ANALYZING THE INFLUENCE OF INTEREST RATES ON MONEY DEMAND ACCORDING TO KEYNESIAN THEORY

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Abstrak

Tujuan daripada penelitian ini adalah untuk menganalisis faktor-faktor yang mempengaruhi permintaan uang yang ditandai dengan jumlah uang beredar dalam arti sempit (M1) di Indonesia, faktor tersebut salah satunya adalah tingkat suku bunga *(interest rate)*.
Model analisis pengamatan yang digunakan dalam penelitian ini adalah OLS *(Ordinary Least Square)*, secara keseluruhan pengujian yang dilakukan adalah dengan uji kendala linear, uji statistik dan uji asumsi klasik. Dalam model tersebut, variabel tingkat suku bunga dalam negeri di Indonesia digunakan sebagai komponen penjelas. Dari variabel tersebut diteliti apakah berpengaruh terhadap permintaan uang (jumlah uang beredar dalam arti sempit) M1 atau tidak.
Hasil yang diperoleh dari penelitian ini adalah variabel tingkat suku bunga dalam negeri mempunyai pengaruh negatif dan signifikan terhadap permintaan uang di Indonesia, hasil tersebut sesuai dengan teori Keynes, bahwa tingkat suku bunga meningkat maka permintaan uang untuk saldo kas akan menurun.

Kata kunci : Permintaan Uang, Jumlah Uang Beredar, tingkat suku bunga dalam negeri.

Abstract

The purpose of this research is to analyze the factors that influence money demand which are characterized by the amount of money currency (M1) in Indonesia, one of which is interest rates. The model of observation analysis used in this study is OLS (Ordinary Least Square), as a whole the tests performed are by linear constraint tests, statistical tests and classic assumption tests. In this model, the variable domestic interest rates in Indonesia are used as explanatory components. From these variables examined whether it influences the demand for money (the velocity of money) M1 or not.
The results obtained from this study are that domestic interest rates have a negative and significant influence on the demand for money in Indonesia, these results are consistent with Keynesian theory, that interest rates increase, the demand for money for the cash balance will decrease.

Keywords: money demand, velocity of money, real national income, domestic interest rates.

A. INTRODUCTION

The monetary policy plays an important role in achieving significant economic growth. Friedman (1968) argues that monetary policy can contribute to achieve economic stabilization by controlling monetary quantities that move into an uncontrolled manner. The uncontrolled monetary magnitude can lead to economic instability. In addition, monetary policy can also help to anticipate instability caused by non-monetary quantities. The stabilization policy package is one of the policies applied to third world countries.

The stabilization of monetary policy can be seen from the balance between money demand and money supply, each of which can be influenced by the different and same independent variables. The Bank of Indonesia as the central bank which has the monetary authority is obliged to control and supervise the money supply and is able to detect any factors that can affect the balance between money demand and money supply in the community. By having this it is expected to determine the right policy so that the demand for the money and it offers in the community which does not experience the shortages, both the amount requested for transactions, as well as being used for speculation. By reducing the amount of money requested, it can hinder the economy of the country, on the contrary if there is an excess of money requested, it can lead to inflation which can disrupt national economic activities.

Basically the theory of money demand comes from Classical theory and Keynesian theory. From the two theories there are differences, according to Classical theory the main motive for holding money is for income-dependent transaction purposes, this theory assumes that the demand for cash is not influenced by interest rates whereas Keynes's theory of money demand develops that interest rates have an influence which is important for economic activities in this case is the demand for money for speculation purposes.

The results of the study of money demand conducted by Insukindro (1997), resulted in the conclusion that the interest rate variable in the country has a negative effect on both real money demand, with different sensitivities while the foreign interest rate variable only affects the demand for real currency and in the long run . This variable foreign interest rates affect the variation in demand for real currency and real demand money.

The study of money demand in Indonesia is still interesting to do with regard to institutional developments in the financial sector. This can be felt since the deregulation in the monetary sector which began on June 1, 1983 and continued with the 1988 PAKTO and policies and Law No. 7/1992 on banking, has caused the banking

sector in Indonesia to experience rapid development. Indeed, it must be admitted that these developments demand business competition and increased efficiency in the banking sector. It seems that in the face of deregulation, the reaction of state-owned banks is different from the reaction of private banks. The usually dominant position of state banks has begun to change due to the accelerated growth of private banks.

Based on the description above, money demand is an estimate of the relevant function. So this research is intended to determine the magnitude of the influence of interest rates which are usually used as the main determinant in examining real money demand in Indonesia.

B. RESEARCH METHODS

This research consists of several stages. The stages of this study consist of types of data and the sources of data, research models, function forms testing and hypothesis testing.

