

CHAPTER IV

RESULT AND ANALYSIS

4.1. Data description of research variables

The research data was taken from 2009 to 2018, it took from the central statistical agency (BPS) and the Indonesian economic and financial statistics (SEKI) bank Indonesia. The research used secondary data, in the form of banking statistics obtained from the financial services authority (OJK) and published by Bank Indonesia. Descriptive statistical data describes all variables used in the research model, it shows the minimum value, maximum value, and average value of the variable: money demand (M2), inflation, interest rate, industrial production index (IPI), equivalent rate, exchange rate and third party funds (DPK). For more details, it can be seen below:

Table 4.1 Descriptive statistics

	M2	INF	INTRATE	IPI	EQRATE	EXRATE	DPK
Mean	3828860.	4.865000	6.166667	117.0893	7.010083	11648.99	4.537417
Median	3880797.	4.435000	6.500000	114.7050	6.835000	11984.50	4.940000
Maximum	6730197.	8.790000	8.750000	148.0500	10.77000	15295.00	6.640000
Minimum	1089011.	2.170000	4.250000	91.58000	4.760000	8481.000	2.130000
Std. Dev.	1300141.	1.718723	1.185227	15.69564	1.482975	2009.099	1.228318
Skewness	-0.043612	0.546282	-0.192509	0.275699	0.652547	-0.155452	-0.461644
Kurtosis	1.819228	2.168135	2.064070	1.916502	2.773071	1.519772	2.049984
Sum	4.59E+08	583.8000	740.0000	14050.71	841.2100	1397879.	544.4900
Sum Sq. Dev.	2.01E+14	351.5272	167.1667	29316.02	261.7065	4.80E+08	179.5431
Observations	120	120	120	120	120	120	120

Source: data processed

Based on data from Bank Indonesia, money demand has an upward trend from 2009 to 2018. In January 2009, money demand in Indonesia was valued at Rp. 1,089,011 billion, whereas in December 2018 money demand in Indonesia reached

Rp. 6,730,197 billion. The average money demand was 3,828,860 billion with a standard deviation of 1,300,141 billion.

Inflation variable shows that, during the research period has a minimum value of 2.17%, meaning that the consumer price index has increased by 2.17% compared to the consumer price index in the base year. In this condition the prices of goods tend to increase with a slight increase. The maximum value of 8.79 means that during the study period the largest inflation rate was 8.79%. The average value of the inflation variable is 4.865 meaning that during the research period there was an average increase in inflation of 4.865% from the base year price index. where the prices of goods have increased an average of 4.865% compared to the base year. Meanwhile, the standard deviation of 1.718 means that during the study period, the spread of Inflation variable was 1.718 out of 120 observations observed.

Interest rate variable shows the policy rate with a one-month tenor determined by Bank Indonesia periodically, as a signal of monetary policy for a certain period and announced to the public. Descriptive analysis of the interest rate variable shows that, during the study period this variable has an average value of 6.166% and a standard deviation of 1.166%. This shows that the interest rate set by Bank Indonesia is 6.166%, with the lowest value of 4.25% and the highest of 8.75%. The standard deviation value is lower than the average value indicating that the fluctuation of interest rate during the study period is quite stable.

The Industrial Production Index (IPI) is an economic indicator released by the board of the US Federal Reserve Bank, which measures changes in the value of total inflation adjusted for production output. Based on Table 4.1. it can be seen

that the development of the industrial production index in Indonesia has a minimum value of 91.58%, a maximum value of 148.05% with an average of 117.08% and a standard deviation of 15.695%. The development of the industrial production index shows the production of goods and services in Indonesia rose with an average increase of 117.08%, indicating increased economic growth.

Equivalent rate is the rate of return on investments that have been invested. The role of equivalent rates is the same as the interest in conventional banks, which gives an idea of how much the return on investment is invested. Equivalent rate is calculated by the bank at the end of the month, after the investment gives a profit. In this research, the equivalent rate variable shows an average value of 7.010%, meaning that during the research period, there was an increase in return on investment provided by the bank to customers. Meanwhile, the standard deviation of 1.482% indicates the spread of the variable equivalent rate of 1.482 from 120 observations.

The exchange rate variable shows the amount of domestic currency needed to obtain a foreign currency, measured by the value of the rupiah per one US dollar. Descriptive analysis of the exchange rate variable shows that, during the study period the exchange rate of the rupiah against the dollar was Rp. 11,648.99. Meanwhile, the standard deviation of 1.1852 means that the spread of the exchange rate variable is 1.185227 from 120 observations.

Third party funds are sourced from the society, because they are the largest source of funds relied on by banks. The bank channeled these funds to generate revenue, banks channel their funds in the form of financing. The greater the income

generated by banks, indicating the greater the opportunity for banks to generate profits. Thus, banks will be increasingly active in raising the distribution of funds to the society. In this research, the average value generate by third party fund was 4.537% and standard deviation 1.228%. This means that the amount of third party funds owned by the Bank is quite high. An increase in third party funds shows that, the society believes to invest or save their money in Islamic banks. As an intermediary, the basic step to optimally collect third party funds is by identifying and analyzing the factors that influence the development of third party funds. The high percentage of profit sharing rate is a factor of attraction for customers to save their funds, in addition to the safety factor of applying sharia principles, and the quality of service becomes a consideration for fund owners to save funds.

4.2. Results of error correction model (ECM) data analysis

4.2.1. Stationarity data test

The first stage: unit root test to find out whether certain coefficients have unit roots or not. In this observation using Augmented Dickey Fuller (ADF). To see the stationarity of a time series data by comparing statistics with Mac Kinnon Critical Value at = 1%; 5% and 10%. If at the level the data is not stationary, then it will proceed to the integration degree test at the first difference level.

