Islamic Money Demand Implications Based on Macroeconomic and Social Value Variables in Indonesia

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Abstract—**This study aims to determine the implications of Islamic money demand based on Indonesia's macroeconomic and social variables value. The used data is secondary data from the 2010-2019 time series. The method of this research is using Error Correction Model (ECM). E-views 9 program is used for processing data. The result of this research indicates that there are implications for a variety of Islamic Money Demands in Indonesia based on macroeconomic and social value variables in Indonesia. The result of ECM estimation showed that macroeconomic variable and social values only zakat variable significantly affect to M2Islam. While based on the coefficient value, the macroeconomic implications of variables on the demand for Islamic money are GDP, exchange rate, and inflation. on social value, the value of the zakat coefficient has the greatest value compared to infaq sadaqah on the Islamic money demand.**

Keywords—Islamic money demand, macroeconomic, social values

I. INTRODUCTION

As a country that implements a dual monetary system, Indonesia has functions of the demand for conventional money and Islamic money demand [1]. The amount of money circulation in-country is determined by the amount of supply and demand for money [2]. Islamic money demands more quickly stable than the demand for conventional money responding to the shock of the variables that affect it [3]. The relatively greater stability in the demand for money in an Islamic economy may also introduce greater stability in the velocity of circulation of money [4].

The variables which are affected by money demand is contained in macroeconomic condition. Among the macroeconomic variables which affect the Islamic money demand are Gross Domestic Product (GDP), Inflation, and Exchange Rate [5].

In contrast to the demand for conventional money, the demand for Islamic money adds a factor of Islamic social value as a factor that influences it. Economics variables also facilitate the attainment of welfare in life hereafter [6]. The demand for money in an Islamic economy may thus be represented by the following equation [4]:

$$Md = f(Y_s, S, \pi)$$

Where:

- Y_s = goods and services that are related to need fulfillment and productive investment and conform with the values of Islam.

- S = all those moral and social values and institutions (including zakat) that influence the allocation and distribution of resources and that can help minimize M_d not only for conspicuous consumption and unproductive investment but also for precautionary and speculative purposes; and

- π = the rate of profit or loss in a system that does not permit the use of the rate of interest for financial intermediation.

Based on this background, this research focuses on the discussion about the effect of the macroeconomic and social value variables on Islamic money demand in Indonesia.

The demand for Islamic money is influenced by the social value factor because in every property or money owed by a Muslim there is an obligation that must be fulfilled. According to the principle of prohibition of Riba, attitudes about the money market conditions are quite different from conventional economics. Most studies about the money demand in the Islamic economy used the Keynesian approach [7]. Therefore, both macroeconomic variables and social values influence Islamic demand. This research aims to explain the effect of

macroeconomic variables and social values on the demand for Islamic money in the short and long term either partially or simultaneously.

II. Methods

The method of this research is using Error Correction Model (ECM) and E-views 9 program is used for processing data. This research also used secondary data from the 01:2010-12:2019 time series. The object of this research is one of the components of Islamic Money Demand such as narrow money (M0), macroeconomic variables (GDP, Inflation, and exchange rate), and social value (Zakat and Infaq Shadaqah) variables in Indonesia for 10 years in 01:2010-12:2019. Data collection techniques used documentation and annual report of Bank Indonesia (BI), Financial Services Authority (FSA), and Central Bureau of Statistics (CDS).

III. Results and Discussion

This research consists of three equation models, namely:

1st Model

$$\Delta LN\_M2_t = \alpha + \beta_1 \Delta LN\_PDB_{t-i} + \beta_2 \Delta INF_{t-i} + \beta_3 \Delta LN\_EX_{t-i}$$
$$+ \beta_4 \Delta LN\_ZAKAT_{t-i} + \beta_5 \Delta LN\_INSH_{t-i} + \delta ECT_{t-i}$$
$$+ \varepsilon_t$$

2nd Model

$$\Delta LN\_M2_t = \alpha + \beta_1 \Delta LN\_PDB_{t-i} + \beta_2 \Delta INF_{t-i} + \beta_3 \Delta LN\_EX_{t-i}$$
$$+ \delta ECT_{t-i} + \varepsilon_t$$

3rd Model

$$\Delta LN\_M2_t = \alpha + \beta_1 \Delta LN\_ZAKAT_{t-i} + \beta_5 \Delta LN\_INSH_{t-i}$$
$$+ \delta ECT_{t-i} + \varepsilon_t$$

A. The Result of the Stationarity Test

The first step in this investigation is to examine the stationarity of all variables. The stationary test of data is used to determine whether or not there is a root of unity between the Phillips-Perron test (PP) based variable at a given level and first. Difference. If the PP value is statistically less than the value of the critical MacKinnon values, then the data were stationary at the level found. The stationary test is also recognizable by the probability value of PP, which is less than the level. The result of the stationary test can be seen in Table 1 below:

TABLE I.   THE RESULT OF THE STATIONARITY TEST

Variables	PP Value	
	Level	1st Difference
LN_M2	5.261855	**-13.56217**
LN_PDB	3.405014	**-10.86890**
INF	-0.762637	**-7.907969**
LN_EX	1.631025	**-11.20783**
LN_ZAKAT	0.449066	**-37.26374**
LN_INSH	0.152521	**-43.82836**

Table I. Cont.