The types and sources of data that are used in this research are sequential time data as secondary data obtained from Indonesian Financial Economic Statistics and the Annual Reports of The Bank of Indonesia. The data is quarterly data used in the variable money supply in the narrow perspective M1 and the interest rate weighted average of time deposits used as a variable in domestic interest rates. Data has been corrected and adjusted. In this study to examine the effect of domestic interest rates on real money demand in Indonesia, the analytical tool used is multiple linear regression or estimated methods. The functions used as a model are as follows:

$$M^d_t = f(rd_t)\ cp \ldots\ldots\ldots\ldots (1)$$

$$dM^d_t / drd_t < 0; dM^d_t / dD_t > 0 ; dM^d_t / d(rdDt) > 0$$

Where :

M^d_t : real money demand (billion rupiah)

rd_t : domestic interest rate (%)

Function form testing is done before determining whether the model is linear or log-linear, then the MWD test is performed *(McKinnon White and Davidson test)*. The MWD test is carried out with assumptions :

Ho : linear model (Md is a linear function of rd)

Ha : Log-linear model (LnMd is a linear function Ln rd)

Where :

M^d : variable dependen

rd : variable independent

If it is linear, the estimated model is:

$$M^d_t = a_0 + a1rd_t + et \ldots..(2)$$

If the log-linear transformation is estimated to be :

$$LnM^d_t = b_0 + b2\ Lnrd_t + ut \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots..(3)$$

Look for the values of the equations Z1 and Z2 as follows:

$Z1 = (LogM^df - Lnf)$ dan $Z2 = (antilog\ Lnf - M^d_f)$

By adding variables Z1 and Z2 as follows :

$$M^d_t = c_0 + c_1rd_t + c_4\ Z1 + et \ldots\ldots\ldots\ldots (4)$$

$$Lnf = d_0 + d_1Lnrd_t + d3\ Z2 + ut \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots..(5)$$

After finding the equation model that will be used, then testing the model requires testing the hypothesis.

The hypothesis testing carried out in this study is the Classical Assumption test which includes Autocorrelation Test, Heteroscedasticity Test and Multicollinearity Test and Statistical Test which includes F Test, T-Test and Determination Coefficient (R2).

C. RESEARCH RESULTS AND ECONOMIC INTERPRETATION

RESEARCH RESULTS

For estimation purposes, the functional relationship model in equation (1) will be expressed in the form of multiple linear regression equations. The regression can be seen in equation (2) in linear form and equation (3) in log-linear form, from which the two

equations will have the most appropriate specifications. The criteria for linear constraint testing are shown by considering the t-statistical value or the probability values Z1 and Z2 to choose which of the models shown in equations (4) and equations (5) has the best specifications. This testing criterion uses a two-sided method where the critical boundary value is to reject or accept the hypothesis of a linear model. For this reason, the following hypotheses are needed :

Ho : linear model : M^d_t is a linear function of the independent variable.

Ha : log-linear model : LnM^d_t is a linear function over log independent variables.

If the t-statistic value of Z1 states to reject the null hypothesis, the equation model does not have a linear specification. Conversely, if the t-statistical value of Z2 states to reject the null hypothesis, the model has log-linear specifications. The following are the results of the estimation *test Mckinnon White and Davidson* (uji MWD)

Table 1
Estimation results *Uji Mckinnon White and Davidson*

Model log-linear Dependen variabel LnM^d_t				**Model linear Dependen variabel M^d_t**			
regressor	koefisien	t-stat	t-prob	regressor	koefisien	t-stat	t-prob
Konstanta	-29.99052	-2.00895	0.0521	Konstanta	294669.6	-2.43410	0.0200
Ln rd_t	3.592614	2.73367	0.0097	rd_t	-91.5297	-0.11637	0.9080
Z2	-1.11E-05	-0.41931	0.6775	Z1	12576.09	0.052416	0.9585
R^2 : 0.281924				R^2 : 0.295466			
Adj R^2 : 0.222084				Adj R^2 : 0.236755			
F hit : 4.711312				F hit : 5.032537			
DW : 0.129521				DW : 0.158159			

Source : eviews program

To determine what model to use can be seen from the value of R2 of each model. R2 value for linear model is 0.295466 and R2 value for log-linear model is 0.281924. From the two values, the R2 value for the linear model is greater, so the model that will be used for data processing is the linear model equation.

The estimation results based on the MWD test model are linear models, can be seen from the following table :

Table 2
Estimation Results Model Linear

Dependen variabel M^d_t				
regressor	**koefisien**	**SE**	**t-stat**	**t-prob**
Constanta	-192378	35013.84	-5.49435	0.00000
rd_t	-2944.037	1125.524	-2.615702	0.0131
(rd_t)	0.022251	0.013347	1.667102	0.1044
R^2 : 0.939935				
Adj R^2 : 0.933071				
F hit : 136.9267				
DW : 1.485710				

Sumber : program eviews

The initial regression results from the linear model will be tested, whether there is a violation of classic assumptions such as autocorrelation, heteroscedasticity and multicollinearity or not.