Table 4.2 The result of unit root test (at level)

Variable	Value ADF t statistic	Prob.*	Explanation
M2	-0.056199	0.9506	Not Stationary
INF	2.126552	0.9999	Not Stationary
IPI	-0.195938	0.9347	Not Stationary
INTRATE	-1.703877	0.4267	Not Stationary
EQRATE	-2.207590	0.2048	Not Stationary
EXRATE	-2.070144	0.2571	Not Stationary
DPK	0.089332	0.9636	Not Stationary

Source: Data processed

The table above shows that, money demand (M2), inflation, interest rate, industrial production indeks (IPI), equivalent rate, exchange rate and third party fund (DPK) are not stationary at level. It is indicated by the augmented dickey fuller value t-statistic smaller than the critical value of MacKinnon at a significance level of 5% or a probability smaller than 0.05. Thus, it is necessary to test the degree of integration at first difference.

4.2.2. Integration degree test

Based on the above results, the augmented dickey fuller test will be continued at the first difference level.

Table 4.3 Result augmented dickey fuller test (at first difference)

Variable	Value ADF t statistic	Prob.*	Explanation
M2	-8.956735	0.0000	Stationary
INF	-15.29296	0.0000	Stationary
IPI	-11.40974	0.0000	Stationary
INTRATE	-11.43494	0.0000	Stationary
EQRATE	-11.08068	0.0000	Stationary
EXRATE	-12.00616	0.0000	Stationary
DPK	-11.11692	0.0000	Stationary

Source: Data processed

The results of the integration degree test above, it can be seen that all variables stationary at first difference. It is indicated from the augmented dickey fuller value of money demand, inflation, interest rate, index production industry (IPI), equivalent rate, interest rate and third party fund greater than the critical value of MacKinnon. Data shows the probability value (p-value) of each variable smaller than critical values (5%).

4.2.3. Cointegration test

Co-integration test is a continuation of unit root and integration degree test, to find out whether there is a long-term relationship or not between variables. There are three ways to test co-integration, namely: Engle Granger (EG), Co-integrating Regression Durbin Watson (CRDW) and Johansen test. Currently the most widely used is the Johansen test, the following are the co-integration test results from the data used. Co-integration test using the Residual Based Test method.

a. Johansen cointegration test

The results of co-integration test, if the value of the trace statistic and max eigenvalue statistic are greater than the critical value of 0.05. It can be concluded that there is a co-integration between dependent and independent variables. The following table shows the results of Johansen's co-integration:

Table 4.4 Cointegration johansen test

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.322720	129.9645	125.6154	0.0265
At most 1	0.268438	85.15237	95.75366	0.2141
At most 2	0.134332	49.20650	69.81889	0.6719
At most 3	0.122956	32.61735	47.85613	0.5780
At most 4	0.079994	17.52955	29.79707	0.6009
At most 5	0.066707	7.941377	15.49471	0.4717
At most 6	1.99E-05	0.002287	3.841466	0.9599

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
 * denotes rejection of the hypothesis at the 0.05 level
 **MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.322720	44.81211	46.23142	0.0705
At most 1	0.268438	35.94587	40.07757	0.1358
At most 2	0.134332	16.58915	33.87687	0.9365
At most 3	0.122956	15.08780	27.58434	0.7412
At most 4	0.079994	9.588174	21.13162	0.7823
At most 5	0.066707	7.939090	14.26460	0.3849
At most 6	1.99E-05	0.002287	3.841466	0.9599

Source: Data processed

Based on the result above, the trace statistic test and Max Eigenvalue Statistic, shows the existence of co-integration at the significance level = 5%, especially in the variable at most 1. Hence, it can be concluded that the independent variables have a long-term relationship to the dependent variable.

b. Co-integration residual based test

Co-integration tests are intended to test whether regression residuals are stationary or not (Engle and Granger, 1987). If there is one or more different degrees of integration, the variable cannot be co-integrated (Engle and Granger, 1987). In general, most discussions are focus on variables that have zero or one integration.

If it is directly stationary, it can be stated that between independent and dependent variables are co-integrated at zero or denoted by I (0). Yet, if it is stationary on the first distinction, then the two variables are co-integrated at the first degree or denoted by I (1).

Engle-Granger co-integration test to estimate the long-term relationship between Inflation, Interest Rate, index production industry, Equivalent rate, Exchange rate, Third Party Funds (DPK) and money demand (M2). The first stage is to regress the ordinary least square (OLS) equation between the dependent and the independent variable. Then, regressing the equation, we get the residual from the equation. The residual augmented dickey fuller (ADF) test is stationary at level or I (0), thus it can be said that the variables used tend to go towards equilibrium in the long run, even though at the level there are variables that are not stationary.

Table 4.5 Engle granger cointegration test regression value

Null Hypothesis: D(RESID) has a unit root
 Exogenous: Constant
 Lag Length: 3 (Automatic - based on SIC, maxlag=12)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-8.921561	0.0000
Test critical values:		
1% level	-3.488063	
5% level	-2.886732	
10% level	-2.580281	

Source: Data processed

Based on the table above, it is known that the augmented dickey fuller (ADF) t-statistic value is greater than the critical value of MacKinnon at the real level of 5% and 10%, so that the residual stationary regression equation is at the level. Thus, the residual does not contain unit roots, it can be interpreted that the variables used in this research have a long-term or co-integrated relationship.

4.3. Classical assumptions test

The test intended to detect the presence or absence of multicollinearity, heteroscedasticity, normality and autocorrelation in the estimation results. If there is a distortion from the classical assumption, the t-test and F-test performed are invalid and statistically damaging the conclusions obtained. In other words, the regression results have met the rules of Best Linear Unbiased Estimator (BLUE) so that, there is no classical assumption disorder in the ordinary least square method namely; multicollinearity, heteroscedasticity, autocorrelation and normality test.

4.3.1. Classical assumptions of multicollinearity, heteroscedasticity, autocorrelation and normality test

a. Multicollinearity test

Multicollinearity is the occurrence of high Intercorrelations among independent variables in a multiple regression model. Multicollinearity can lead to skewed or misleading results when a researcher or analyst attempts to determine how well each independent variable can be used most effectively to predict or understand the dependent variable in a statistical model. In general, multicollinearity can lead to wider confidence intervals and less reliable probability values for the independent variables. That is, the statistical inferences from a model with multicollinearity may not be dependable.

