



## Impact of Government Debt and Foreign Investment on the Indonesian Economy: An ARDL Model Analysis

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### Abstract

*This study aims to obtain empirical evidence of the effect of government debt, foreign investment on Indonesia's economic growth. A number of macroeconomic variables are used to explain the influence between variables in both the short and long term. The short-term effect is explained through the ARDL model, while the long-term effect is explained through the Long Run Bounds Test. From the ARDL model, it shows that government debt, inflation, exchange rates and the BI rate have a negative and significant effect on economic growth. Meanwhile, foreign investment has a positive and significant effect on economic growth. The results of the Long Run Bounds Test, in the long run, the increase in government debt and foreign investment does not have a significant effect on economic growth. Meanwhile, inflation and exchange rates have a negative and significant effect on economic growth. Unlike the case with the BI rate which has a positive and significant impact on economic growth. The increase in government debt in the long term has an impact on the decline in output and public consumption. This is the impact of an increase in the tax burden in the future.*

#### Keywords:

Government debt  
Foreign investment  
Macroeconomics  
Economic growth.

#### JEL Classification:

E6; E62; F2; F63.

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#### Publisher:

Scientific Publishing Institute

Received: 12 May 2021

Revised: 16 June 2021

Accepted: 7 July 2021

Published: 4 August 2021

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**Funding:** This study received no specific financial support.

**Competing Interests:** The authors declare that they have no competing interests.

## 1. Introduction

This study aims to obtain empirical evidence related to the effect of government debt spending, foreign investment and macroeconomic variables on Indonesia's economic growth. ARDL analysis model is used to identify the effect of the independent variable on the dependent variable. In conditions of a fiscal deficit, an increase in government spending has the potential for fiscal risk. The risk caused by an excessive increase in debt. The increase in government debt is in line with the increasing need for the government to finance expenditures. Along with the occurrence of Covid -19 in Indonesia. Government spending is more aimed at reducing the impact of Covid -19 on the economy. For 2020, the fiscal deficit has exceeded the maximum limit of 3 percent of GDP. This limit has been regulated in Law No. 17 of 2003 concerning State Finance. The increase in deficit also stems from changes in macroeconomic assumptions that are difficult to predict as a result of global economic pressures. The increase in government spending has had an adverse effect on

increasing the deficit, increasing government debt and slowing down the economy. This also puts strong pressure on a number of macroeconomic variables, such as: inflation, SBI, and exchange rates.

According to Ricardian understanding: fiscal financed by debt, will not have an effect on improving the economy. This is because the long-term government debt is paid through an increase in the tax burden, which is imposed on the community. The increase in the tax burden resulted in a decrease in public consumption. A number of studies have stated that an increase in government debt is closely related to an increase in the fiscal deficit. The increase in the deficit is in line with the increasing need for the government to finance development. In the short term, spending affects economic growth. This is in line with the study conducted by (Hazmi, Faisal, & Cahyani, 2019). Fiscal deficit has a positive and significant effect on government debt. The increase in debt has a positive and significant impact on Indonesia's economic growth. And in the long term, the increase in debt is not significant to Indonesia's economic growth. In a deficit condition, the government tends to increase debt. Ideally this effort is only carried out in the short term. In the long run, an increase in debt will create an accumulation of government debt. The accumulation of debt tends to damage the economic structure, economic sustainability and create greater distortions, so that it has an impact on increasing the tax burden. The study of Hazmi et al. (2019) found a positive interaction between debt accumulation and fiscal deficit. Excessive accumulation of debt tends to worsen the economy. Fiscal deficits financed through debt tend to be less productive and economic growth to decline. This requires a maximum debt limit. Fiscal deficits financed through debt tend to be less productive and economic growth to decline. This requires a maximum debt limit. Fiscal deficits financed through debt tend to be less productive and economic growth to decline. This requires a maximum debt limit.

