$\beta_1, \beta_2, \beta_3, \beta_4$: Coefficient of regression
X_1	: Exchange rates
X_2	: <i>E-money</i>
X_3	: Interest rates
e	: <i>Error (outlier)</i>

Data analysis using an alpha significance level of 0.05.

Hypothesis testing

Hypothesis testing was done to analyze and draw conclusions on the problems studied. This test was intended to find out whether there is an influence of independent variables on non-independent variables. The hypothesis test used was the t test (individual parameter significance test) because the seven hypothesis models were uni influence partially. The steps in this t test are as follows:

- Make a hypothesis, namely:
 H_0 : The independent variable partially does not affect the dependent variable.
 H_1 : Independent variables partially influence the dependent variable.
- Establish the value of α (level of significance) which is 0.05.
- Take decisions with the following provisions:

If the value of t_{count} according to the calculation results is smaller than the value of t_{table} ($t_{count} < t_{table}$), then H_0 is accepted and H_1 is rejected. If the value of t_{count} according to the calculation results is greater than the value of t_{table} ($t_{count} > t_{table}$), then H_0 is rejected and H_1 is accepted. The software used in this study was the Statistic Product and Service Solution (SPSS) program software 24th verse.

RESEARCH FINDING AND DISCUSSION

Classic Assumption Test

1. Normality Test

The normality test in this study used Kolmogorov-Smirnov. Table 1 shows that the Asyms of significance for the five variables, namely inflation, money supply, the exchange rate of USD to IDR, e-money, and interest rates are 0.74; 0,200; 0.083; 0.061; and 0.59, which means that everything is greater than 0.05. The data of this study shows that the five variables are normally distributed.

Table 1. Normality Test Results
One-Sample Kolmogorov-Smirnov Test

		Inflation	Money Supply	Exchange rate of USD to IDR	E-money	Interest Rate
N		72	72	72	72	72
Normal Parameters ^{a,b}	Mean	,4194	40986,7500	12299,8186	38161499,0700	6,3090
	Std. Deviation	,57915	7409,87903	2098,28281	17920158,46000	1,16242
Most Extreme Differences	Absolute	,130	,086	,180	,147	,208
	Positive	,130	,086	,146	,147	,157
	Negative	-,129	-,068	-,180	-,094	-,208
Test Statistic		,130	,086	,180	,147	,208
Asymp. Sig. (2-tailed)		,074 ^c	,200 ^{c, d}	,083 ^c	,061 ^c	,059 ^c

Source: Data reduction result SPSS 24

2. Heterocedasticity test

Heteroscedasticity testing of this study used P-Plot images. Data is normally distributed (free from heteroscedasticity) if the points still follow and approach the diagonal line. The test results for all variables are free from heteroscedasticity, it can be seen in Figure 3 to 9.

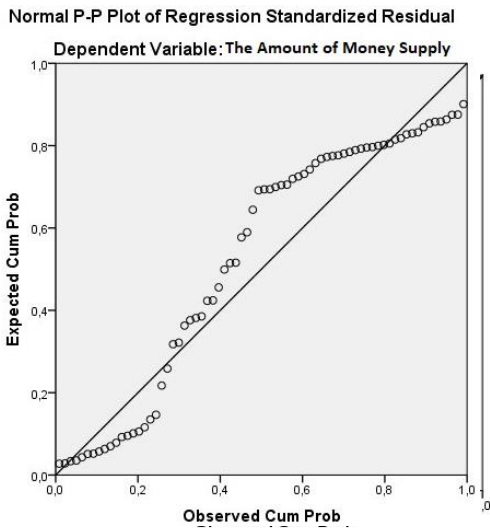


Figure 5. P-Plot of the Effect of Interest Rates on the Money Supply

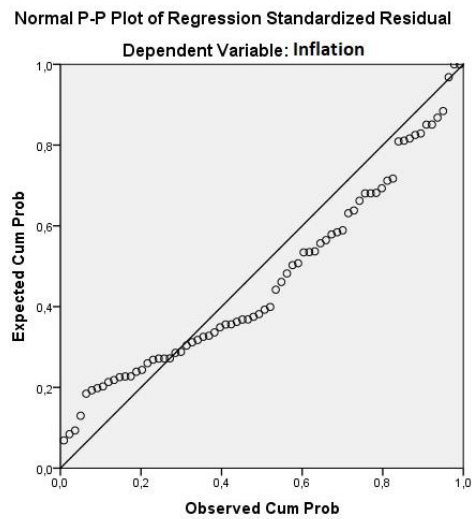
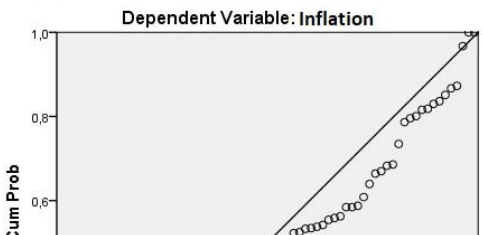


