

Analysis of the Effect of Macroeconomic Variables on Indonesian Foreign Debt

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Abstract

This study aims to determine and analyze the factors that influence foreign debt in Indonesia with influencing variables including economic growth, inflation, and foreign interest rates. This type of research is associative descriptive research, where the data used are secondary data from 1970 to 2017 obtained from relevant institutions and agencies, which are analyzed using the Error Correction Model (ECM) method. The findings of this study indicate that economic growth and inflation have a significant long-term effect, but interest rates do not have a significant effect, and in the short term all have a significant effect on foreign debt in Indonesia.

Keywords: *foreign debt*

Introduction

A country in achieving economic growth requires relatively large funds. However, the effort to mobilize funds has experienced many obstacles, namely difficulties in terms of collecting capital that will be used for development. Sources of capital can be obtained from within the country and from abroad, it is the basis for raising funds for economic development. Efforts to raise funds from within the country for developing countries tend to be more difficult to do. In general, developing countries are dependent on foreign debt to raise funds as capital in their development, of course, debt obtained from abroad will affect the national balance of payments in the long run. If a country is dependent on foreign debt and too often lends a substantial amount of funds from other countries, it will lead the country to a foreign debt crisis.

Foreign debt is a portion of a country's total debt obtained from creditors from outside the country. Sources of debt can be obtained from private banks, other state governments or national financial institutions such as the IMF and World Bank or other financial institutions.

The amount of foreign debt continues to increase along with the increase in economic growth which also increased, in 2000 Indonesia's foreign debt reached 144 billion US dollars and continued to increase until 2017 reaching 353 billion US dollars. From the graph above it can be seen that the decline in foreign debt only occurred a few times, such as in 2006 debt decreased and in the following year it continued to increase until 2017 and has not declined but it was accompanied by economic growth that continued to increase. The problem that occurs in Indonesia is that although economic growth has increased, Indonesia's foreign debt has not declined in line with improving economic growth in Indonesia. From this we can know that Indonesia is still very dependent on financial assistance from abroad to encourage its development.

Foreign debt is a good tool to improve the wheels of the national economy if managed properly, because with a stable and healthy foreign debt, it will push the wheels to push the wheels of the Indonesian economy towards a steadier. This is supported also by the growing development of the production sector activities both from the government and the private side with the existence of financial assistance from abroad. However, if foreign debt is not managed properly, it will have an impact on the stability of the national economy in the future. Therefore, foreign debt needs to be allocated and managed properly so that foreign debt does not become a burden and a new problem for the Indonesian economy. However, it is expected that the existence of foreign debt will be able to develop the Indonesian economy towards a better future.

The problem to be examined in this study is how the influence of macroeconomic variables on Indonesia's foreign debt in the long term and short term. The research objective is to determine the effect of economic

growth, foreign interest rates and inflation on foreign debt in Indonesia in the long and short term. This study examines the effect of Indonesia's foreign debt on macroeconomic variables using the Error Correction Model (ECM) for the period 1970-2017.

Methods

The data used are secondary time series data (time series), the period 1970-2017. Sources of data were obtained through publications from official institutions, namely from Central Bureau of Statistics and data published by the IMF and World Bank.

The basic equation model compiled in this study:

$$FD_t = \alpha_0 + \alpha_1 GDP_t + \alpha_2 RIR_t + \alpha_3 INF_t + e_t$$

The equation is formulated in the form of an error:

$$\Delta LOG(FD_t) = \alpha_0 + \alpha_1 \Delta LOG(GDP_t) + \alpha_2 \Delta RIR_t + \alpha_3 \Delta INF_t + e_t$$

The ECT models formed in this study are:

$$ECT = \alpha_0 + \alpha_1 \Delta GDP_{t-1} + \alpha_2 \Delta RIR_{t-1} + \alpha_3 \Delta INF_{t-1} + e_{t-1}$$

Where:

FD : Foreign Debt

GDP : Gross Domestic Product

RIR : Real Interest Rate

INF : Inflation

e : Error Term

Table 1 Definition of Variable Operations

Variable	Definition
Foreign Debt	Foreign debt is the sum of program assistance, project assistance and other loans received by the government and private parties from other parties who come from abroad. The data used was obtained from the World Bank which used annual data from 1970-2017 with the measurement standard used is Billion U \$ Dollars.
Gross Domestic Product	Economic growth is a form of increasing income per capita in a country. Viewed using gross domestic product which is a national income and expenditure within a certain time this study uses annual data from 1970-2017 and the unit used in this study is a constant GDP of 20 billion US dollars.
Real Interest Rate	Overseas interest rates use the American interest rate which is the monetary interest rate set by the Fed. Data is obtained in annual form from 1970-2017 and the unit used in this study is percent.
Inflation	Inflation is a monetary event where an increase in the price level causes prices to rise simultaneously. The data used are consumer price index data obtained from the World Bank using annual data from 1970-2017 with the unit of measurement used is percent.