The endogenous growth model states: there is an important role for investment in economic growth. Economic growth has an effect on increasing aggregate production, and tends to encourage investment to grow. Investment encourages increased resources and creates positive externalities to the economy and spurs increased productivity. This model also places the important role of technology in increasing growth. In the condition that economic factors are at their maximum point, an increase in output can only be done through technological improvements. The endogenous growth model states that technology is an important factor in the creation of long-term economic growth. Besides the technological factor, this model also emphasizes the existence of investment. The study of Syahrini, Raja, Aliasuddin, and Hazmi (2021) stated, and job opportunities. Investment as one component of aggregate expenditure. An increase in investment will increase aggregate demand, national income and employment opportunities. An increase in investment encourages consumption to increase, which in turn increases income. The relationship between investment and national income has been explained by Keynes. A number of studies mention the increase in government debt, investment, and macro variables affect economic growth. Studies (Dwi & Muhammad, 2016) there is a one-way relationship between government debt, investment and economic growth in Indonesia.

Foreign debt has a positive effect on GDP growth, while investment has a negative effect. Syahrini et al. (2021) investment has a positive and significant effect on economic growth in Indonesia. Kasidi and Said (2013) study found that government debt has a positive and significant effect on economic growth. In another study, debt has a negative effect on the economic growth of a country. This result is in line with the study of Hayat, Hayat, and Malik (2010). Their study found that foreign debt has a negative effect on Pakistan's economic growth. In a study by Ajayi and Oke (2012) foreign debt has a negative effect on Nigeria's economic growth, which is caused by currency devaluation, so that the Nigerian economy is depressed. Amid the fiscal deficit and increasing debt, the government tends to use expansionary fiscal as a fiscal instrument in economic growth. This policy is appropriate to use in times of economic recession. In the condition of Indonesia being hit by Covid-19, maintaining this policy is certainly not the right action. An increase in government spending tends to increase the formation of excessive debt accumulation and fiscal risk. Fiscal has the potential to fail.

## **2. Literature Review**

### *2.1. Fiscal Deficit and Economic Growth*

Economic growth shows an increase in the long-term output of goods and services in a country. The increase in output is closely related to the technological, institutional and ideological levels. Economic growth is closely related to the amount of government spending. In a condition where government spending is greater than revenue, the fiscal deficit will occur. In a deficit condition, the government in the short term tends to draw new debt to cover the fiscal deficit. In addition to withdrawing debt, it also imposes a greater tax burden on the community. An increase in taxes can cause disposable income to decrease, so consumption and output also experience a decline. In the short run, deficits tend to increase demand, thereby driving higher output.

Fiscal policy can increase aggregate demand. However, without being accompanied by an accommodative monetary policy in the long term, it will be counterproductive. Expansive fiscal policy tends to cause debt to increase and so does inflation. In the long term, debt affects the amount of tax rates that must be paid by the public, so that economic growth slows down. The prolonged fiscal deficit has adversely affected fiscal performance and macroeconomic instability. A number of studies state that there is an effect of a fiscal deficit on economic growth. This is in line with studies (Dwinanda & Berly, 2015; Khairul, 2014). However, the

results of state that the fiscal deficit has a positive and significant effect on debt in Indonesia. This is because the government tends to use debt to finance development. An increase in the deficit affects economic growth.

### *2.2. Government Debt on Economic Growth*

Keynesian ideology states that the increase in spending originating from foreign debt has a positive effect on economic growth. The increase in debt has an effect on aggregate demand originating from capital accumulation. The fiscal deficit covered by foreign debt resulted in increased public income and consumption. However, Ricardian understands that foreign debt to finance the deficit has a negative effect on economic growth. The increase in spending comes from debt, will reduce consumption in the future. As a result the government imposes higher taxes.

A number of studies explain the effect of debt on economic growth. Studies [Dison and Nyoman \(2015\)](#) found: government debt has a negative effect on GDP growth in Indonesia. This result is in line with the study [Syahrini et al. \(2021\)](#) and [Hazmi, Masbar, Nazamuddin, and Abdullah \(2019\)](#) which states: government debt has a negative effect on Indonesia's economic growth. Withdrawal of debt to finance the deficit in the long term, has the potential to create excessive debt accumulation and fiscal risk. This requires setting the maximum amount of debt. Debt growth every year without being accompanied by income growth, so that economic growth declines. Addition of debt to be used to pay old debts that have matured. Foreign debt can increase employment opportunities and increase consumption, thus affecting GDP growth. In the short term, foreign debt plays a role in reducing the fiscal deficit. However, in the long term, foreign debt causes the rupiah to weaken ([Atmadja, 2000](#)).