Table 4.6 The result of multicollinearity test

Correlation t-Statistic Probability	INF	INTRATE	IPI	EQRATE	EXRATE	DPK
INF	1.000000 ---- ----					
INTRATE	-0.002939 -0.031928 0.9746	1.000000 ---- ----				
IPI	0.045678 0.496713 0.6203	-0.488340 -6.078853 0.0000	1.000000 ---- ----			
EQRATE	0.220887 2.460213 0.0153	0.111461 1.218366 0.2255	-0.246542 -2.763435 0.0066	1.000000 ---- ----		
EXRATE	-0.100992 -1.102694 0.2724	-0.235481 -2.631991 0.0096	0.607699 8.312227 0.0000	-0.008069 -0.087657 0.9303	1.000000 ---- ----	
DPK	0.102763 1.122236 0.2640	-0.451636 -5.498772 0.0000	0.664916 9.670189 0.0000	-0.051081 -0.555604 0.5795	0.521499 6.639221 0.0000	1.000000 ---- ----

Source: Data processed

Based on the table above, it can be seen that all independent variables do not have the correlation coefficient > 0.85 . Thus, there is no Multicollinearity problem.

b. Heteroscedasticity test

To determine the presence of heteroscedasticity, the White test was implemented. By comparing, the chi squares count (χ^2) is smaller than the critical value of chi squares (χ^2). Then the alternative hypothesis of heteroscedasticity in the model is rejected. The method to detect the presence of heteroscedasticity in this research using White Test. Heteroscedasticity testing done with the eviews 9 program, and the regression results are obtained as below:

Table 4.7 The results of heteroscedasticity test

Model	Heteroscedasticity test: White			
Short term	F-statistic	1.126062	Prob. F(7,111)	0.3520
	Obs*R-squared	7.890228	Prob. Chi-square (7)	0.3424
Long term	F-statistic	0.300576	Prob. F(6,113)	0.9354
	Obs*R-squared	1.885089	Prob. Chi-square (6)	0.9300

Source: Data processed

Detection of heteroscedasticity through the White Test. the steps are as follows:

Hypothesis:

H_0 : Heteroscedasticity does not occur

H_1 : Heteroscedasticity occurs

Decision making criteria:

- If the probability $Obs*R < 0,05 \rightarrow H_0$ rejected, heteroscedasticity occurs
- If the probability $Obs*R \geq 0,05 \rightarrow H_0$ accepted, heteroscedasticity does not occur

Based on the result table 4.7 shows that, in short term R-squared was 7.890228 and probability. Chi-square was 0.3424. Meanwhile, in long term R-squared was 1.885089 and probability chi-square was 0.9300 greater than $\alpha = 0,05$. It is mean that H_0 is rejected (heteroscedasticity does not occur).

c. Autocorrelation test

To detect autocorrelation problems, the LM test is used. It is very useful for identifying autocorrelation problems, not only in the first degree but also at the degree level. If the LM test results are in the null hypothesis (H_0); the value of chi

squares calculated (χ^2) < than the critical value of chi squares (χ^2), it can be concluded that the estimation model does not have autocorrelation and vice versa.

Table 4.8 The result of autocorrelation test

Model	Breusch-godfrey serial correlation LM-test			
Short term	F-statistic	1.215255	Prob. F(12,99)	0.2835
	Obs*R-squared	15.27855	Prob. Chi-square (12)	0.2266
Long term	F-statistic	1.612066	Prob. F(12,101)	0.0999
	Obs*R-squared	19.28937	Prob. Chi-square (12)	0.0818

Source: Data processed

Testing of autocorrelation using the Breusch-Godfrey Serial Correlation LM Test, table 4.8 showed that, F-statistic 1.215255 and the result of probability 0.2266 greater than $\alpha = 0,05$ in short term. Meanwhile, in long term F-statistic 1.612066 and the probability 0.0818. It can be concluded that, the resulting equation does not contain autocorrelation problem.

d. Normality test

Jarque Bera normality test to determine whether the error term detects a normal distribution (Gujarati, 1995). The results of the normality test can be seen below:

Table 4.9 The Results of Normality test Jarque-Bera Statistic

Model	JB-Test	Sig	explanation
Short term	2.749507	0.252902	Normal
Long term	5.21212	0.073825	Normal

Source: Data processed

In the normality test using Jarque-Bera, it shows the probability of 0.252902 in short term and 0.073825 in long term is greater than $\alpha = 0.05$. Hence, the equation can be said to be normally distributed.

4.4. Short-term regression model

Error Correction Model is a testing method used to find a balance model in the long run. If in the short term there is disequilibrium, but in the long run experiencing balance, then these differences need to be corrected by the ECM with an adjustment of the Error Correction Term (ECT). To state whether the ECM model used is correct or not, the Error Correct Term (ECT) coefficient must be significant. If the coefficient is not significant, it means that the model is not suitable and needs further changes (Insukindro, 1993, 12). The ECT value is used to find short and long term coefficient differences. Therefore, this value is often called disequilibrium error. The results of processing data using eviews, with a linear regression error correction model (ECM) as follows:

Table 4.10 The results of short term model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-6208.743	75976.76	-0.081719	0.9350
D(INF)	118728.6	52367.80	2.267207	0.0253
D(INTRATE)	-163257.1	96143.07	-1.698064	0.0923
D(IPI)	38875.36	9067.596	4.287284	0.0000
D(EXRATE)	222.2542	47.37450	4.691431	0.0000
D(EQRATE)	213272.7	49298.35	4.326163	0.0000
D(DPK)	262532.0	86037.01	3.051385	0.0029
ECT(-1)	-0.842784	0.093887	-8.976616	0.0000
Adjusted R Squared	0.761720			
F Statistic	54.88783			
Prob (F-Statistic)	0.00000			

Source: Data processed.

