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CAUSALITY ANALYSIS OF FOREIGN DEBT WITH BUDGET DEFICIT IN INDONESIA (1980 - 2020)

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ABSTRACT

The State Revenue and Expenditure Budget (APBN) is an instrument to regulate state expenditures and revenues in order to finance the implementation of government and development activities, achieve economic growth, increase national income, achieve economic stability, and determine development directions and priorities in general. Until now, the Indonesian government is still facing the problem of limited capital to finance development. This is due to a gap in revenue and expenditure or a budget deficit, so that the Indonesian government has carried out a series of policies, both in the form of domestic and foreign stimulus through tax and non-tax extensification and intensification as a source of state revenue, as well as the implementation of foreign debt policies, and foreign investment.

The purpose of this study is to analyze the relationship between the APBN budget deficit and foreign debt in Indonesia for the 1980 - 2020 period using the Causality Error Correction Model (ECM) method. The results of this study indicate from the results of the error correction model (ECM) causality test, it is known that in the estimation of foreign debt and the APBN deficit there is a mutual influence. This indicates that foreign debt is influenced by the state budget deficit, and conversely that the state budget deficit is influenced by foreign debt.

Keyword: Budget Deficit, Foreign Debt, ECM

1. INTRODUCTION

Fiscal policy is the government's effort in making economic plans that aim to prosper the people (Suriadi, 2013). From a theoretical perspective, fiscal policy is a policy carried out by the government on revenues and expenditures to achieve objectives, such as economic growth and general economic stability. Fiscal policy which is one of the policies in the economy is carried out by the government through the State Revenue and Expenditure Budget (APBN) instrument.

The APBN is an instrument to regulate state expenditures and revenues in order to finance the implementation of government and development activities, achieve economic growth, increase national income, achieve economic stability, and determine the direction and priorities of development in general. Fiscal policy in the government's budget policy in the past always required a balanced policy. At this time the budget policy became a deficit budget policy (deficit budget). One of the advantages of a deficit budget is that there is control over the deficit figure and

the additional value of debt which is clearly more transparent and can be monitored by the public.

Until now, the Indonesian government is still facing the problem of limited capital to finance development. This is due to a gap in revenue and expenditure or a budget deficit. In an effort to overcome this gap, the Government of Indonesia has implemented a series of policies, both in the form of domestic and foreign stimulus through tax and non-tax extensification and intensification as a source of state revenue, as well as the implementation of foreign debt and foreign investment policies. All efforts made by the Indonesian government are to finance the budget deficit. (Junaedi, 2018).

The budget deficit can also be caused by a budget that is indeed lacking and also the method or method of financing that results in a deficit, namely the government consumes more than the amount of its income, then the cost of the shortage is taken from individual income in the form of taxes. An increase in government spending that is not followed by an increase in tax sources as the main source of government finance will result in a

budget deficit (Anderson, 2015). This means that taxes are the main source of government revenue that can influence the budget deficit policy.

In addition to tax revenues as the main source of state revenue, the next source of financing to cover the budget deficit is loans/debts. In relation to debt, in the theoretical framework of the Two Gap Model, it explains that in starting development, almost all developing countries experience problems in financing development, low-income countries have two obstacles at the same time in financing their economic development. First, not having sufficient domestic savings to finance the investments needed to achieve targeted economic growth. Second, low foreign exchange earnings to finance imports of raw goods and capital goods needed for investment. Countries that are in the early stages of development are by definition poor countries.

The inability to close the gap means that poor countries do not have the opportunity to trigger their economic progress and poverty will continue to be a vicious circle. (Jhingan, 2003). The solution taken by the government to cover the two gaps is through debt, both foreign debt and domestic debt.

According to Daryanto 2003 and Bappenas 2004, the discussion of foreign debt can be explained by the theoretical framework of the Two-Gap Model which shows that the financing deficit occurs because savings are smaller than private investment $IS = \text{resource gap}$, and the trade deficit occurs because exports are smaller than imports $XM = \text{trade gap}$. In addition, there is still a deficit in the government budget because the government's revenue from taxes is smaller than government spending. $T-G = \text{fiscal gap}$.

Graph 1

Ratio of Foreign Debt to GDP



Indonesia's external debt-to-GDP ratio continues to decline (see Graph 1). In 2004 it was recorded at 51.66%, then decreased to 44.19% in 2005 and continued to decline again until 2008 to 28.55%, although it experienced a slight increase in 2009 to 30.09%. However, at the end of 2010 it again experienced a significant decline to 26.08% and

increased to the range of 36.08% in 2015 to 2019 reaching 33.53%.