Figure 6. P-Plot of the Effect of Exchange Rates on Inflation

Normal P-P Plot of Regression Standardized Residual



Normal P-P Plot of Regression Standardized Residual

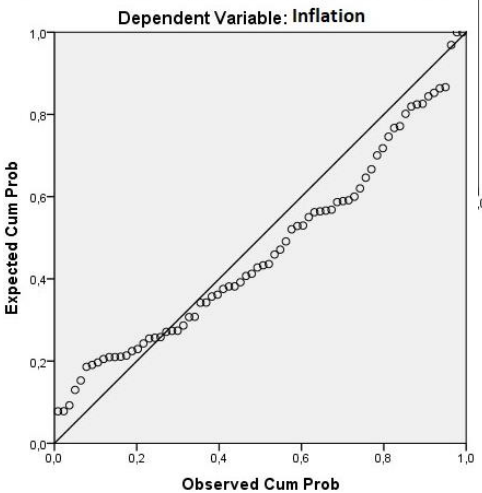


Figure 9. P-Plot of the The Effect of Money Supply on Inflation

E-money on the Money Supply
Normal P-P Plot of Regression Standardized Residual

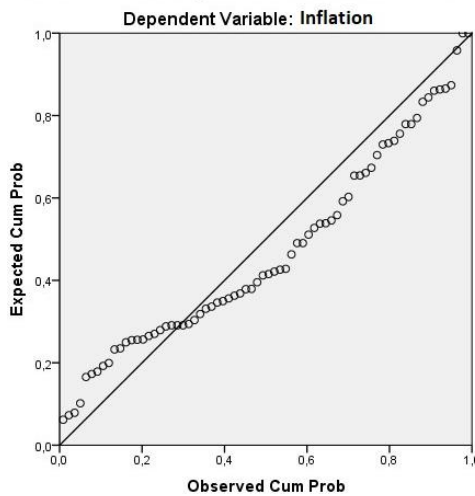


Figure 8. P-Plot of the Effect of Interest Rates on Inflation

3. Autocorrelation Test

In determining whether or not autocorrelation occurs, among others, by using the formula of "Durbin Watson > 4-dL". This means that if $DW > 4-dL$ means there is autocorrelation (Sarwono, 2012: 159-165). As for the autocorrelation test, dL and dU must be known in advance which can be seen in the Durbin-Watson Table. At 0.05 significance with n (number of data) = 72, the value of dL is 1.5895 and dU is 1.6457. The 4-dU value = $4 - 1.6457 = 2.3543$, while the 4-dL value = $4 - 1.5895 = 2.4105$. Based on the Durbin Watson values (Tables 2 to 8) for the regression results on the independent variable is entirely lower than the 4-dL value (2.4195). So that the regression model is entirely free from autocorrelation.

**Table 2. The Effect of Exchange Rates on Money Supply
Model Summary^b**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,705 ^a	,496	,489	5296,15429	,922

a. Predictors: (Constant), Exchange rate of USD to IDR

b. Dependent Variable: The amount of money supply

**Table 3. The Effect of E-Money on Money Supply
Model Summary^b**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,881 ^a	,776	,773	3533,72391	,373

a. Predictors: (Constant), E-money

b. Dependent Variable: Money Supply

**Table 4. The Effect of Interest Rates on Money Supply
Model Summary^b**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,310 ^a	,096	,083	7095,01181	,010

a. Predictors: (Constant), Interest Rates

b. Dependent Variable: Money Supply

**Table 5. The Effect of Exchange Rates on Inflation
Model Summary^b**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,008 ^a	,000	-,014	,58326	1,391

a. Predictors: (Constant), Exchange Rate of USD to IDR

b. Dependent Variable: Inflation

**Table 6. The Effect of E-Money on Inflation
Model Summary^b**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,112 ^a	,013	-,001	,57957	1,407

a. Predictors: (Constant), E-money

b. Dependent Variable: Inflation

Table 7. The Effect of Interest Rates on Inflation Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,108 ^a	,012	-,002	,57983	1,401

a. Predictors: (Constant), Interest Rates

b. Dependent Variable: Inflation

Table 8. The Effect of Money Supply on Inflation Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,127 ^a	,016	,002	,57853	1,417

a. Predictors: (Constant), Money Supply

b. Dependent Variable: Inflation

Hypothesis testing

T test

Considering that all the hypothetical models of this study were partial models, a t test (not an F test) was carried out with the following results:

Table 9. The Effect of Exchange Rates on Money Supply Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	10385,807	3736,889		2,779	,007		
	Exchange rate of USD to IDR	2,488	,300	,705	8,306	,000	1,000	1,000

a. Dependent Variable: The amount of money supply

Table 9 illustrates the effect of the exchange rate on the amount of money supply; it appears that the value of t count is 8.306. This value of t count will be compared with the value of t table. At the position of the amount of data (n) = 72, and a significance value which is 0.05, the t table value is 1.99348. Means that t count (8.306) > t table (1.99348). In addition, the significance value of t is calculated (0.00) < significance value that has been set (0.05). Based on the two indicators proven, the exchange rate partially has a positive and significant effect on the money supply. The results of this study are in accordance with hypothesis 1 of this study which presumes that the exchange rate has a positive effect on money supply.