Based on the estimation of the dynamic ECM model, the OLS regression function as follows:

$$\Delta M2 = -6208.743 + 118728.6\Delta INF - 163257.1 \Delta INTRATE + 38875.36 \Delta IPI + 222.254\Delta EXRATE + 213272.7\Delta EQRATE + 262532.0\Delta DPK - 0.842784 ECT(-1)$$

Error correction model (ECM) is used to test the short-term relationship, which is seen from the regression equation by estimating the dynamics of Error Correction Term (ECT). Based on the ECM dynamic model estimation results above, it can be seen that the error correction term (ECT) variable is significant at 5%, the probability is $0.0000 < 0.05$ and the coefficient with a negative sign (-0.842784), the model specifications are correct and can explain variations in dependent variable. The results show that the balance value of -0.842784 means that the process of adjusting for the imbalance of money demand (M2) in Indonesia in the period 2009.1-2018.12 is relatively fast, or around 0.842784 the mismatch between the actual growth of money demand (M2) and the growth of money demand (M2) is estimated will be removed in one period.

The estimated results of the dynamic model of the short-term equation Error Correction Model of Two Sted-Enged Granger (ECM-G), will be explained through simultaneous significance testing (F-statistic test), testing the adjusted R squared coefficient (adjusted R squared) and test significant individual parameters (t-statistic test).

a. Simultaneous significance test (F-statistical test)

For the overall parameter significance test, it is known that the F-statistic is 54.88783 with a probability (F-statistic) of $0.0000 < (\text{level of significance of } 5\%)$. It is showed that, changing all independent variables in the model has a significant effect on changing the value of the dependent variable, simultaneously.

b. Adjusted determination coefficient (Adjusted R Squared)

Based on the estimation results of the ECM-G dynamic model equation, the short-term equation can be seen the adjusted Determination coefficient value of 0.76172, meaning that the ability of the independent variable in explaining changes in the value of the dependent variable is 76.17% and the remaining 23.83% is affected by other factors outside the model.

c. Significance test of individual parameters (t-statistical test)

- The effect of the inflation variable on money demand (M2), through the t statistical test shows a positive coefficient of 118728.6 with t-statistical value of 2.267207, and a probability value of 0.0253 which is significant at $\alpha = 5\%$. This shows that in the short term the inflation variable has a positive and significant effect on the money demand variable (M2) in Indonesia. the first hypothesis is accepted.
- The effect of the interest rate variable on money demand (M2) through the t-statistic test shows a negative coefficient of -163257.1, with t-statistical value of -1.698064 and a probability value of 0.0923 which is not significant at $\alpha = 5\%$. These results indicate that, in the short term the interest rate variable has a negative and not

significant effect on the money demand (M2) variable in Indonesia, and the second hypothesis is rejected.

- The effect of industrial production index (IPI) variables on money demand (M2) through t-test statistics shows a positive coefficient of 38875.36 with a t-statistics value of 4.287284 and a probability value of 0.0000 which is significant at $\alpha = 5\%$. This shows that, in the short term the industrial production index (IPI) variable has a positive and significant effect on the money demand (M2) variable in Indonesia. The third hypothesis is accepted.
- The effect of exchange rate variables on money demand (M2) through the t-statistic test shows a positive coefficient of 222.2542 with a t-statistic value of 4.691431 and a probability value of 0.0000 which is significant at $\alpha = 5\%$. This shows that, in the short term the exchange rate variable has a positive and significant effect on the money demand variable (M2) in Indonesia. The fourth hypothesis is accepted.
- The effect of the equivalent rate variable on money demand (M2) through the t-test statistic shows a positive coefficient of 213272.7 with a statistical t value of 4.326163 and a probability value of 0.0000 which is significant at $\alpha = 5\%$. This shows that, in the short term the equivalent rate variable has a positive and significant effect on the money demand (M2) variable in Indonesia. The fifth hypothesis is accepted.

- The effect of third party fund (DPK) variables on money demand (M2) through t-test statistics shows a positive coefficient of 262532.0, with a t-statistic value of 3.051385 and a probability value of 0.0029 which is significant at = 5%. This shows that, in the short term the third party fund (DPK) variable has a positive and significant effect on money demand (M2) variable in Indonesia. The sixth hypothesis is accepted.

4.5. Long-term regression model

If the stationary residuals at degree (first difference), it can be concluded that there is a long term co-integration or variables having a long term relationship. The results are as follows:

Table 4.11 The results of long term model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3016843.	1142156.	-2.641358	0.0094
INF	135694.5	49056.19	2.766103	0.0066
INTRATE	-118967.1	78957.09	-2.506731	0.0047
IPI	19622.26	8279.294	2.370040	0.0195
EXRATE	199.0961	53.26432	3.737889	0.0003
EQRATE	161818.4	58622.44	2.760350	0.0067
DPK	257414.1	91518.98	2.812686	0.0058
Adjusted R Squared	0.558432			
F Statistic	26.08240			
Prob (F-Statistic)	0.0000			

Source: Data processed

Based on the estimation results of the long-term equation above, it is known that the adjusted coefficient of determination (Adjusted R Square) is 0.5584, meaning that the ability of the independent variable in explaining changes in the

value of the dependent variable is 55.84% and the remaining 44.16% is influenced by factors other factors outside the model.

The overall parameter significance test is known that the F-statistic is 26.08240 with a probability (F-statistic) of $0.0000 < (\text{level of significance of } 5\%)$. This shows that, the changes in all independent variables in the model have a significant influence on changes in the value of the dependent variable simultaneously.