As a developing country, Indonesia is one of the countries that still rely on loans/debt. The position of government debt, the development and realization of government debt in 2015-2019 can be seen in table 1. below:

Table 1

**Government Debt Development and Realization
 2015-2019 (Trillion Rupiah)**

Description	2015	2016	2017	%	2018	%	2019	%
Total Government Debt	3.166,13	3.515,46	3.938,70	100	4.418,30	100	5.567,31	100
a. Loan	756,12	734,86	744	18,90	805,62	18,23	791,19	17,32
1. Foreign Loan	751,04	729,91	738,4	18,70	799,04	18,08	784,06	17,17
Bilateral	340,63	315,07	313,7	8,00	330,96	7,49	322,26	7,06
Multilateral	360,63	368,92	381,2	9,70	425,49	9,63	420,61	9,21
Internasional	50,20	45,61	42,6	1,10	42,6	0,96	41,18	0,90
Suppliers (Export Credit Loan)	0,17	0,10	1	0,00	-	0,00	-	0,00
2. Domestic Loans	4,08	5,13	5,5	0,10	6,57	0,15	7,13	0,16
b. Government Securities	2.410,01	2.780,61	3.194,70	81,10	3.612,69	81,77	3.766,12	82,68
Forex Denomination	658,92	766,58	853,6	21,70	1.011,06	22,88	1.014,94	22,22
Rupiah Denomination	1.751,09	2.014,03	2.341,10	59,40	2.601,63	58,88	2.761,18	60,46

Source: Ministry of Finance, 2019

In table 1. it can be seen that the amount of Government Debt at the end of March 2019 consisted of Government Securities (SBN) with a composition of 82.68% of total debt (Rp. 3,776.12 trillion) and loans with a composition of 17.32% of total debt (Rp791.19 trillion). The 2019 SBN issuance was still used for project financing and refinancing, while the 2019 Foreign Loan was used to finance projects and cover the APBN deficit.

The formulation of the problem in this study will analyze the causal relationship between foreign debt and the Indonesian APBN budget deficit for 1980 - 2020 with the ECM (Error Correction Model) approach.

The purpose of this study is to analyze the relationship between the APBN budget deficit and foreign debt in Indonesia for the 1980 - 2020 period using the ECM Causality method.

The benefit of this research is as a material consideration for policy makers in overcoming the problem of the APBN budget deficit in the future by increasing domestic sources of revenue.

2.LITERATURE REVIEW

2.1. APBN and Fiscal Policy

Fiscal Policy is a policy carried out by the government in order to obtain funds and policies taken by the government to spend these funds in order to carry out development. Or in other words, Fiscal Policy is an economic policy in order to direct economic conditions for the better by changing government revenues and expenditures.

When talking about fiscal policy, it is always associated with the interests of the government through the right to tax revenues, government spending, and government loans which aim to create jobs, control prices, and maintain positive economic growth. In its implementation, fiscal policy is carried out when the government makes adjustments between tax revenues and government expenditures which has an impact on the level of job creation, prices (inflation), and the rate of economic growth. The concept of fiscal policy was first applied on a large scale in America in the 1930s, when the depression hit the American economy.

Fiscal policy has various objectives in driving the country's economic activities, namely increasing economic growth, price stability, income distribution. However, the impact of fiscal policy on the country's economic activity is very broad. Various other economic indicators also underwent changes as a result of the implementation of fiscal policies carried out by the government. The impact of fiscal policy on economic growth is expected to always be positive, while the impact on inflation is expected to be negative. But in theory, expansionary fiscal policy carried out by increasing government spending without an increase in tax sources, as the government's main source of finance, will result in an increase in the budget deficit (Sriyana, 2012).

Fiscal policy is one of the most important macroeconomic policies (besides monetary policy) which aims to stimulate the economy (expansive) when economic conditions are sluggish, or aim to relax (contract) the economy when it is overheating. Various fiscal policies have

varied channels, in which, all of these fiscal policies can be implemented through the government's budget policy channel (if in Indonesia it is known as the APBN).

The effect of fiscal policy on the economy can be analyzed in two successive stages, namely: a) How a fiscal policy is translated into a APBN; b) How does the APBN affect the economy. Fiscal policy can be seen from the structure of APBN posts. Where the APBN has two sides, namely the side that records expenditures and the side that records receipts. The expenditure side records all government activities that require its implementation. In practice, the types of posts listed on this side are very diverse and reflect what the government wants to implement in its program, including: a) Government expenditure for the purchase of goods/services, b) Government expenditure for employee salaries, c) Government expenditure for transfer payments which include, for example, payment of subsidies or direct assistance to various groups of people, interest payments for government loans to the community. In addition, the post on the expenditure side requires funds to carry it out. (Boediono, 2005).

The receiving side shows where the required funds are obtained. There are four main sources for obtaining these funds, namely: a) Taxes of various kinds, b) Loans from the central bank, c) Loans from domestic communities, d) Loans from abroad. Furthermore, from these budget items, the impact of fiscal policy on the national economy will be seen. In other words, a fiscal policy is a combined flow of APBN items with various mechanisms, which can affect the economy as a whole.