Error Correction Model (ECM)

ECM can explain long-term and short-term information from the data and can be known whether or not an empirical model is consistent. In the long run are ordinary regression equations which are not stationary at the level whereas in the short run the variables have been stationary and the coefficient e must be significantly negative.

Error Correction Term (ECT)

ECM has a characteristic that is the presence of the Error Correction Term (ECT / RES) element in the model. If the ECT / Res coefficient is statistically significant ie the probability value is less than 5%, then the model specifications used are valid or valid.

Results and Discussion

Stationary Test

Non-stationary time series data tend to cause spurious regression where the value of R Square is large, but the relationship shown is only in the form of a relationship caused by trend equations. Time series data is said to be stationary if the data does not contain unit roots, ie the mean, variance, and covariance are constant over time. The unit root test can be performed by the Augmented Dickey Fuller method or the ADF test by comparing the statistical ADF value with the mackin-non critical value. The actual level used is 5%.

Table 2 Stationary Test Results

Variable	Test	ADF Test	CV (5%)	Stationary
FD	Level	0.638394	-3.510740	Yes
	1 st Difference	-3.776459	-3.510740	Yes
	2 nd Difference	-6.844027	-3.515523	Yes
GDP	Level	1.718335	-3.508508	No
	1 st Difference	-4.585601	-3.510740	Yes
	2 nd Difference	-7.168726	-3.515523	Yes
(RIR)	Level	-2.428508	-3.510740	No
	1 st Difference	-7.193472	-3.510740	Yes
	2 nd Difference	-4.557761	-3.520787	Yes
INF	Level	0.150728	-3.508508	No
	1 st Difference	-5.355880	-3.510740	Yes
	2 nd Difference	-8.436432	-3.515523	Yes

Source: Data Processed, 2019

Unit root test can be performed by the Augmented Dickey Fuller method or ADF test by comparing the statistical ADF value with the non-critical value mankin. The actual level used is 5%.

H0: Data is not stationary P-value > α

H1: The data is stationary P-value < α

Test Criteria If P-value ADF > $\alpha = 5\%$, then H0 is not rejected or the data is not stationary. If the p-value of ADF < $\alpha = 5\%$, then H0 is rejected or the data is stationary. Based on the Adg test it can be seen that, all variables are not stationary at the level of levels but are stationary at first difference and second difference. From these tests it can be seen that all variables in this study were stationary at the 1st integration level.

Table 3 Estimated Long Term Equation

Dependent Variable: LOG(FD)

Method: Least Squares

Date: 05/21/19 Time: 13:33

Sample: 1970 2017

Included observations: 48

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-34.41196	1.869818	-18.40391	0.0000
LOG(GDP)	2.250123	0.073161	30.75592	0.0000
INF	-0.010185	0.001263	-8.064353	0.0000
RIR	-0.010379	0.010928	-0.949719	0.3474
R-squared	0.988309	Mean dependent var		24.87938
Adjusted R-squared	0.987512	S.D. dependent var		1.235792
S.E. of regression	0.138098	Akaike info criterion		-1.042049

Table Cont...

Sum squared resid	0.839129	Schwarz criterion	-0.886115
Log likelihood	29.00917	Hannan-Quinn criter.	-0.983121
F-statistic	1239.893	Durbin-Watson stat	0.617324
Prob(F-statistic)	0.000000		

Source: Data Processed, 2019

The long-term equation from the final estimation results above is as follows:

$$\text{Log(FD)} = -34.41196 + 2.250123\text{Log(GDP)} - 0.010185\text{INF} - 0.010379\text{RIR}$$

From the processed results we can know that the estimation results show the influence of independent variables on the dependent variable in the long run. R-Squared value of 0.988309 states that the independent variable in the model is able to explain the dependent variable of 98.83% and the other 1.17% explained by other variables outside the model.

In the table above it can be seen that Indonesia's economic growth has a significant positive effect on foreign debt. This can be seen from the coefficient value of 2.250123 with a probability of 0.0000. If there is a change in economic growth of 1%, foreign debt will increase by 225.01% assuming ceteris paribus. Inflation has a significant negative effect on foreign debt. This can be seen from the coefficient value of -0.010185 with a probability of 0.0000. If there is a change in inflation of 1.01% with the assumption ceteris paribus. Foreign interest rates have a negative influence on foreign debt. This can be seen from the coefficient value of -0.010379 with a probability of 0.3474. If there is a change in foreign interest rates by 1%, foreign debt will decrease by 1.03% assuming ceteris paribus.