MacKinnon critical values:	1% level	-4.046072
	5% level	-3.452358
	10% level	-3.151673

[a.] Note: The bold print indicates that the data is stationary at the 1%, 5%, and 10% significance levels.

Based on the test result, there is no stationary variable at a certain level. The root unit test then continues at the first diff level. After the PP test examined all variables, the root unit at the first difference, the result indicated that all variables were stationary at the first difference level. From the result of the test, it can be concluded that the first difference data does not contain a root of unity.

B. The Result of the Cointegration Test

Cointegration relationships in a system of equations imply that there is an error correction model in that system that describes the consistent dynamics of the relationship between the short and long run. The cointegration test is performed using the Johansen cointegration test methods by comparing the value of the trace statistic to its critical value. If the value of the trace statistic is greater than the critical value, there is cointegration in the model. All models in the following study found long-term cointegration.

TABLE II.   THE RESULT OF THE COINTEGRATION TEST

Model	t-Statistic	Decision
1st Model	-7.342280***	Cointegrated
2nd Model	-2.374657**	Cointegrated
3rd Model	-3.341889***	Cointegrated
Test critical values:	1% level	-2.584539
	5% level	-1.943540
	10% level	-1.614941

***), **), and *) are cointegrated at the 1 percent, 5 percent, and 10 percent significance levels

After testing the cointegration (Table 2) and demonstrating that each equation exhibits cointegration, the analysis of the sensitivity of macroeconomic variables to money uses the ECM estimation approach. Subsequently, the outcome of the ECM process provides two main estimation results, estimating the cointegration or long-term equilibrium effect between the variables and estimating the error correction or speed of its variables to move towards their long-term equilibrium. The significance used in this study is at the 5% level.

C. The Results of the Classic Assumption Test

1) The result of the normality test: The JarqueBera normality test was performed to check whether the error term approximated the normal distribution. The results obtained show that the residuals in the three models are not normally distributed because the probability value is below the 5 percent significance level. This means that the three models do not correspond to normality (Table 3-5).

TABLE III.   THE RESULT OF THE 1ST MODEL NORMALITY TEST

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Series: Residuals
Sample 2010M02 2019M12
Observations 119

Mean        -4.48e-18
Median      -0.001431
Maximum      0.108132
Minimum     -0.090446
Std. Dev.    0.036048
Skewness     0.548657
Kurtosis     3.871251

Jarque-Bera  9.734077
Probability  0.007696
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TABLE IV.   THE RESULT OF THE 2ND MODEL NORMALITY TEST

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Series: Residuals
Sample 2010M02 2019M12
Observations 119

Mean        -5.13e-19
Median      -0.004774
Maximum      0.123447
Minimum     -0.090660
Std. Dev.    0.037231
Skewness     0.838352
Kurtosis     4.293637

Jarque-Bera  22.23730
Probability  0.000015
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TABLE V.   THE RESULT OF THE 3RD MODEL NORMALITY TEST

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Series: Residuals
Sample 2010M02 2019M12
Observations 119

Mean         2.82e-18
Median       0.002378
Maximum      0.099061
Minimum     -0.125716
Std. Dev.    0.038419
Skewness    -0.179127
Kurtosis     4.122988

Jarque-Bera  6.889350
Probability  0.031915
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2) The result of the heteroscedasticity test: The heteroscedasticity test was performed using the Breusch-PaganGodfrey test. The results of the analysis showed that the chi-square probability of Obs*RSsquare in the three models is below the 5 percent level of significance, so it can be concluded that the data in these three models exhibit heteroscedasticity (Table 6).

TABLE VI.   THE RESULT OF THE HETEROSCEDASTICITY TEST

	1st Model	2nd Model	3rd Model
Prob. F(6,112)	0.0005	0.0377	0.0000
Prob. Chi-Square(6)	0.0009	0.0393	0.0001
Prob. Chi-Square(6)	0.0001	0.0043	0.0000

3) The result of the autocorrelation test: The autocorrelation test can be performed by looking at the value of BreuschGodfrey's serial correlation LM test. From this, it can be concluded that the indication of autocorrelation was found in the three models (Table 7).