2.2. Two Gap Model Framework

Theoretically, economic policies in developing countries arise because of the assumption that the market fails to carry out its function (market failure) so that government intervention is needed. However, according to Weiss (1995), if the government's policies are not directed properly, it will actually encourage the emergence of government failure.

The theoretical framework of the Two Gap Model shows that the deficit in private investment financing occurs because Savings is smaller than Investment ($I-S = \text{resource gap}$), and the trade deficit is caused by Exports being smaller than

Imports ($X-M = \text{trade gap}$). In addition, there is still a deficit in the government budget because government revenue from taxes is smaller than government spending ($T-G = \text{fiscal gap}$). The relationship between private investment deficit, government budget deficit, and trade deficit can be explained as follows: National income (Y) from the expenditure side is the sum of Private Consumption Expenditure (C), Private Investment Expenditure (I), Government Expenditure (G) and Exports clean (XM) or:

$$Y = C + I + G + X - M \quad (1)$$

National income (Y) in terms of usage allocation is the sum of public consumption (C), savings (S) and taxes (T)

or:

$$Y = C + S + T \quad (2)$$

From equations (1) and (2) will produce an identity deficit equation, namely that the Trade deficit (X-M) is the same as the Government Revenue and Expenditure deficit (T-G) plus the Private Savings and Investment (S-I) deficit or:

$$(X-M) = (T-G) + (S-I) \dots\dots\dots (3)$$

For equation (3) there may be a causal relationship in the sense that if there is an internal imbalance, namely in the government sector and/or the private sector, it will disrupt the external balance, namely in the trade sector. If it is assumed that exports and imports include goods and services, the definition of a trade deficit will be more directed at the deficit in the current account.

With the framework of the two gap model above, it is implied that if a country is in a state where its current account balance experiences an imbalance, then capital inflows are needed. However, if a country is facing a current account deficit problem and uses capital inflows as a way out, then that country should also prepare policies aimed at reducing the deficit. The more restrictions and controls, the more difficult it will be for a country to reduce the deficit. If a country has implemented a tight money policy, implemented fiscal policy and exercised control over tariffs and imports, but still has a balance of payments deficit, it will be increasingly difficult to overcome it (Sodersten, 1980).

2.3. Theory About the Budget Deficit

Several theories that explain the budget deficit are as follows:

a. Ricardian Theory

The Ricardians, with their theory of Ricardian Equivalence (RE) argue that there is a close familial relationship between generations. In this condition, consumption is determined by all the resources owned by the extended family for all time. The budget deficit is basically just a transfer of the tax burden from the present to the future. The tax burden, both now and in the future, remains the burden of the extended family. For this large family, the budget deficit will not have any impact on the economy. Ricardian Equivalence theory is basically a development of permanent income theory and the life cycle hypothesis (Permanent Income and Life Cycle Hypothesis or PILCH). In the Ricardian Equivalence theory, the variables of government spending, taxes and government debt that do not exist in the PILCH theory are introduced in the model. An important conclusion from the Ricardian Equivalence theory is that the budget deficit policy has no effect on the economy, including the level of consumption, investment, interest rates, and price levels. The Ricardian Equivalence theory has received a lot of criticism, because in reality the budget deficit affects the economy both in the short term and in the long term.

b. Neoclassical Theory

The Neoclassical group tried to explore the effect of the budget deficit on the economy. The Neoclassical group emphasizes the discussion on the effects of permanent deficits. The standard Neoclassical model is based on three main characters, these characters are: (Bernheim, 1989)

- a. Economic actors have a limited life span (finite horizon)
- b. The optimal consumption rate is determined by the intertemporal intimization solution.
- c. Every time period there is a market equilibrium

The Neoclassical model is similar to the Ricardian model. In the Ricardian model, one economic actor lives throughout the ages, whereas in the

Neoclassical model there are two economic actors who live in different periods. The two models have an intertemporal relationship. The intertemporal relationship in the Ricardian model shows the relationship between the interests of economic actors in youth and old age, while in the Neoclassical model shows the relationship between the interests of the younger generation and the older generation. The implications of the differences between the two models are quite significant. In the Ricardian model there is only one economic actor who lives at all times. Utility functions represent individual utilities. The losses in the present are fully compensated by the gains in the future. Marginal utility in the present will be directly related to marginal utility in the future. Future tax increases will be fully compensated by reduced consumption levels and increased savings in the present.

In the Neoclassical model, there are two or more economic actors who live in different time periods. Intertemporal relations are not as close as if there is only one economic actor. It is very possible that current economic actors still care about economic actors from the next generation, but not completely. If economic actors who live in the present are very altruistic, then as Barro's research results (Barro, 1989) both models will produce the same conclusion. The description above also explains the second characteristic that the level of consumption is determined by the optimization process over time. Neoclassicals do not deny that the intergenerational relationship, although small, is always there.