Based on the estimation results of the table above, mathematical equations can be made as follows:

$$M2 = -3016843 + 135694.5 \text{ INF} - 118967.1 \text{ INTRATE} + 19622.26 \text{ IPI} + 199.0961 \text{ EXRATE} + 161818.4 \text{ EQRATE} + 257414.1 \text{ DPK}$$

The interpretation of the long term individual regression coefficient (t-test) is as follows:

- The effect of the inflation variable on money demand (M2), through the t-statistical test shows a positive coefficient of 135694.5 with t-statistical value of 2.766103, and a probability value of 0.0066 which is significant at $\alpha = 5\%$. This shows that in the long term the inflation variable has a positive and significant effect on the money demand variable (M2) in Indonesia. The first hypothesis is accepted.
- The effect of the interest rate variable on money demand (M2) through the t-statistic test shows a negative coefficient of -118967.1, with t-statistical value of -2.506731 and a probability value of 0.0047 which is significant at $\alpha = 5\%$. The results indicated that, in the long term the

interest rate variable has a negative and significant effect on the money demand (M2) variable in Indonesia. The second hypothesis is accepted.

- The effect of industrial production index (IPI) variables on money demand (M2) through t-test statistics shows a positive coefficient of 19622.26 with a t-statistics value of 2.370040 and a probability value of 0.0195 which is significant at $\alpha = 5\%$. This shows that, in the long term the industrial production index (IPI) variable has a positive and significant effect on the money demand (M2) variable in Indonesia. The third hypothesis is accepted.
- The effect of exchange rate variables on money demand (M2) through the t-statistic test shows a positive coefficient of 199.0961 with a t-statistic value of 3.737889 and a probability value of 0.0003 which is significant at $\alpha = 5\%$. This shows that, in the long term the exchange rate variable has a positive and significant effect on the money demand variable (M2) in Indonesia. The fourth hypothesis is accepted.
- The effect of the equivalent rate variable on money demand (M2) through the t-test statistic shows a positive coefficient of 161818.4 with a statistical t value of 2.760350 and a probability value of 0.0067 which is significant at $\alpha = 5\%$. This shows that, in the long term the equivalent rate variable has a positive and significant effect on the money demand (M2) variable in Indonesia. The fifth hypothesis is

accepted.

- The effect of third party fund (DPK) variables on money demand (M2) through t-test statistics shows a positive coefficient of 257414.1, with a t-statistic value of 2.812686 and a probability value of 0.0058 which is significant at = 5%. This shows that, in the long term the third party fund (DPK) variable has a positive and significant effect on money demand (M2) variable in Indonesia. The sixth hypothesis is accepted.

4.6. Discussion of research results

After statistical testing, it can be seen that the inflation variable, industrial production index (IPI), exchange rate, equivalent value, and third party funds (DPK) affect the demand for money, while the interest rate variable does not affect the demand for money (M2) in the short term. On the contrary, all variables affect money demand (M2) in the long term. The impact of independent variables on the dependent variable in the short term can be seen from the adjusted R squared value of 76.17%, while the remaining 23.83% is affected by other factors not mentioned in this research. Meanwhile, the value of adjusted R squared in the long run is 55.84%, this means that the ability of the independent variable in explaining changes in the value of the dependent variable is 55.84% and the remaining 44.16% is affected by other factors outside the model.

From the estimation results, the short term independent variable balance ability is higher (76.17%) compared to the long-term (55.84%). This is because in the dynamic long-term error correction model (ECM), a lag variable is included to

capture the short-term and long-term difference values. As the authors explained before, if a model with variables that co-integrates in the long term means that the variable experiences long-term balance. This condition of long-term balance does not guarantee a short-term variable balance. If the variables in the short term do not experience equilibrium, whereas in the long term in opposite position, then the difference needs to be corrected called Error Correction. In the Error Correction Model equation of -0.842784, it means that about 0.842 mismatch between the growth of the actual money money demand (M2) with the estimated growth in the money demand (M2) will be eliminated in one period.

From the results of the data analysis above, it will be explained the discussion on each independent variable as follows:

a. The effect of inflation on money demand (M2)

From the test results show that, in the short term and long term, inflation affects money demand with a probability of 0.0253 and 0.0066, respectively, smaller than $\alpha = 5\%$. While, coefficients of 118728.6 and 135694.5, respectively. Meaning that, the increasing of inflation by one percent affect the increase money demand (M2) by 118,8728.6 billion, and in the long term, every one percent increase in inflation raises money demand (M2) by 135,694.5 billion.

Inflation is a condition where there is a continuous increase in general prices, not an increase or two kinds of goods, but an increase in the price of most goods and services, and not only occurs one or two times the price increase, but continuously (Suparmoko, 2000). In general, inflation causes a number of social costs that must be borne by the society. Firstly, inflation has a negative impact on

income distribution. The lower income groups will continue to bear the burden of inflation with the decline in their purchasing power. Conversely, the middle class and above who have financial assets such as savings and deposits can protect their wealth from inflation, hence their purchasing power is relatively stable. Second, high inflation has a negative impact on economic growth. One of the policies in controlling inflation is monetary policy. policies taken by monetary authorities to influence monetary variables, money demand, interest rates and exchange rates. In general, monetary policy is the achievement of internal balance (internal balance) and external balance (external balance). Internal balance is usually indicated by the creation of a high work balance, achieving a high rate of economic growth and maintained a low inflation rate. On the other hand, internal balance is usually indicated by a balanced balance of payments (Insukindro, 1994: 204). Monetary policy implemented in developing countries is generally more severe and difficult, compared to developed countries. The first factor that causes it is that the duty of creating sufficient money supply thus the increase can be aligned with the course of development that requires strong discipline among monetary authorities and the government. Lack of capital and limited government revenue, often creates a strong urge to the government to borrow excessively from the Central Bank. Hence, the rate of increase in the money demand resulting in inflation.

Secondly, the Central Bank in developing countries must be more careful in overseeing the development of foreign exchange and export/import activities. The activities in this sector are easy to cause inflation, due to fluctuating prices of export raw materials, so that export activities experience irregular changes as a result of

ups and downs in export revenues, it will affect the occurrence of economic and monetary instability and national development. To maintain a low inflation rate, the government must suppress price increases, by suppressing the rate of increase in money demand. For example, by limiting lending or raising tight money policy. But the impact will be a decline in investment, and an increase in unemployment, which in turn will reduce national income.