### *2.3. Investment in Economic Growth*

Neo classicalism states that expansionary policies in conditions of a fiscal deficit tend to have a negative effect on economic growth. This is the impact of lowering investment, especially if the fiscal deficit continues to increase. Deficit policy by lowering tax rates will increase interest rates and reduce investment. This results in a decline in economic growth. Expansive policy as a fiscal instrument, under certain conditions is inappropriate and tends to cause inflation to increase and raise interest rates. This results in expensive investment and slows economic growth. The main problem of investment today is to maximize the role of investment in economic growth. Government policies related to investment have not had an effect on the rate of investment growth. Harrod-Domar and Solow-Swan's theory of economic growth states: investment tends to affect the acceleration of economic growth. A number of studies say: investment is closely related to economic growth and this is in line with the study of [Jilenga and Xu \(2016\)](#) in Tanzania. In their research, in the long term investment tends to encourage economic growth. [Ulfa and Zulham \(2017\)](#) mentions: investment has a positive and significant impact on Indonesia's economic growth. So is the study [Klolis \(2012\)](#) states: foreign investment has a significant positive effect on economic growth in Indonesia. Increased investment will lead to economic growth. Studies [Putri \(2014\)](#) concluded, increasing investment has an impact on economic growth through an increase in infrastructure. Improved infrastructure has a multiplier effect on production, expansion of employment opportunities, and income.

However, a number of studies have stated that foreign investment has a negative effect on economic growth. This result is in line with the study of [Nizar, Hamzah, and Syahnur \(2013\)](#) from their research which states that foreign investment has no effect on economic growth in Indonesia. Investment increase has no effect on increase in national income.

### *2.4. Macroeconomics on Economic Growth*

According to monetarists, inflation occurs due to an excess supply of money supply in the community, resulting in a decrease in the purchasing power of money. However, Monetarism has been criticized by non monetarists. Non-monetary experts stated that inflation occurred as a result of excess aggregate demand, which stemmed from increases in consumption, investment, government spending and net exports. Thus, inflation also comes from 2 factors, namely monetary and non-monetary factors. From an economic perspective, inflation is a monetary phenomenon and tends to affect the dynamics of economic growth. The inflation rate affects the cost of producing goods and services. Inflation is one of the macroeconomic indicators used to measure the stability of a country's economy. Changes in the inflation rate have an impact on the dynamics of economic growth. The relationship between inflation and economic growth shows a negative effect ([Syahrini et al., 2021](#)). High inflation has an impact on slowing economic growth in a region, so that the government's role is needed to control the inflation rate at a low level. A number of studies say that inflation has a negative effect on economic growth. Studies mentions, inflation negatively and significantly related to economic growth in Indonesia. The same results were found from the study ([Royda & Agung, 2018](#)) which states that inflation results in high production costs and an increase in unemployment, thus disrupting the economy.

In addition to inflation, the exchange rate also has an influence on economic growth, which is sourced from international trade transactions (exports and imports). Countries with smaller exports compared to imports will experience a trade balance deficit and exchange rate depreciation. Exchange rate affects economic

growth through people's purchasing power. The decline in domestic production has pushed imports of goods and services to increase. The increase in imports resulted in an increase in the demand for foreign exchange. This will affect the weakening of the domestic exchange rate against foreign currencies. Studies Pratiwi (2015) concludes, the exchange rate has a positive and significant effect on Indonesian economic growth. The strengthening of the exchange rate causes the purchasing power of money to increase.

### 3. Methodology

#### 3.1. Data Analysis Model

This study uses secondary time series data, requiring a unit root test. This test is performed with ADF-Test for each variable. The ADF-Test formulation is as follows:

$$\Delta y_t = \mu + \gamma y_{t-1} + \epsilon_t \tag{1}$$

The hypotheses to be tested are:

$$H_0 : \gamma = 0$$

$$H_0 : \gamma < 0$$

If the null hypothesis is accepted, it means that the series is not stationary, in other words it contains a unit root.