⁴ In general, the Neoclassicals argue that a budget deficit will harm the economy. According to (Bernheim, 1989) the weakness of the Neoclassical theory in terms of the impact of the budget deficit is similar to the Ricardian Equivalence theory, except that economic actors are no longer single, and live in a limited period of time. The conclusion of the Neoclassical group budget deficit theory will be the same as the conclusion of the Ricardian Equivalence theory, if the economic actors are altruistic. (Barro, 1989).

c. Keynesian theory

¹¹ The third group is the Keynesians who argue that budget deficits affect the economy. The Keynesian group assumes that economic actors have a short-term view (myopic), the relationship between generations is not close, and not all markets are

always in a position of balance. One of the imbalances occurs in the labor market, and in the economy there is always unemployment. According to the Keynesians, a budget deficit will increase income and welfare and consumption in the next turn.

The budget deficit financed by debt, which means the current tax burden is relatively lighter, will lead to an increase in disposable income. An increase in disposable income will increase consumption and the overall demand side.

3. ANALYSIS METHOD

3.1. Research Object

The object of this research is Foreign Debt (ULN) and the State Budget Deficit (DA) in Indonesia with a time series of 1980 – 2020

3.2. Types and Sources of Data

The data used in this study is secondary data in the form of time series from 1980 to 2020. The data used include data on foreign debt and budget deficits obtained from BPS and the Ministry of Finance.

3.3. Variable Operational Definition

The variables used in this study are:

- Foreign debt is assistance in the form of program assistance and project assistance obtained from other countries, in billions of Rupiah per year
- The budget deficit is the difference between government revenues and expenditures in billions of Rupiah per year.

3.4. Analysis Tools and Models

In this study, the analysis test of the dynamic error correction (ECM) model was used. The specifications of the model used are:

$$\Delta ULN_t = \alpha + \gamma_1 \Delta DA_t + \gamma_2 DA_{t-1} + \gamma_3 ECT1_t + vt \quad (1)$$

$$\Delta DA_t = \beta + \delta_1 \Delta ULN_t + \delta_2 ULN_{t-1} + \delta_3 ECT2_t + vt \quad (2)$$

Where:

External Debt = External Debt

DA = Budget deficit

DA = DA_t – DA_{t-1}

ULN = ULN_t – ULN_{t-1}

ECT1 = DA_{t-1} – ULN_{t-1}

ECT2 = ULN_{t-1} – DA_{t-1}

α, β = parameters

1, 2, 3 = regression coefficient

1, 2, 3 = regression coefficient

vt = confounding variable

Equation (1) is an equation to test the hypothesis between the budget deficit and foreign debt, while equation (2) is to test the hypothesis between foreign debt and the budget deficit.

3.5. Data Analysis Method

The analytical tool used to test the reciprocal relationship or causality between foreign debt and the budget deficit is the dynamic error correction (ECM) model. The first step is to test the data stationarity and cointegration. This test is needed to see whether the data used is stationary or not.

- The stationarity test of the data on the ECM model was carried out by applying the unit roots test developed by Dickey and Fuller, namely the DF (Dickey Fuller) test. The test of DF can be estimated as follows (Gujarati, 2003).

$$\Delta X_t = f_0 + g_1 BX_t + \sum_{i=1}^k h_i B_i \Delta X_t + \varepsilon_t$$

Where:

X = observed variable

B = operator lag

ΔX_t = X_t – X_{t-1}

BX = X_{t-1}

From the equation above, the statistical value of Dickey Fuller (DF) is calculated. The DF value for the hypothesis that g₁ = 0 is indicated by the statistical value of the coefficient BX_{t-1}. To determine whether the data is stationary or not, we compare the t-value with the critical value of

DF. If the absolute value of the DF statistic is greater than the critical value, then the data indicates stationarity and otherwise, the data is not stationary.

b. Cointegration test is carried out using the cointegration method based on residuals which then adopts the unit roots test from Dickey and Fuller, so that it can be written as follows:

$$\Delta U_t = \beta_0 + \beta_1 U_{t-1} + \beta_2 T + \sum_{i=1}^p \gamma_i \Delta U_{t-i} + e_t$$

Where U is the residual from equations (1) and (2), p is the number of lags in the dependent variable, T is the trend, et is the error term.