TABLE VII.   THE RESULT OF THE AUTOCORRELATION TEST

	1st Model	2nd Model	3rd Model
Prob. F(1,111)	0.0014	0.0063	0.0001
Prob. Chi-Square(1)	0.0012	0.0057	0.0001

4) The result of the multicollinearity test: The multicollinearity test can be performed by looking at the value of the variance inflation factor (VIF). If the value of VIF is less than 10, it is said that there is no multicollinearity problem. The estimation results showed that the data in the three models do not have multicollinearity problems since the VIF values of all variables are less than 10 (table 8).

TABLE VIII.   THE RESULT OF THE MULTICOLLINEARITY TEST

Variable	Centered VIF		
	1st Model	2nd Model	3rd Model
D(LN_PDB)	1.069480	1.053535	
D(INF)	1.052168	1.032981	
D(LN_EX)	1.051137	1.033926	
D(LN_ZAKAT)	1.307391		1.583510
D(LN_INSH)	1.322743		1.299757
ECT(-1)	1.065394	1.053466	1.416273

Next, are the results of ECM estimation for the short and long term in each model.

a) 1st model: The following are the results of the short-run and long-run estimates of the three Islamic money demand models. According to the results of the cointegration test, the three models are cointegrated over the long term, allowing a long-term estimation followed by a short-term MSE estimation. This estimate can determine the long-term effect of the independent variable on the dependent variable (Table 9).

TABLE IX.   THE RESULT OF ECM ESTIMATION IN THE SHORT-TERM 1ST MODEL

Variable	Coefficient
	1st Model
D(LN_PDB)	0.249138
D(INF)	0.007323
D(LN_EX)	-0.033463
D(LN_ZAKAT)	0.010167**
D(LN_INSH)	0.003143
ECT(-1)	-0.206697***
C	0.009857
R-Squared	0.189961
F-statistic	4.377479
Prob(F-*statistic*)	0.000521

***), **), and *) are cointegrated at the 1 percent, 5 percent, and 10 percent significance levels

Based on the short-term estimation results, it is known that only the Zakat variable (LN_ZAKAT) has a significant value

in the first model. Each model's ECT value is 0.2, which is significant at the 1 percent significance level, indicating that each model's imbalance in the previous period has been corrected by 0.2 percent in the following period.

The results of the ECM estimation show that the R-squared value of this model is 0.18, which means that the variables used in the model can explain 18 percent of the money supply diversity, and the rest is explained by variables in the model. Meanwhile, the value of the F-statistic showed that the independent variables together have a significant effect on the dependent variable at the 5 percent significance level and there is at least one significant variable in the model.

In addition, the long-run estimation results of this model reveal two significant variables in the following table. The variables that significantly influence Islamic money demand are the GDP variable (LN_PDB) and the inflation variable.

TABLE X.   THE RESULT OF ECM ESTIMATION IN THE LONG-TERM 1ST MODEL

| Variable | Coefficient |
	1st Model
LN_PDB	2.266894***
INF	0.012651***
LN_EX	0.135744
LN_ZAKAT	0.015707
LN_INSH	0.004348
C	-18.84027

***), **), and *) are cointegrated at the 1 percent, 5 percent, and 10 percent significance levels

In the 1st model, Islamic money demand only the zakat variable has a significant coefficient value in the short term (Table 10). While in the long-term estimation the ones with significant coefficient values are GDP and inflation. The result of ECM Estimation showed that the zakat variable will have a positive implication on Islamic money demand in the short term. That can be used by the domination of the conventional system over sharia's system [8] and the effect is still very small on the demand for Islamic money [1]. Furthermore, the result of ECM Estimation also showed that GDP and Inflation will have positive implications for Islamic money demand in the long term. This result is by the results of the study which has been done [2,8,9].

b) 2nd model: The following are the results of the short-run and long-run estimates of the three Islamic money demand models. After the results of the cointegration test, the three models are cointegrated in the long term, so that a long-term estimation followed by a short-term ECM estimation can be performed. This estimate can determine the long-term impact of the independent variable on the dependent variable.

TABLE XI.   THE RESULT OF ECM ESTIMATION IN THE SHORT-TERM 2ND MODEL

| Variable | Coefficient |
	2nd Model
D(LN_PDB)	0.303807
D(INF)	0.008631
D(LN_EX)	-0.082708
ECT(-1)	-0.213073***
C	0.010110
R-Squared	0.135891
F-statistic	4.481959
Prob(F-statistic)	0.002119

***), **), and *) are cointegrated at the 1 percent, 5 percent, and 10 percent significance levels

Based on the results of the short-run estimation (Table 11) it is known that in this model its non-significant variable influences the demand for Islamic money. that the imbalance of each model in the previous period was corrected by 0.21 percent in the following period.