The method used in the study to see whether there is autocorrelation is to use the *Breusch-Godfrey test LM* or LM test. From the LM test the probability results will be obtained *Obs*R-Squared*. To find out whether there is autocorrelation, then the probability value *Obs*R-Squared* these must be compared with a 5 percent significance level. If the probability value *Obs*R-Squared* greater than 0.05, it can be concluded that there are no symptoms of autocorrelation in the model and vice versa. The autocorrelation equation is as follows:

$U_t = b_0 + b_1 rd_t + b_3 (rd) + p1\ ut\text{-}1 + p1\ ut\text{-}2 + ht$……..…..(6)

Based on the results of the autocorrelation test can be seen in table 3 values *Obs *R-Squared* that is equal to 0.139167 greater than 0.05 it can be concluded that there are no symptoms of autocorrelation.

Tabel 3
Calculation Results of the Autocorrelation Test with the approach LM test

Breusch-Godfrey Serial Correlation LM test

F-Statistic	1.464359	Probability	0.242735
Obs*R-squared	4.828475	Probability	0.139167

Source: program reviews

Heteroscedasticity testing is done using a test *White*. From *White test* the result will be greater probability *Obs*R-squared*. To find out whether there is heteroscedasticity, the probability value of Obs * R-squared must be compared with the significance level of alpha 5%. If the probability value of Obs * R-squared is greater than 0.05 (significant level of 5%), then it can be concluded that there is no hetero-elasticity, and vice versa. Based on the results of heteroscedasticity test can be seen in table 4, namely the probability value Obs*R-squared of 0.083038 greater than 0.05, it can be concluded that there is no heteroscedasticity.

Table 4
The Calculation of heteroscedasticity Test

White heteroscedasticity test

F-Statistic	2.097232	Probability	0.072676
Obs*R-squared	12.57963	Probability	0.083038

Source: program reviews

Multicollinearity testing was carried out using the auxiliary regression method and an analysis was conducted based on the Clients of Rule of Thumb (Gujarati, 2003: 361). The auxiliary regression method is done by regressing each other independent variable in the regression model tested to obtain the value of R2 in the auxiliary regression results which will be compared by comparing the F-count from the auxiliary regression with the F-table value, if F is calculated from the auxiliary regression greater than the auxiliary regression with the F-table value at a certain level of significance, the independent variables that are used as the dependent variable in the auxiliary regression have a relationship of colinearity with other variables.

Analysis of Clients of Rule of Thumb stated that the test stated that there was no multicollinearity, if the R2 auxiliary regression value <R2 was the initial model. Comparison of these values can be seen in table 5 with the dependent variable real money demand which is indicated by the money supply in the narrow sense M1. In table 5 the values of F statistics for the auxiliary regression number 1; 4; 7 and 9 are greater than the critical boundary value which means that there is multicollinearity in the auxiliary regression method but if using the Clients Rule of Thumb the value of each R2 auxiliary regression model smaller than the R2 value of the main model which means that overall the results show there is no multicollinearity between the independent variables which include real national income and domestic interest rates are in a low degree between one variable and another.

Table 5
Multicolinearity test Results

Auksiliari Regretion Model		R^2	F-statistik
1	$Y^r_t = f(rd_t)$	0.097305	4.096181
2	$Y^r_t = f(rd)$	0.034974	1.377190
3	$Y^r_t = f(rd_t, (rd)$	0.336478	6.085296
4	$R^d_t = f(rd)$	0.610231	59.49359
Model Regresi Utama: $M^d_t = f(, rd_t, rd)$		0.939935	136.9267

Source: the result of output SPSS

After testing linear constraints, the next step is to do a statistical test of the model used. The statistical test consists of three types, namely the F test, t test, and R2 test or the Determination Coefficient using the Ordinary Least Square (OLS) method which can be seen in table 6 whose regression results can be seen as follows:

Table 6
Results of the Main Model Estimates

Dependen variabel M^d_t				
regressor	**koefisien**	**SE**	**t-stat**	**t-prob**
Konstanta	-192378	35013.84	-5.49435	0.00000
rd	-2944.037	1125.524	-2.615702	0.0131
(rd_t)	0.022251	0.013347	1.667102	0.1044
R^2 : 0.939935				
Adj R^2 : 0.933071				
F hit : 136.9267				
DW : 1.485710				

Source: reviews output results

Information :
Nilai t-tabel : $t_{0.025;35} = \pm 2.021$, n = 40, α = 5%, k = 5, df = 40-5=35
Nilai F-tabel : $t_{0.05;4;35} = 2.61$, n = 40, α = 5%, k = 5, df1 = 5-1 = 4,df =40-5=35