To find out whether the variables are cointegrated or not, that is by comparing the t-statistical values of DF and ADF with their critical values. If the statistical value is greater than the critical value, the observed variables are cointegrated with each other. On the other hand, if the statistical value is less than the critical value, the observed variables are not cointegrated.

c. Error Correction Model Causality Test

According to Ramanathan (1993) the causality test in addition to measuring the strength of the relationship between two or more variables, also shows the direction of influence between the independent variable and the dependent variable. The causal relationship consists of:

One-way causality

$X \rightarrow Y$ means X affects Y

$Y \rightarrow X$ means Y affects X

Two-way causality

That is $X \rightleftarrows Y$ means that there is a simultaneous relationship between X and Y. In other words X affects Y and Y affects X

There is no causal relationship between Y and X

The principle behind the error correction model is a long-run equilibrium relationship between two or more economic variables. In the short term, equilibrium may or may almost always occur. With the error correction mechanism, a proportion of the disequilibrium in one period will be corrected in the next period. Thus the error

correction process becomes a tool for reconciling short-term behavior and long-term behavior. The error correction model in the short-term relationship is formulated as follows:

$$\Delta HLN_t = \alpha_1 \Delta DA_t - \alpha_2 (HLN_{t-1} - \beta_0 - \beta_1 DA_{t-1}) + U_t$$

Where 1 is a parameter that describes the short-term effect of the DA variable, 2 is an adjustment parameter that describes the error correction mechanism, 1 is a parameter that describes the long-term effect of the DA variable, the value of 2 is between 0 and 1, which indicates that only part of the past disequilibrium was corrected. at the present time.

Equation (4) is the standard form of the first-order error correction model, which can then be parameterized to:

$$\Delta HLN_t = \gamma_0 + \gamma_1 \Delta DA_t + \gamma_2 DA_{t-1} + \gamma_3 ECT + U_t$$

$$\gamma_0 = \alpha_2 \beta_0$$

$$\gamma_1 = \alpha_2$$

$$\gamma_2 = -\alpha_2 (1 - \beta_1)$$

$$\gamma_3 = \alpha_2$$

$$ECT = DA_{t-1} - ULN_{t-1}$$

Ut = error term

Based on the general error correction model above, the error correction model for the causality test between foreign debt (ULN) and budget deficit (DA) can be formulated as in equations (1) and (2) will produce four types of causality relationship patterns, namely:

1). If γ_1 and $\gamma_3 \neq 0$; δ_1 dan $\delta_3 = 0$, then there is a one-way causality from foreign debt to the budget deficit in the short run.

2). If δ_1 dan $\delta_3 \neq 0$; γ_1 dan $\gamma_3 = 0$, then there is a one-way causality from the budget deficit to foreign debt in the short term.

3). If $\gamma_1, \gamma_3, \delta_1$ dan $\delta_3 \neq 0$, then there is reciprocal causality between foreign debt and the budget deficit in the short term.

4). If $\gamma_1, \gamma_3, \delta_1$ dan $\delta_3 = 0$, then there is no reciprocal causality between foreign debt and the budget deficit in the short term.

d. Classical Assumption Test which includes:

1). Normality test.

The normality test uses the assumption that the ut disturbance is very important considering the validity test of the influence of the independent variables individually and simultaneously and the estimation of the value of the dependent variable requires this condition. With the non-fulfillment of the two tests and the estimated value of the dependent variable, it becomes invalid. Normality test can use Jargue-Bera test. If the Jargue-Bera value is greater than 2 table ($\alpha, 2$) then the distribution of t is not normal, in other words, the data used is normally distributed.

2). Multicollinearity

Multicollinearity is a condition in which one or more independent variables are correlated with other independent variables, or in other words an independent variable is a linear function of other independent variables. To determine whether there is a multicollinearity problem in this study, a partial regression method is used, namely comparing the R2 value of the main regression model to the R2 auxiliary regression between independent variables. If the R2 value of the main model is greater than the R2 auxiliary regression value, it can be said that there is no multicollinearity.

3). Heteroscedasticity

Heteroscedasticity is a condition where a confounding variable does not have the same variance. To detect the presence or absence of heteroscedasticity problems can be done using the White test method.

4). Autocorrelation

Autocorrelation occurs when the confounding error of a period is correlated with the confounding error of the previous period. One of the most important assumptions in the Classical linear model is that there is no autocorrelation or sequential condition among the disorders that enter into the regression function.

Breusch Gidfrey test in this study to track the presence of autocorrelation. If the value of 2 count is greater than 2 table, then there is autocorrelation (H0 is rejected).

e. t test. To test the validity of the effect of each independent variable on the dependent variable, the t-test was used. This statistical t test aims to determine the magnitude of the influence of each independent variable on the dependent variable in two ways.

f. F test to analyze whether the model used exists or not. If the calculated F value F_{table} then H0 is accepted and Ha is rejected, meaning that the independent variables together do not significantly affect the independent variables (the model does not exist), otherwise if the calculated F value $> F_{table}$ then H0 is rejected and Ha is accepted, meaning that the variable independent jointly affect the dependent variable significantly (model exists)

g. Coefficient of Determination. The coefficient of determination states the proportion or percentage of the total variation in the dependent variable that can be explained by the independent variables in the model. The value of R2 lies between 0 and 1, if R2 = 1 means explaining 100% of the variation of the dependent variable. If R2 = 0 means that all the independent variables in the model do not explain the slightest variation in the dependent variable, so it can be concluded that a model can be said to have a better value of the coefficient of determination close to 1.