Table 10. The Effect of E-Money on Money Supply Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	27088,415	985,400		27,490	,000		
	E-money	,000	,000	,881	15,562	,000	1,000	1,000

a. Dependent Variable: The amount of money supply

Table 10 illustrates the effect of e-money on the amount of money supply; it appears that the value of t count is 8.306 > t table (1.99348). In addition, the significance value of t is calculated (0.00) < significance value that has been set (0.05). Based on these two indicators, it is evident that e-money partially has a positive and significant effect on the money supply. The results of this study are in accordance with hypothesis 2 of this study which presumes that e-money has an effect on the money supply.

Table 11. The Effect of Exchange Rate on Money Supply Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	53453,596	4645,938		11,505	,000		
	Suku Bunga	-1976,033	724,371	-,310	-2,728	,008	1,000	1,000

a. Dependent Variable: The amount of money supply

Table 11 illustrates the influence of interest rates on the amount of money supply; it appears that the value of t count is -2,728 which means smaller (negative) than > t table (1,99348). In addition, the significance value of t count (0.08) > significance value that has been set (0.05). Based on these two indicators it is evident that the interest rate partially has a negative effect but not significant on the money supply. The results of this study are in accordance with hypothesis 3 of this study which presumes that e-money has a negative and significant effect on the money supply.

Table 12. The Effect of Exchange Rate on Inflation Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	,446	,412		1,084	,282		
	Kurs USD ke IDR	-2,156E-6	,000	-,008	-,065	,948	1,000	1,000

a. Dependent Variable: Inflation

Table 12 illustrates the effect of the exchange rate on inflation; it appears that the value of t count is -0.65 which means smaller (negative) than > t table (1.99348). In addition, the significance value of t count (0.948) > significance value that has been set (0.05). Based on these two indicators, the exchange rate partially has a negative but not significant effect on inflation. The results of this study are in accordance with hypothesis 4 of this study which presumes that the exchange rate has a negative effect on inflation.

Table 13. The Effect of E-Money on Inflation Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	,558	,162		3,453	,001		
	E-money	-3,634E-9	,000	-,112	-,947	,347	1,000	1,000

a. Dependent Variable: Inflation

Table 13 illustrates the effect of e-money on inflation; It appears that the value of t count is -0.947 which means smaller (negative) than > t table (1.99348). In addition, the significance value of t count (0.347) > significance value that has been set (0.05). Based on these two indicators, it is evident that e-money partially has a negative but not significant effect on inflation. The results of this study are not in accordance with hypothesis 5 of this study which presumes that e-money has a positive effect on inflation.

Table 14. The Effect of Exchange Rate on Inflation Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	,078	,380		,207	,837		
	Suku Bunga	,054	,059	,108	,913	,364	1,000	1,000

a. Dependent Variable: Inflation

Table 14 illustrates the effect of interest rates on inflation; it appears that the value of t arithmetic is 0.913 which means it is smaller than > t table (1.99348). In addition, the significance value of t count (0.364) > significance value that has been set (0.05). Based on these two indicators, the interest rates partially have a positive but not significant effect on inflation. The results of this study are not in accordance with hypothesis 6 of this study which presumes that interest rate has a negative effect on inflation.

Table 15. The Effect of Money Supply on Inflation Coefficients^a

Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.	Collinearity Statistics
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		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	,827	,386		2,144	,036		
	Uang Beredar	-9,947E-6	,000	-,127	-1,073	,287	1,000	1,000

a. Dependent Variable: Inflation

Table 15 illustrates the effect of money supply on inflation; it appears that the value of t count -1,073 which means it is smaller than > t table (1,99348). In addition, the significance value of t count (0.287) > significance value that has been set (0.05). Based on these two indicators it is proven that the money supply partially has a negative but not significant effect on inflation. The results of this study are in accordance with the hypothesis 7 of this study which presumes that money supply has a negative effect on inflation.

Determination Coefficient Test (R²)

Determination coefficient test (R²) is to find out the independent variable affect on the dependent variable, or how the independent variable can explain the dependent variable. Following this the determination coefficient test results are terminated for the seven research models.