Low inflation can drive the economy better through increasing national income therefore makes people excited to save money as well as investment activities. While hyperinflation, it leads to a worst economic situation, people are not eager to produce or invest. When inflation occurs means the money demand circulating in the society is overflow. According to Paunescu (200), states that the demand for money is influenced by inflation. The relationship between inflation and money demand is positive, if inflation rises then the money supply will rise and vice versa. These results are in line with the theoretical basis and hypothesis that an increase in inflation will increase money demand in Indonesia. In other words, the level of inflation in Indonesia is affected by the level of money demand that is circulated in a country. The findings of the study are in line with the findings of Adrian Sutawijaya (2012), in his research the money demand has a positive and significant effect on inflation. Furthermore, these findings are also in line with the results of research from Fery Magaline (2006) the effect of the interest rate and the money demand on the inflation rate in Indonesia, that it has a positive and significant effect on inflation in Indonesia.

b. The effect of interest rate on money demand (M2)

Interest rate variables in the short term shows a coefficient of -163257.1 and a probability of 0.0923 greater than $\alpha = 0.05$. Meanwhile, in the long term the coefficient is -118967.1 and the probability of 0.0047 lower than $\alpha = 0.05$, meaning that, the interest rate variable does not affect money demand (M2) in short term and interest rate variable has a negative and significant effect on money demand (M2) in long term. Therefore, an increase in interest rate of one percent in the long term, causes money demand will decrease by 118,967.1 billion and vice versa. Interest rates are not significant in the short term because society is sensitive to the current economic conditions. society is more rational in managing their funds, because of unexpected economic fluctuations hence people prefer to hold their portfolios (assets) rather than keep their money in the bank. The long-term results are consistent with economic theory that the relationship between interest rates and money demand is negative. The results of this study are also in accordance with Keynes's theory of money demand. According to Keynes, there is a negative relationship between the demand for money for speculative purposes and the interest rate.

An interest rate is the percentage of principal charged by the lender for the use of its money. The principal is the amount of money lent. As a result, banks pay you an interest rate on deposits. They are borrowing that money from you. Anyone can lend money and charge interest, but it's usually banks. They use the deposits from savings or checking accounts to fund loans. They pay interest rates to encourage people to make deposits. Banks charge borrowers a little higher interest

rate than they pay depositors so they can profit. At the same time, banks compete with each other for both depositors and borrowers. The resulting competition keeps interest rates from all banks in a narrow range of each other.

Interest rates are a measure of the economic activities of a country, which impacts on the activities of the banking financial flow, inflation, investment and currency movements in a country. In countries such as America, the United Kingdom and members of the European Union, are the countries that have the largest currency in exchange transactions. Economic activity that occurs in countries has a fundamental influence on economy world.

Interest rate is the value of profits given to investors from the use of investment funds on the basis of calculating the economic value within a certain time period. Interest rates are used to control a country's economy. Interest rates are set and determined by the government aims to maintain the sustainability of a country's economy, it is important to be taken into account because investors always expect greater investment returns. Determination of interest rates determined by bank Indonesia, with a one-month tenor announced periodically for a certain period of time as a signal or monetary policy stance (Puspoproto, 2004: 60).

According to Aldrin and Susi (2009), interest rates are costs that must be paid by borrowers for loans received (in return for lenders for their investments). The interest rate is also a monetary policy stance set by Bank Indonesia and announced to the public. Bank Indonesia in general will raise the interest rate (BI rate), if inflation rises hence it will increase money demand. If interest rates decline, people will tend to apply for loans to financial institutions. This causes the money

circulating in the society will tend to increase. However, if interest rates are high, people tend to compete to save their income in the bank. Thus, the money in circulation will be reduced due to high public interest to save money in the bank.

Setiadi (2012), the interest rate variable in the short run has no significant impact and long run has a negative and significant impact on the demand for money in Indonesia. The variable interest rate in short run is not significant, while in long run are significant impacts on demand for money in Indonesia. Bank Indonesia as the monetary authority in Indonesia hopes to maintain monetary stability through a guard against inflation, as the research results in both the short and long run of inflation significantly influence the demand for money in Indonesia.

According to the theory of liquidity preference states that between interest rates and money demand has a negative relationship. If interest rates increase, the money demand will decrease. Conversely, if money demand rises, interest rates decrease (Lipsey et al, 1995: 234 in Susanti, 2011: 9). Aprileven's research results (2015), stated that interest rates have a negative and significant effect on the money demand, if interest rates increase, the money demand decrease in the community. If the government sets high interest rates, it is expected that the public will be careful in using money or the level of consumption of the society will be reduced, as to reduce the money demand in circulation.

Money demand conditions are dominated by the influence of interest rates and inflation. This refers to the theory of interest rate transmission which explains that the role of the monetary sector is still quite important in controlling the amount of money in circulation. The government through the central bank control the

economy in Indonesia. Economic growth is quite influential on interest rates, inflation and the amount of money in circulation.

c. The effect of industrial production index on money demand (M2)

From the test results shows that, in short term and long term, the industrial production index (IPI) affect money demand (M2) with a probability of 0.0000 and 0.0195, respectively, less than $\alpha = 5\%$, and the coefficients 38875.36 and 19622.26, respectively. In the short term, an increase in the industrial production index by one percent will increase money demand by 38,875.36 billion, and in the long term an increase of one percent in the industrial production index (IPI) increases money demand (M2) by 19,622.26 billion.

Industrial Production is monthly data that measures the total production of all factories, mining, and public service companies (electricity, water, gas, transportation, etc.). The Industrial Production Index (IPI) is an economic indicator released by the board of the US Federal Reserve Bank, which measures changes in the value of total inflation adjusted for production output. The index usually does not include the construction industry. Industrial production index (IPI) is usually set to measure the increase and decrease in production. The higher the industrial production index (IPI), the greater the production of goods and services. If the production of goods and services in the country higher, it also indicates that the country's economic growth is increasing. Increased economic growth causes an increase in money demand (M2).