4. RESULTS AND DISCUSSION

4.1. Stationarity Test

To test the stationarity of the data in this study, the authors use a method that is widely used by econometricians, namely the Augmented Dickey-Fuller Unit Root Test method. At this stage, the first step that must be done is to test the unit roots which aims to determine the degree of integration of the data used. In this study, the unit root test used is the unit root test which has been developed by Dickey-Fuller. If the unit root and degree of integration test, if the ADF t-statistic value is more than or greater than the value stated in the critical value, then we reject the null hypothesis of the existence of a unit root so that the observed data is considered stationary. On the other hand, if the ADF t-statistic value is less than or less than the value stated in the critical value, the observed data is not stationary, so it is necessary to test the unit root when the data is differentiated. Or the data is said to be stationary when the T-statistical value is greater than the critical test value and vice versa, the data is said

to be non-stationary when the t-statistical value is less than the critical test value.

Table 1. Root Test Results

Variable	Significant Level	Critical Value	Nilai ADF	Probability			
Budget Defisit	ADF (Level)	1% level	-3.610453	4.803591	1.000		
		5% level	-2.938987				
		10% level	-2.607932				
	ADF (DIFFERENCE 1)	1% level	-3.621023			0.557370	0.9865
		5% level	-2.943427				
		10% level	-2.610263				
	ADF (DIFFERENCE 2)	1% level	-3.621023			-5.099265	0.0002
		5% level	-2.943427				
		10% level	-2.610263				
Foreign Debt	ADF (Level)	1% level	-3.600987	3.635166	1.000		
		5% level	-2.935001				
		10% level	-2.605836				
	ADF (DIFFERENCE 1)	1% level	-3.605593			-4.292344	0.0015
		5% level	-2.936942				
		10% level	-2.606857				
	ADF (DIFFERENCE 2)	1% level	-3.615588			-7.624702	0.0000
		5% level	-2.941145				
		10% level	-2.609066				

Source: E-views Processing Data 10

Based on the table above, after the data stationarity test was carried out, the results and conclusions were obtained that all data in the study were not stationary at the level and stationary at the second level of differentiation, as evidenced by the t-statistic value which is smaller than the critical value with $\alpha = 5\%$ and p value > 0.05 , so it is not stationary at the level. However, it is stationary at the second level of differentiation where the t-statistic value is

greater than the critical value with $\alpha = 5\%$ and p value < 0.05 . Then the data can then be tested with cointegration.

4.2. Cointegration Test

The requirement that to meet the criteria that the variables studied are cointegrated is to look at the behavior of the residuals from the regression equation used, that is, the residuals must be stationary. The stationary results to the residuals are as follows:

Table 2. Residual Regression Stationarity Test Results

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.156682	0.0326
Test critical values:		
1% level	-3.661661	
5% level	-2.960411	
10% level	-2.619160	

Table 2 above shows that the regression residual is stationary, by looking at the probability of 0.0326 which is smaller than 0.05.

3. Result of Error Correction Causality Analysis

The data stationarity test and cointegration test have been carried out, the results show that the research data is not stationary at the level and

stationary at the second level of differentiation as well as several integrated variables. In the short term there may be an imbalance, so for the next method using the ECM method. The ECM method used in this study uses the ECM method popularized by Engle-Granger. The first is by regressing the long-term equation the results are as follows:

Table 3. Estimation Results of the Error Correction Model (ECM) for the Short Term

Independent Variable	Dependent Variable					
	D(ULN)	t-statistic	Prob.	D(DA)	t-statistic	Prob.
C	3956659	1.049133	0.3011	-36736.10	-0.863885	0.3935
D(DA)	-26.28171	-1.922783	0.0624***			
DA(-1)	-11.30331	-3.465345	0.0014*			
ECT1	0.060502	1.514603	0.1386			
D(ULN)				-0.002745	-1.744473	0.0899***
ULN(-1)				-3.22E-05	-0.103962	0.9178
ECT2				-0.000996	-2.487382	0.0178**
R ²	0.473071			0.304704		
ADJUSTED R ²	0.429161			0.245107		
F-STAT	10.77348			5.112751		
Prob (F-statistic)	0.000034			0.004872		