The Augmented Dickey Fuller Test is a development of the Dickey Fuller Test. The ADF test uses correction parameters for higher order correlations by assuming that the y series follows the AR (p) process and makes adjustments to the test method. The ADF approach controls for higher order correlations by adding the lag of the difference term for the dependent variable y to the regression equation. The equation as referred to in 2:

$$\Delta y_t = \mu + \gamma y_{t-1} + \delta_1 \Delta y_{t-1} + \delta_2 \Delta y_{t-2} + \dots + \delta_{p-1} \Delta y_{t-p+1} + \delta_p \Delta y_{t-p} + \epsilon_t \tag{2}$$

Augmented specification then used to test:

$$H_0 : \gamma = 0$$

$$H_1 : \gamma < 0$$

Furthermore, the determination of the optimum lag is carried out. This is done by using the Akaike Information Criterion (AIC) basis value approach, so that the smallest criterion value can be known. The next step is to perform a cointegration test. Cointegration test has the following equation:

$$y_t = \beta_0 + \beta_1 X_1 + \epsilon_t \tag{3}$$

So, the variance of the equation becomes:

$$\epsilon_t = y_t - \beta_0 X_0 - \beta_1 X_1 \tag{4}$$

Where:

t is a linear combination of X<sub>1</sub> and X<sub>2</sub>. The cointegration concept requires that t be stationary at I(0) in order to produce long-run equilibrium.

#### 3.2 Estimation Model ARDL

ARDL estimation model is a combination of Autoregressive model with Distributed Lag. The Autoregressive (AR) model uses one or more past data from the variable Y. Meanwhile, Distributed Lag (DL) is a regression model that involves present and past data from the variable X. The ARDL estimation formulation is:

$$y_t = \alpha_0 + \alpha_1 t + \sum_{i=1}^p \phi_i y_{t-i} + \hat{a}' x_t + \sum_{j=0}^{q-1} \beta_j \Delta x_{t-j} + \eta_t \tag{5}$$

Where m = maximum (q, s+1),  $\pi_1 = 1 - \rho_1'$ , where  $1 \times 1$  is the vector containing the contemporary correlation between  $u_t$  and  $\epsilon_t$ , so the ARDL approach requires to include sufficient lag of forcing variable  $x_t$  in order to homogenize  $y_t$ , by doing this, endogenous regression problems and serial autocorrelation can be corrected simultaneously.

$$\Delta x_t = P_1 \Delta x_{t-1} + P_2 \Delta x_{t-2} + \dots + P_s \Delta x_{t-s} + \epsilon_t \tag{6}$$

Where:

x : Variable with dimension k at integration 1(1), not cointegrated between them.

t : Error with zero mean, constant variance and covariance and no serial correlation.

P<sub>t</sub> : Coefficient matrix k x k vector autoregressive process at stable x<sub>t</sub>.

ARDL estimates explain the equilibrium relationship in the short run. The ARDL approach requires a lag, which indicates the time it takes to respond (Y), as a result of an effect. Lag selection is done using Akaike Information Criteria (AIC). The ARDL model also requires negative and significant ECT values, as a measure of parameter stability in the long term. Meanwhile, to determine the effect in the long term, the Long Run Bounds Test was carried out.

#### 3.3. Research Formulation

The formulation of the ARDL model in this study are:

$$EG_t = \alpha_0 + \alpha_1 EG_{t-1} + \dots + \alpha_p EG_{t-p} + \beta_1 \text{LogDebt}_t + \beta_2 \text{LogDebt}_{t-1} + \dots + \beta_q \text{LogDebt}_{t-q} + \kappa_1 \text{LogInv}_t + \kappa_2 \text{LogInv}_{t-1} + \dots + \kappa_q \text{LogInv}_{t-q} + \gamma_1 \text{Inf}_t + \gamma_2 \text{Inf}_{t-1} + \dots + \gamma_r \text{Inf}_{t-r} + \rho_1 \text{LogER}_t + \rho_2 \text{LogER}_{t-1} + \dots + \rho_s \text{LogER}_{t-s} + \mathbf{q}_1 \text{BIR}_t + \mathbf{q}_2 \text{BIR}_{t-1} + \dots + \mathbf{q}_t \text{BIR}_{t-t} + \varepsilon_t \tag{7}$$

Where:

- EG<sub>t</sub> = Economic Growth at time t.
- EG<sub>t-1</sub> = Economic Growth at time t-1.
- LogDebt<sub>t-1</sub> = Government Debt Log at time t-1.
- LogInv<sub>t-1</sub> = Foreign Investment Log at time t-1.
- Inf<sub>t-1</sub> = Inflation at time t-1.
- LogER<sub>t-1</sub> = Log Exchange Rate at time t-1.
- BIR<sub>t-1</sub> = BI Interest Rate at time t-1.
- t = Error Term.