1. Based on Table 2 the *adjusted R square* value is 0.489 or 48.9%. Exchange rates affect the money supply by 48.9%. In other words, the money supply can be explained by the exchange rates of 48.9%, which means the rest (100% -48.9% = 51.1%) is explained by other independent variable out of the exchange rates variable.

2. Based on Table 3 the *Adjusted R square* value is 0.773 or 77.3%. *E-money* has an effect on the money supply amounting to 77.3%. In other words, the money supply can be explained by *e-money* by 77.3%, which means the rest (100% -77.3% = 22.7%) is explained by other independent variables out of the *e-money* variable.

3. Based on Table 4 the *Adjusted R square* value is 0.083 or 8.3%. Interest rates affect the money supply by 8.3%. In other words, the money supply can be explained by an interest rates of 8.3%, which means the rest (100% -8.3% = 91.7%) is explained by other independent variables out of the interest rates variable.

4. Based on Table 5 the *Adjusted R square* value is -0.014 or -1.4%. Exchange rates has a negative effect on inflation of -1.4%. In other words, inflation can be explained by a rate of -1.4%, which means the rest (100% - (-1.4%) = 98.4%) is explained by other independent variables out of the exchange rates variable.

5. Based on Table 6 the *Adjusted R square* value is -0.001 or -0.1%. *E-money* has a negative effect on inflation of -0.1%. In other words, inflation can be explained by *e-money* by -0.1%, which means the rest (100% - (-0.1%) = 98.9%) is explained by other independent variables out of the *e-money* variable.

6. Based on Table 7 the *Adjusted R square* value is -0.002 or -0.2%. Interest rates affect inflation by -0.2%. In other words, the money supply can be explained by an interest rates of -0.2%, which means the rest (100% - (-0.2%) = 99.8%) is explained by other independent variables out of the interest rates variable.

7. Based on Table 8 the *adjusted R square* value is 0.002 or 0.2%. Money supply affects inflation. In other words, inflation can be explained by money supply of 0.2%, which means the rest (100% -0.2% = 99.8%) is explained by other independent variables out of the money supply variable.

Discussion

From various analysis and test conducted, the result can be concluded are:

The result shows that the exchange rates have a positive and significant effect on the money supply that the result of this study is in accordance with hypothesis no. 1. The result of this study is also in accordance with the result of research by Luwihadi and Arka (2017) that explained the exchange rates has a positive and significant effect on money supply. The same thing is revealed by the result of the study of Triyono (2008), Fahmi (2012).

The result of the study shows that *e-money* has a positive and significant effect on the money supply that the result of this study is in accordance with the hypothesis. The result of this study corroborates the result of the study of Abednego Priyatama & Apriansh (2010) which proved that *e-money* circulates can increase the velocity of money.

The result shows that interest rates have a negative effect, but it is not significant on the money supply that the result of this study is in accordance with hypothesis no. 3. The result of this study is also in accordance with the result of research by Luwihadi and Arka (2017) which proved that interest rates have a negative and significant effect on money supply. Likewise, the research of Febiansyah (2011) and Aprileven (2015) showed the phenomenon of negative relations in it.

The result shows that the exchange rates has a negative effect, but it is not significant to inflation that the result of this study is in accordance with hypothesis no. 4. The result of this study is in accordance with the result of the study of Langi *et al.* (2014) which proved that the exchange rates have a positive effect, but it is not significant. But this result is contrary to the result of research by Luwihadi and Arka (2017) which proved that the exchange rates has a positive and significant effect on the inflation rates.

The result shows that *e-money* partially has a negative but not significant effect on inflation as well as it is not in accordance with hypothesis no. 5. The result of this study is also contrary to the result of research by Clara and Yuwono (2017) which proved that in the long and short run, ATM / credit card transactions and credit transaction volumes affect inflation in Indonesia for the period of 2009 to 2016.

The result of the study indicates that interest rates has a positive effect, but it is not significant on inflation. The result of this study is not in accordance with hypothesis no.6. The result of the study is in accordance with the result of the study of Langi *et al.* (2014), and Luwihadi & Arka (2017) which proved that interest rates has a positive and significant effect on the inflation rates. However, the result of the study is contrary to the result of the research of Hidayat (2012) and Magaline (2006) which showed that interest rates has a negative and significant effect on inflation. Meanwhile, the results of Yodiatmaja's (2012) study found that the BI rate has an indirect effect on inflation, because it has to go through several other macroeconomic variables which continue to inflation.

The result shows that money supply has a negative but not significant effect on inflation that the result of this study is in accordance with hypothesis no. 7. The result of this study is contrary to a number of previous studies, such as Nguyen (2015), Utami and Soebagiyo (2013), Sukirno (2012), Sofilda (2005), Magaline (2006), and Bose (1996) which revealed that money supply has a positive effect on inflation. In contrast to the research of Langi *et al.* (2014) that proved that the money supply has a positive but not significant effect.

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