Description: * : Significant at 1%

*** : Significant at 10%

** : Significant at 5%

Table 4. ECM Estimation Results for the Long Term

Variable	Estimate	
	D(ULN)	D(DA)
C	3956659/0.060502 = 65397260.424448	-36736.10/-0.000996 = 36883634.5381
DA	-11.30331/0.060502 = -186.8354	
ULN		-0.002745/-0.000996 = 2.7560

From the results of the ECM analysis in table 3, the equations in the short-term foreign debt and budget deficit are obtained as follows:

$$D(ULN) = 3956659 - 26.28171D(DA) - 11.30331DA(-1) + 0.060502ECT1$$

$$D(DA) = -36736.10 - 0.002745D(ULN) - 3.22E-05ULN(-1) - 0.000996ECT2$$

Meanwhile, the equation for the long-term relationship between foreign debt and the budget deficit can be estimated by dividing the parameter by the ECT value so that the following equation is obtained:

$$D(ULN) = 65397260.424448 - 186.8354DA$$

$$D(DA) = 36883634.5381 + 2.7560ULN$$

4.4. F Test Results

The F test results show that in ECM1 and ECM2, the calculated F value is 10,77348 on ECM1 and 5,112751 on ECM2. Where the probabilistic F count is significant (< 0.05), where the probabilistic F count on ECM1 is 0.000034 and the probabilistic F count on ECM2 is 0.004872 , so it can be concluded that the two models used quite exist.

4.5. Test Results R2

The coefficient of determination (R2) for ECM1 is 0.473071, meaning that the variation of the foreign debt variable is explained by a budget deficit of 47.31 percent, and the remaining 52.69 percent is explained by other independent variables outside the model used. While the coefficient of determination (R2) for ECM2 is 0.304704, meaning that the variation in the budget deficit variable is explained by foreign debt by 30.47 percent and the remaining 69.52 percent is explained by other independent variables outside the model used.

4.6. t test results

The partial test (t) can be concluded that in the ECM1 model only the DA(-1) variable is proven to significantly affect foreign debt at the 5 percent onfidence level. The effect of the budget deficit on foreign debt is negative, with a coefficient of - 11.30331. This means that if there is an increase in DA (-1) of 1 billion rupiah, the foreign debt will decrease by 11,30331 billion rupiah. Meanwhile, the variables D(DA) and ECT1 did not significantly affect foreign debt.

For the second ECM model, the ECT2 variable is proven to have a significant and negative effect on

Model ECM 1		Model ECM 2	
Series: Residuals		Series: Residuals	
Sample 1980 2019		Sample 1995 2017	
Observations 40		Observations 18	
Mean	-5.47e-10	Mean	0.000000
Median	-327219.9	Median	17009.56
Maximum	40221341	Maximum	450296.6
Minimum	51256811	Minimum	-395774.6
Std. Dev.	17454614	Std. Dev.	246664.3
Skewness	-0.268129	Skewness	0.070446
Kurtosis	4.325803	Kurtosis	1.916475
Jarque-Bera	3.408875	Jarque-Bera	0.895408
Probability	0.181875	Probability	0.639094

the budget deficit with a coefficient of -0.000996. Meanwhile, external debt and external debt (-1) also proved insignificant in influencing the budget deficit.

4.7. Classical Assumption Test Results

a. Heteroscedasticity Analysis

By using the White test to detect whether the confounding variables do not have the same variance. The results obtained as table 5

Table 5. Heteroscedasticity Test

Model	Prob.	sig
DULN = f(DDA, DA(-1), ECT1)	0.3405	0.05
DDA = f(DULN, ULN(-1), ECT2)	0.7827	0.05

Based on table 5. the results of the heteroscedasticity test using the white test, it can be concluded that the regression model in model 1 and model 2 has no heteroscedasticity problem. Because the Chi-Square Prob value is 0.662 and 0.9546 is greater than = 5% (0.05), then the results are not significant or fail to reject the null hypothesis so that there is no heteroscedasticity problem.

b. Normality

Normality test is a test conducted to determine whether the research regression model residual value is normally distributed or not.

Table 6. Normality Test

To find out if the data is normally distributed or not, it is done by comparing the Jarque-Bera probability value with an alpha level of 5%. If the Jarque-Bera probability value is greater than 0.05, it can be concluded that the residuals are normally distributed and vice versa. The normality test table above shows that the Jarque-Bera probability value for the ECM 1 model is 0.31875 greater than 0.05, meaning that the data is normally distributed and the Jarque-Bera probability value for the ECM 2 model is 0.639094 greater than 0.05, meaning that the data normally distributed.

c. Autocorrelation Test

Autocorrelation is the existence of a relationship or correlation between members of different observations. Autocorrelation usually occurs in the case of time series data, namely the existence of a relationship or correlation between the error term of one period and the disturbance of another period. In this study, the autocorrelation test used the Breusch-Godfrey method, which is more commonly known as the Lagrange Multiplier (LM) test.