Calculation criteria for the F test are to state whether all independent variables simultaneously can affect the dependent variable to a certain level (5%). The null hypothesis in the F test states that overall the independent variable cannot influence the dependent variable. To declare a rejection or acceptance of the null hypothesis based on the comparison of the F-

count value with the F-table value. To compare the F-count with the value of F-table first look for the value df1 obtained by the formula df1 = k-1 and then calculate the value of df with the formula df = nk and the level of α of 5%, then the value of F table is expressed as Fα, df1 , df. If F-count <Fα, df1, df, then the null hypothesis is accepted. And vice versa if F-count> Fα, df1, df, then the null hypothesis is rejected. The F-count value is shown as 136.9267 the critical limit for rejecting the null hypothesis has a value of 2.61. This model's F-count value is greater than the critical limit. This shows that the null hypothesis is rejected or it can be said that overall simultaneous or joint variables can affect the dependent variable, namely the demand for real money marked by the money supply in the form of M1 at a significant level of 5%.

The t test is used to calculate the significance level of the influence of independent variables on the dependent variable individually. The criteria for rejection or acceptance are based on a comparison between the calculated values and the t-table value. If the value of t counts is in the Ho reception area where in this condition the value of t is said to be statistically not important. The critical limit for the 5% significance level is ± 2.021.

The domestic interest rate variable has a t-count value of -2.615702 where the value is in the area that rejects the null hypothesis or is outside the critical limit of the acceptance of the null hypothesis which is located between -2,021 to 2,021. this shows that individually, domestic interest rates have a significant effect on the magnitude of real money demand which is indicated by the money supply in the narrow sense M1 at the 5% significance level.

The coefficient of determination (R2) is a measure in a summary of data that states how well the sample regression line matches the spread of a data. Please note that R2 is a function that has never decreased (non-decreasing) from the number of independent variables contained in the regression model, so with the increase in the number of independent variables, R2 always increases and never decreases.

In table 6 R2 value is 0.939935, the value states that 93.9935% changes from the dependent variable, namely the demand for real money which is marked by the money supply in the narrow sense M1 caused by a change in the independent variable, namely domestic interest rates. The remaining 6.0065% is caused by changes from other independent variables not included in the model.

ECONOMIC INTERPRETATION

From the estimation results obtained from the regression equation (table 6) below:

M^d_t = -192378.3201 – 2944.036585 rd_t + 0.02225059954 (rd)

They can be interpreted economically as follows:

1. The constant value shown at -192378.3201 means that real money demand is -192378,3201 assuming if the domestic interest rate is considered constant.
2. Domestic interest rates, which are indicated by interest rates on time deposits, are statistically significant and have a negative relationship to the demand for money in Indonesia; this means that it accepts the hypothesis which states that domestic interest rates have a negative and significant effect on demand for real money in Indonesia. Indonesia. The regression coefficient value is indicated as -2944.036585, this indicates that if the interest rate rises by 1 point, it will result in real money demand decreasing by 2944.036585 billion rupiah, assuming that other variables are considered constant. As what Keynes has said that if the interest rate is expected to fall, someone would prefer to hold wealth in the form of deposits rather than cash, this is because deposits can provide capital gains and can provide income for a certain period of time originating from the interest rate.

D. CONCLUSIONS AND RECOMMENDATIONS

Conclusion

Conclusions that can be drawn from the results of the analysis of real money demand in Indonesia during the study period are as follows:

Variable domestic interest rates negatively and significantly affect the demand for real money which is indicated by the money supply in the narrow perspective M1. This means that by changing in domestic interest rates it turns out the response of the community in holding or choosing a form of wealth (bonds, stocks, deposits in rupiah, etc.) that can provide other benefits and they are not only for the purpose of the transaction. The community behavior is also increasingly critical of changes in interest rates and they also consider the size of the risk that will be obtained later. Whether or not the investment at a certain interest rate will be attractive depend on the risks and expectations of inflation in the future. Expectations of inflation can affect the purchasing power of the currency in the future, while the level of risk reflects security in investing in the the money value.

Research Recomendation

Based on the conclusions stated above, the suggestions that will be given are as follows:

a. Deposit interest rates need to get serious attention from The Bank of Indonesia, in this case The Bank of Indonesia cannot directly determine the interest rate, but it can only indirectly through the creation of a healthy market structure. By the provisions of market law that apply market developments can be directed, so that the central bank can determine interest rates as expected by the government and society.
b. For further research can use more developed models among others, for instance Error Correction Models Test, Partial Adjusment Model Test or other tests and also can be done with the addition of variables that can better explain what factors can affect the money demand in Indonesia.

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