In industrial societies, the value of transactions and the velocity of money are relatively higher compared to agrarian societies, because the production process

requires more money in a short time. On the contrary, agrarian societies require a longer production time (harvest) and the amount of money used is also relatively smaller. As a result, the money in circulation will tend to be smaller.

d. The effect of exchange rate on money demand (M2)

The test results show that, in the short term and long term the exchange rate has a positive and significant effect on money demand with a probability of 0.0000 and 0.0003, respectively, smaller than $\alpha = 5\%$, and the coefficients of 222.2542 and 199.0961, respectively. Meaning that, in the short term the increasing of exchange rate by one thousand rupiah raises money demand (M2) by 222,2542 billion, while in the long term, every one thousand rupiah increase in the exchange rate, affect the raising of money demand (M2) by 199,0961 billion. The results indicated the higher the exchange rate, the more the money demand (M2) needed. The results of this research are in accordance with Suprianta (2007), where the exchange rate has a positive and significant effect on the money demand, means that if the dollar exchange rate increases, the amount of money circulating in the society will increase.

Nominal exchange rate is defined as the price of a currency in terms of another currency. In parallel, real currency exchange rate should be defined as the price of the currency in real terms. In the literature and textbooks, however, it is defined as the relative price levels between two countries, rather than how much the currency can purchase in real terms.

The objectives of monetary policy are to achieve economic growth, prices, interest and balance of payments, and to achieve employment opportunities. One

monetary policy that can be used to control finances by maintaining currency exchange rates. In an open budget, a currency for transit is required. The US Dollar Exchange Rate is the world currency used as an international transaction tool in all countries. This is because the US dollar is a currency that can be converted (accepted and accepted by the whole world as a means of payment).

The exchange rate is one indicator that shows the economy of a country is better than other countries. The higher exchange rate shows it has a better economy than other countries. According to Ismawati (2013), the exchange rate is defined as the price of a new currency, the exchange rate as one of the most important prices in the economy and other macroeconomic variables. The United States is the dominant trading partner in Indonesia so that when the rupiah is unstable against the US dollar, it will disrupt trading and cause economic losses due to trading valued at the dollar. The stability of the rupiah exchange rate is maintained by all Indonesian banks as well as Local Banks through the established monetary policy. Bank Indonesia issued a policy of stabilizing the rupiah exchange rate on the 30th of 2015, as a continuation of the currency in order to ensure stability and exchange value.

According to Hamdy (2001: 24), the exchange rate is defined as a payment instrument used to conduct international economic and financial transactions and usually has an official exchange rate at Bank Indonesia. If the exchange rate increases, then the value of the rupiah issued must be more. which means that the value of the domestic currency is low, so the money demand will increase. According to (Triyono 2008: 160), if the dollar exchange rate increase, then a

certain amount of rupiah is needed to be exchanged to USD. Thus, the need for the rupiah become high, in the end the bank will increase the money demand. This means that the US dollar exchange rate has a positive effect on the money demand. The results of Fahmi's (2012) showed that, the US dollar exchange rate had a positive and significant effect on the money demand in the society. Where the US dollar exchange rate increased, the amount of money circulating in the community would also increase.

According to (Miskhin, 2008: 130), an increase in money demand will cause price levels to be higher in the long term and will reduce the rupiah exchange rate in the future. Changes in money demand drive exchange rates too high, which causes more changes in the short term than in the long term. The higher demand for domestic money will cause the domestic currency to depreciate. If the money supply is too large, people will use it more for the transaction process, which will cause an increase in the price of goods in the country. According to Joseph, et al. (1999) that the influence of money demand has a positive relationship with the exchange rate, an increase in money demand will cause pressure to depreciate the rupiah against the dollar, so that the dollar exchange rate increases.

Money demand has a positive and significant effect on the exchange rate of the rupiah against the US dollar. This shows that, an increase in money demand will increase the exchange rate, where the value of the rupiah depreciates against the US dollar, and vice versa. The further decrease in money demand will reduce the exchange rate, which means the value of the rupiah will appreciate against the US dollar. This result also supports the results of a study conducted by Atmadja (2002)

that variable money demand has a significant influence on the movement of the rupiah exchange rate against the US dollar. According to Joseph (1999), that the influence of money demand has a positive relationship with the exchange rate, where an increase in the money demand will cause depreciation pressures on the rupiah and the dollar (USD) to increase. This result is also reinforced by the purchasing power parity theory that an increase in the money demand will cause domestic inflation against foreign inflation, this will cause the domestic currency to decline compared to foreign currencies. The higher the domestic money demand will cause the domestic currency to depreciate.

e. The effect of equivalent rate on money demand (M2)

The results of the research indicate that, in the short term and long term the equivalent rate has a positive and significant effect on money demand with probabilities of 0.0000 and 0.0067, respectively, greater than $\alpha = 5\%$, and coefficients of 213272.7 and 161818.4, respectively. Meaning that, in short term every one percent increase in equivalent rate, raising money demand (M2) by 213,272.7 billion. While in the long term, every one percent increase in equivalent rate raises money demand (M2) by 161,818.4 billion.

Islamic banks must be able to maintain good financial performance in carrying out its operations. Thus, it can become an institution that prioritizes public trust. As a profit oriented institution like other financial institutions, the financial health of Islamic banks is very important, especially at the level of profitability. Sharia banks must have adequate capital that can develop earning assets and maintain profitability and liquidity levels. As an intermediary institution, the role

of Islamic banks between parties who have excess funds, and those who need it also requires sound finance.