#### 4. Survey Results and Descriptive Statistics

##### 4.1. Data Stationarity

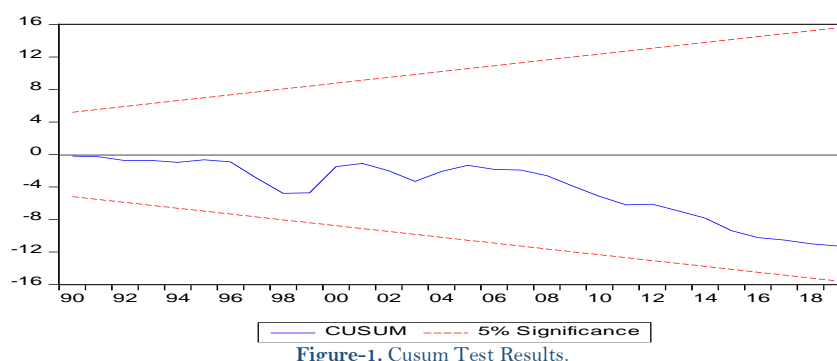
From the results of the unit root test, using the Augmented Dickey-Fuller test (ADF-test) it is obtained: the variables of Economic growth (EG), inflation (Inf), exchange rate (ER) and Bank Indonesia rate (BIR) are stationary at I(0). While the variable government debt (Debt) and foreign investment (Inv) is stationary at I(1). From the results of the stationary test data, the selection of the ARDL analysis model has been fulfilled. ARDL model is one of the appropriate models to be used in achieving research objectives. Mainly related to the influence of the independent variable on the dependent variable, both in the short term and in the long term. The results of the unit root test are as shown in Table 1 with a confidence level of equal to 5 percent.

Table-1. Unit Root Test with Augmented Dickey-Fuller

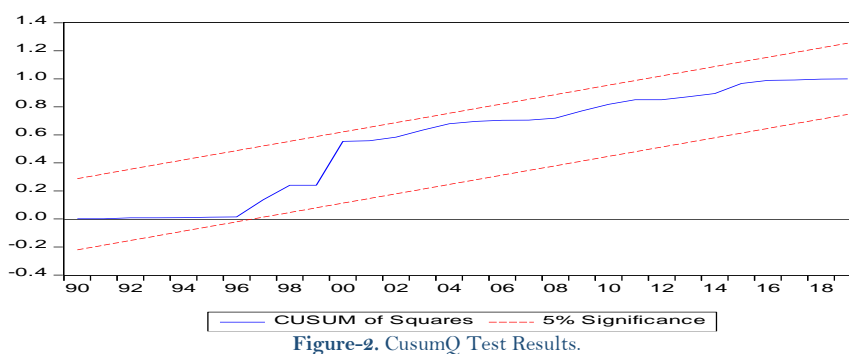
Variable	t-Stats	Mackinnon Critical	Information
	ADF	Value (5%)	
EG	-17.27413	-4.443649	stationary at I (0)
Debt	-5.095085	-4.859812	stationary at I (1)
Inv	-5.799008	-4.443649	stationary at I (1)
Inf	-14.42315	-4.443649	stationary at I (0)
ER	-5.649960	-4.443649	stationary at I (0)
BIR	-5.391481	-4.443649	stationary at I (0)

##### 4.2 Model Stability Test

To give maximum results to time series data, it is necessary to test the stability of the model. This test is intended to ensure that the model used has stability or not. The stability test of the model carried out is using Cusum and CusumQ tests, with a confidence level of 95 present. The results of the model stability test are as shown in Figure 1 and Figure 2.



From the Cusum model stability test, it proves that the data used in this study is stable. This can be proven from the test results which place the position of the Cusum line (blue color) between two positive and negative significance lines (red colour) at  $\alpha$  equal to 5 percent.



Furthermore, the results of the model stability test using the CusumQ test. Figure 2 proves that the model used is stable. This can be seen from the position of the CusumQ line (blue color) which is between the two positive and negative significance lines (red colour) at equal to 5 percent.

**4.3. Cointegration Long Run Bounds Test**

From the results of the Long Run Bounds test, as shown in Table 2, in the long term government debt and investment do not have a significant effect on economic growth. Meanwhile, macroeconomic variables consisting of: inflation, exchange rate and BIR, in the long term have a significant effect.