Table 7. Autocorrelation Test

Model ECM 1				Model ECM 2			
F-statistic	1.067752	Prob. F(3,14)	0.3943	F-statistic	0.296913	Prob. F(3,14)	0.8270
Obs*R-squared	3.351609	Prob. Chi-Square(3)	0.3405	Obs*R-squared	1.076728	Prob. Chi-Square(3)	0.7827

Based on table 7 the ECM 1 model produces P-Value Obs*R-squared = 3.351609 and the probability value is 0.3405 where 0.3405 is greater than $\alpha = 5\%$ (0.05) which means it is not significant, it can be concluded that the data does not have any problems. autocorrelation. The ECM 2 model produces P-Value Obs*R-squared = 1.076728 and the probability value is 0.7827 where 0.7827 is greater than $\alpha = 5\%$ (0.05) which means it is not significant, it can be concluded that the data does not have an autocorrelation problem.

d. Multicollinearity Analysis

Multicollinearity is a problem that indicates a linear relationship between independent variables. The multicollinearity problem can be tested by looking at the variance value of the infition factor (VIF) and tolerance. The limit of the VIF is around the number 1 and does not exceed the number 10 and the tolerance value is close to 1. Here are the results of the multicollinearity test with evIEWS.10

Table 8. Multicollinearity Test

Model ECM 1				Model ECM 2			
Variabel	Coefficient	Uncentered	Centered	Variabel	Coefficient	Uncentered	Centered
	Variance	VIF	VIF		Variance	VIF	VIF
C	1.92E+09	1.605024	NA	C	2.02E+13	1.898676	NA
DA(-1)	0.001539	1.847358	1.217883	ULN(-1)	0.000752	2.140599	1.199024
ECT(1)	2.07E-07	1.219377	1.217883	ECT(2)	0.001800	1.202458	1.199024

4

Based on the results of the multicollinearity test, it can be concluded that all independent variables from both the ECM 1 and ECM 2 models are free from multicollinearity problems because the centered VIF value does not exceed 10. So the conclusion in this study is that the regression model does not occur multicollinearity.

8. Economic Interpretation

7

Based on the results of the ECM analysis, it is known that there is a two-way relationship, namely the APBN deficit affects foreign debt and foreign debt affects the APBN deficit. The interpretation is as follows:

a). In ECM1, the budget deficit variable affects foreign debt at 10 percent with a short-term coefficient of -26,281 and a long-term coefficient of -186.835. Which means that every 1 billion rupiah increase in the budget deficit will cause a decrease in foreign debt by 26.281 billion rupiah in the short term and 186.835 billion rupiah in the long term, and vice versa.

b). In ECM2, the external debt variable affects the budget deficit at 10 percent with a short-term coefficient of -0.0027 and a long-term coefficient of 2.7560. Which means that every 1 billion rupiah increase in foreign debt will reduce the budget deficit by 0.0027 billion rupiah in the short term and increase the budget deficit by 2.7560 billion rupiah in the long term, and vice versa.

The coefficient value of ECT1 for the foreign debt equation is 0.060. This means that 0.060 percent of the actual value of foreign debt (ULN) is corrected every year so that foreign debt reaches equilibrium.

The coefficient value of ECT2 for the budget deficit equation (DA) is 0.0009. Which means that 0.0009 percent of the actual value of the budget deficit (DA) is corrected annually so that the budget deficit reaches balance or equilibrium.

5. CONCLUSION

1. From the results of the causality test of the error correction model (ECM) it is known that in the estimation of foreign debt and the APBN deficit there is a mutual effect. This indicates that foreign debt is influenced by the APBN deficit, and conversely that the APBN deficit is influenced by foreign debt.

2. From the results of the Classical assumption test, there are no problems of heteroscedasticity, autocorrelation, normality and multicollinearity.

3. From the estimation model (ECM) it is known that the coefficient value of ECT1 for the foreign debt equation is 0.060. This means that 0.060 percent of the actual value of foreign debt (ULN) is corrected every year so that foreign debt reaches equilibrium.

4. The coefficient value of ECT2 for the budget deficit equation (DA) is 0.0009. Which means that 0.0009 percent of the actual value of the budget deficit (DA) is corrected every year so that the budget deficit reaches equilibrium.

6. RECOMMENDATIONS

1. To reduce the budget deficit, it is necessary to improve debt management, especially foreign debt which is only intended to see the effectiveness of its financing through financing the productive sectors.

2. Revenue from taxes can still be increased, because it is still very potential but needs to be supported by strict supervision.

3. The government must determine a policy that can reduce the burden on the state budget, among others, by increasing income, saving state spending (efficient use of the state budget).

4. The budget deficit must be directed at the utilization mechanism, namely the type of budget use and institutions that ensure the effectiveness of its use, because the use of the budget deficit for consumption financing will harm the economy in the long term.

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