Table 4 Co-integration Test Results

Dependent Variable: D(RES)

Method: Least Squares

Date: 05/21/19 Time: 13:43

Sample (adjusted): 1971 2017

Included observations: 47 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RES(-1)	-0.353320	0.105102	-3.361694	0.0016
C	0.007460	0.013950	0.534789	0.5954
R-squared	0.200725	Mean dependent var		0.008253
Adjusted R-squared	0.182963	S.D. dependent var		0.105790
S.E. of regression	0.095624	Akaike info criterion		-1.815166
Sum squared resid	0.411477	Schwarz criterion		-1.736436
Log likelihood	44.65640	Hannan-Quinn criter.		-1.785539
F-statistic	11.30099	Durbin-Watson stat		1.514251
Prob(F-statistic)	0.001589			

Source: Data Processed, 2019

After co-integration testing is done by using the Engle Granger test, the following results are obtained. Using the results of the residual regression equation, the equation shows the probability of RES (-1) of 0.0016. This is in accordance with the requirements for conducting tests using the Error Correction Model (ECM) to be co-integrated. The co-integration results above show that the probability of Error Correction Term (ECT / RES) is 0.0016, then the long-term equilibrium of the independent variable to the dependent variable in this study has been seen, because the probability of Error Correction Term (ECT / RES) is already smaller than 0.05.

Table 5 Short-term Estimated Results (ECM)

Dependent Variable: D(LOG(FD))

Method: Least Squares

Date: 05/25/19 Time: 00:26

Sample (adjusted): 1971 2017

Included observations: 47 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.158920	0.028405	5.594768	0.0000
D(LOG(GDP))	-0.265444	0.348230	-0.762268	0.4502
D(INF)	-0.015789	0.003752	-4.208555	0.0001
D(RIR)	-0.007900	0.006282	-1.257495	0.2155
RES(-1)	-0.295344	0.069200	-4.267954	0.0001
R-squared	0.485075	Mean dependent var		0.098597
Adjusted R-squared	0.436035	S.D. dependent var		0.082678
S.E. of regression	0.062089	Akaike info criterion		-2.620206
Sum squared resid	0.161912	Schwarz criterion		-2.423382
Log likelihood	66.57484	Hannan-Quinn criter.		-2.546140
F-statistic	9.891337	Durbin-Watson stat		1.163514
Prob(F-statistic)	0.000010			

Source: Data Processed, 2019

The short-term equation from the estimation results above is as follows:

$$\Delta \text{Log}(\text{FD}) = 0.158920 - 0.265444\Delta \text{Log}(\text{GDP}) - 0.0015789\Delta \text{INF} - 0.007900\Delta \text{RIR} - 0.295344\text{ECT}(-1)$$

The table above shows the short-term results of this study. The Error Correction Term (ECT) value shows the number 0.0000 <0.05, with the coefficient of -0.295344 and the statistical T (4.267354) > T table (2.01063). The calculation that has been done shows that in the short term the change in the independent variable has an influence on the dependent variable.

In the above equation it can be seen that Indonesia's economic growth has a negative influence on foreign debt. This can be seen from the coefficient value of -0.265444 with a probability of 0.4502. If there is a change in economic growth of 1%, foreign debt will decrease by -26.54%, assuming ceteris paribus. Foreign interest rates have a negative effect on foreign debt. This can be seen from the coefficient value of -0.007900 with a probability of 0.2155. If there is a change in foreign interest rates by 1%, foreign debt will decrease by 0.79% assuming ceteris paribus. The Error Correction Term (ECT / RES) value above can be interpreted that the process of adjusting foreign debt in Indonesia for short-term imbalances that occurred from the period 1970-2017 is relatively slow. This can be seen from the amount of Error Correction Term (ECT / RES). From the ECT / RES equation of -0.295344 which means that there was an imbalance in the past of -1, then foreign debt will adjust to a decrease of -0.295344. If there is an imbalance in the past of 100%, foreign debt will appreciate by -29.53%. Thus it can be concluded that the process of adjusting foreign debt to return to normal had to wait several years.

Conclusions

Economic growth is measured by constant price GDP, which is that GDP has a significant positive effect on the long-term direction of foreign debt. Whereas in the short term economic growth has a negative effect on foreign debt. Inflation is measured by the consumer price index (CPI), which is a significant effect in the long term negative direction on foreign debt. While in the short term inflation has a negative effect on foreign debt. Foreign interest rates are measured by the US interest rate (RIR), which is not a significant effect on the

long-term negative direction of foreign debt. Whereas in the short term foreign interest rates negatively affect foreign debt. Economic growth, inflation and foreign interest rates together have a significant and long-term significant effect on Indonesia's foreign debt.

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