**Table-2. Long run bounds test results.**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Debt	0.003627	0.001050	3,453,645	0.1790
Inv	0.083753	0.135829	0.616604	0.6482
Inf	-0.412209	0.099750	-4,132.409	0.0151
ER	-0.409370	0.101020	-4,052,374	0.0154
BIR	0.350071	0.132406	2,643,921	0.0230
C	4,989.997	1,735,148	2,875,834	0.2130

In the long term inflation and exchange rates have a positive and significant effect on economic growth. Meanwhile, BIR has a negative and significant effect. Government debt and investment in the long term have no effect on economic growth. An increase in debt does not result in an increase or decrease in economic growth. However, a number of studies conclude that debt in the long term has an effect on economic growth. This result is not in line with previous studies.

**4.4. ARDL Model - Short Run Estimation**

From the estimation results of the ARDL method as shown in Table 3, it proves that there is an effect of the independent variable on the dependent variable. In the short term, government debt is at lag -1 and current investment has an effect and is significant on economic growth in Indonesia. This happened through the macro variables of inflation, exchange rates and BIR. The estimation results of the ARDL method are as shown in Table 3.

**Table-3. ARDL Model Test Results.**

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
EG(-1)	0.235472	0.104737	2,248,208	0.0344
EG(-2)	-0.102032	0.074424	-1,370,956	0.1836
Debt	-0.001734	0.001398	1,240,727	0.0272
Debt (-1)	-0.002168	0.001613	-1,344,091	0.0192
Inv	0.186422	0.219873	0.847862	0.0453
Inf	-0.188427	0.035753	-5,270,227	0.0000
ER	-0.236246	0.107902	-2,189,451	0.0390
BIR	-0.083094	0.063352	-1,311,623	0.0226
BIR(-1)	-0.034080	0.064165	-0.531123	0.0304
C	9,670,440	1,754,190	5,512,766	0.0000

From the results of testing the ARDL analysis model, it shows that all independent variables of government debt, foreign investment, inflation, exchange rates and BI rete have a balance effect in the short



term on the dependent variable (EG). Government debt, inflation, exchange rate and BI rate have a negative and significant effect on economic growth. Meanwhile, foreign investment has a positive and significant effect on economic growth.

## 5. Discussion

Withdrawal of new debt to finance the fiscal deficit, in the long term, tends to have a negative effect on economic growth and a number of macroeconomic variables, such as inflation, exchange rates, BI rate. Debt withdrawal has an effect on increasing inflation, through the money supply. Likewise with respect to the exchange rate, the increase in debt has led to the weakening of the rupiah against foreign currencies (depreciation). The addition of debt in a state of deficit, only increases the tax burden on the community. The government uses tax instruments to encourage increased state revenues. This is also a form of the government's failure to increase state revenue, especially from non-tax sources. The tax instrument is the government's most preferred choice in encouraging an increase in state revenues. However, this policy has had a negative impact on the growth of output and public consumption. The increase in debt also affects the amount of money circulating in the community, thereby encouraging an increase in inflation.

The impact of the increase in debt is an increase in the BI rate, this is related to the policy of Bank Indonesia to control inflation. so that it has an effect on the amount of investment costs. In this condition, investment will decrease. In several studies, investment has an effect on economic growth. This study finds that foreign investment in the long term has no significant effect on Indonesia's economic growth. This is illustrated by the estimation results of the Long Run Bounds Test model. Even though the results are different (in the short term), policies related to investment (domestic and international) are needed. This is intended to reduce the government's dependence on debt, especially in an effort to increase economic growth. Test result, government debt in the short term affects the increase in economic growth. The increase in debt in the long term has no effect on economic growth. Debt withdrawal should ideally be carried out not continuously and a maximum limit on the amount of debt is required. Debt that exceeds the maximum limit tends to cause a number of problems, including a decrease in output and public consumption, as a result of an increase in the tax burden. For this, policies related to debt are needed, such as: the maximum limit of money and the use of debt. Ideally debt is only intended for economic sectors that have an impact on growth. Debt withdrawal should ideally be carried out not continuously and a maximum limit on the amount of debt is required. Debt that exceeds the maximum limit tends to cause a number of problems, including a decrease in output and public consumption, as a result of an increase in the tax burden. For this, policies related to debt are needed, such as: the maximum limit of money and the use of debt. Ideally, debt is only intended for economic sectors that have an impact on growth.

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