The increase in sharia banking profits was influenced by macro economic conditions. This can be shown that, the development of Islamic banking depends on the demand of the society for products and services, where as sharia bank customers generally still compare the rate of return (equivalent rate) that can be provided by Islamic banking to customers is the result of the distribution of funds. The results of the distribution of Islamic bank funds depend on the business profits of the borrowers, which of course will be influenced by macroeconomic conditions.

Equivalent rate is an indication of the level of return from an investment or fund raising by a bank. Equivalent rate also means the rate of return on investment that has been invested. This role is like the interest rate on conventional banks, which gives a percentage rate of return on investment. The differences in calculation, interest is immediately agreed at the beginning of the contract before the investment runs. Whereas the equivalent rate is calculated by the bank at the end of each month after the investment carried out produces. Customers can see what the bank's equivalent rate was last month, to provide an estimate of what the bank's equivalent rate is in the current month.

Equivalent rate is the amount of monthly profit sharing divided by the average balance of the customer's savings expressed in percentages. One important role of a bank is the ability to collect third party funds, which can be in the form of savings, deposits, or current accounts. In this case, Islamic banks use profit sharing instruments which in other forms are stated as "equivalent rate" in attracting

customers to deposit their funds in Islamic banks. Determination of the percentage at the equivalent rate is different from conventional interest rates, which compete competitively in setting deposit rates to attract potential customers. The distribution of profits is determined at the beginning by calculating the amount of interest expense from funds deposited or borrowed and is greatly influenced by interest rates. The higher interest rates will be followed by rising deposit and loan interest rates.

The increase in money demand is associated with business cycle expansion. The increase in money demand will encourage companies or banks to source financing which will increase the company's or bank's expansion in a wider market share and have an impact on improving company performance. The improvement in the company's performance is reflected in the increased profit side. Hence, the company can be the choice of investors who invest their capital. When money demand rises, expectations of prices will also increase causing interest rates in the economy to decline. A decrease in interest rates will have an impact on the shift of investors to invest funds hoping to get a higher return in the future.

Money demand is one of the macro policies used by the government to stabilize economic conditions. Therefore changes in money demand will affect banking conditions. When money demand increases, the instrument used by the government is to raise interest rates. Raising interest rates will stimulate people to invest their funds in banks. Islamic banks as part of the banking industry will raise these funds. The amount of funds collected will increase the ability of Islamic banks to channel funds.

f. The effect of third party fund (DPK) on money demand (M2)

From the test results indicate that, in the short term and long term third party funds affect money demand (M2) with a probability of 0.0029 and 0.0058 respectively, less than $\alpha = 5\%$. And the coefficients of 262532.0 and 257414.1, respectively. Meaning in short term, one percent increase in third party fund (DPK), raising money demand (M2) by 262,532.0 billion. While in the long term, every one percent increase in third party funds raises money demand (M2) by 257,414.1 billion. The results of this research are supported by Thohari (2010), in his research conclude the variable exchange rate of the rupiah against the dollar, inflation and money demand (M2) have a significant effect on third party funds. Based on Said (2011), the results show that inflation, exchange rates, interest rates, and the money demand have a significant effect on third party funds.

Meanwhile, the results of Rossar Maries's research (2008: 71), concluded that the response shown by third party fund variables to the money demand (M2) was the reaction of Islamic banks in seeing the development and growth of money demand that had increased. This relates to the intermediary function of Islamic banks, as known sharia banks channel more financing to the small and medium business sector (UKM) or the real sector.

The small and medium businesses (UKM) are those who have a low level of income compared to corporations. Small and medium entrepreneurs generally aim at the market share of people with low incomes. Thus the response shown by Islamic banking to the money demand is a reaction to the potential that can be utilized in order to increase the money demand. In order for an increase in the

money demand to have a positive impact on third party funds, Islamic banking implements policies in increasing third party funds by providing a competitive percentage ratio for savings or term deposits.

Third party funds are sources of funds obtained from the society in the form of demand deposits, savings and deposits. According to Law No. 21 of 2008 concerning syari'ah banking (article1) it is written that deposits are funds entrusted by customers to syari'ah banks or syari'ah business units based on wadi'ah contracts or other contracts in the form of demand deposits, savings and do not conflict with the principles of shari'ah 'Ah. So all public funds collected by banks in general, including Islamic banks in the form of current accounts, savings and deposits. Each form of account has different characteristics. According to Bank Indonesia Regulation No.10 / 19 / PBI / 2008 Third Party Funds are bank obligations to the public in rupiah and foreign currencies. Funds raised by banks will be used to fund real sector activities through lending. Funds collected from the society are the biggest and most reliable source by banks.

According to Sukirno (2000: 426), one of the important functions of the central bank is creating sufficient currency (banknotes and coins) to be used in trade transactions, payment of income, and other transactions in the economy. To maintain the smooth operation of an economy, the central bank needs to add currency which is in line with the needs of economic growth. The more money circulating in the community, it will increase the interest of the public to invest or save money in the bank, this will increase the number of third party funds in Islamic banks.

Dendawijaya (2005), the relationship with money demand has a significant positive effect on collecting third party funds, which means that if money demand increases, third party funds also increase. Money demand consists of currencies outside the monetary system plus deposits owned by the community is generally kept in a bank. While money demand in a broad sense (M2) is the amount of M1 plus all time deposits and internal savings balances are only rupiah in the form of a bank. Thus the greater the third party funds consisting of public deposits (savings and deposits), the money demand also increases.

Furthermore, the positive relationship between money demand and third party funds indicates that the funds raised in the society have increased. This provides additional fresh funds for national banks in general. The increase in money demand (M2) indicates an increase in public interest and trust to save or invest funds in time deposits, therefore third party funds are increasing. The increase in money demand provides opportunities for banks to carry out the intermediation function. The increase in money demand was responded by Islamic banking with increased financing. Therefore, an increase in money demand will increase the amount of third party funds. Third party funds are immediately channeled in the form of financing, because Islamic banks will suffer losses, due to the obligation to provide a ratio or nisbah to the third party funds that have been collected (Tohari, 2010: 86).