The results of the ECM estimation show that the R-squared value of this model is 0.13, which means that the variables used in the model can explain 13 percent of the money diversity and the rest is explained by variables not included will be in the model. Meanwhile, the statistic's value showed that the independent variables together do not have a significant effect on the dependent ones, since there is no significant variable in this model.

In addition, the long-term estimation result of the 2nd is shown in the following table. The variables that significantly affect the money supply are the GDP (LN_GDP) and Inflation (INF) variables.

c) The result of ECM estimation in the long term:

TABLE XII.   THE RESULT OF ECM ESTIMATION IN THE LONG-TERM 2ND MODEL

| Variable | Coefficient |
	2nd Model
LN_PDB	2.396617***
INF	0.012433***
LN_EX	0.109283
C	-20.17630

***), **), and *) are cointegrated at the 1 percent, 5 percent, and 10 percent significance levels

In the 2nd model (Table 12), the results of the short-term MSE estimation show no variable with significant value, therefore the second model cannot proceed with the long-term MSE analysis. it also means that this second model is not reliable. This can happen because macroeconomic variables have no partial impact on the demand for Islamic money. However, different methods can be an option to detect possible differences in the results.

d) 3rd model: The following are the results of the short-run and long-run estimates of the three Islamic money demand models. After the results of the cointegration test, the three models are cointegrated in the long term, so that a long-

term estimation followed by a short-term ECM estimation can be performed. This estimate can determine the long-term impact of the independent variable on the dependent variable.

TABLE XIII.   THE RESULT OF ECM ESTIMATION IN THE SHORT-TERM 3RD MODEL

Variable	Coefficient
	3rd Model
D(LN_ZAKAT)	0.010882**
D(LN_INSH)	0.003327
ECT(-1)	-0.015733
C	0.010706
R-Squared	0.079902
F-statistic	3.328889
Prob(F-statistic)	0.022110

***), **), and *) are cointegrated at the 1 percent, 5 percent, and 10 percent significance levels

Based on the short-term result (Table 13), it is known that there is one significant variable in this model, namely the zakat variable (LN_ZAKAT). Each model's ECT value is 0.01, which is significant at the five percent significance level, indicating that each model's imbalance was corrected by 0.01 percent in the previous period. in the next period.

The result of the ECM estimation showed that the R-squared value of this model is 0.079, which means that only the zakat variable used in the model can explain the diversity of Islamic money demand of 7.9 percent, and the rest explained by variables will not be included in the model. Meanwhile, the F statistic showed that the independent variables together have a significant effect on the dependent variable at the 5 percent significance level and there is at least one significant variable in the model.

Furthermore, the result of the long-term estimation of this Islamic money demand model in this table produces one significant variable, namely the zakat variable (LN_ZAKAT).

TABLE XIV.   THE RESULT OF ECM ESTIMATION IN THE LONG-TERM 3RD MODEL

Variable	Coefficient
	3rd Model
LN_ZAKAT	0.250318***
LN_INSH	0.034596
C	10.85133

***), **), and *) are cointegrated at the 1 percent, 5 percent, and 10 percent significance levels

Furthermore, in the 3rd model the results of ECM estimation both in the short and in the long-term, zakat variable has a significant value at the level of 5 and 1 percent.

The results showed that the social variable zakat has significant potential for monetary stability in Indonesia. This is also due to the research conducted stating that the greatest contribution to influencing the variational change in Islamic money demand comes from the social value variable [8]. The results of other research showed that zakat, infaq, and alms have a positive effect on economic growth in Indonesia [10].

IV. CONCLUSION

In the 1st model, only the zakat variable will have a positive implication for Islamic money demand in the short term. That can be used by the domination of the conventional system over sharia's system and the effect is still very small on the demand for Islamic money. And the result also showed that GDP and Inflation will have positive implications for Islamic money demand in the long term. In the 2nd model, the short-term ECM estimation results do not show any variables that have a significant value, therefore, the second model cannot be continued with the long-term ECM reliability. This can happen because macroeconomic variables have no partial effect on the demand for Islamic money. However, different methods can be an option to see possible differences in results. In the 3rd model the results of ECM estimation both in the short and in the long-term, zakat variable has a significant value at the level of 5 and 1 percent. The result showed that the social variable, namely zakat, has considerable potential for the stability of the monetary system in Indonesia

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