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# DEBT AND ECONOMIC GROWTH: THE CASE OF INDONESIA

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***ABSTRACT***

*Debt is an intriguing state financing to be studied and analyzed because debt can have positive or negative impacts. Sources of debt can be from the issuance of domestically-sold bonds or foreign investment. Indonesia uses debt instruments to address the fiscal gap and increase capital for economic development. This study aims to analyze the impact of debt on Indonesia's economic growth and investment during the 1970-2018 period, using the Autoregressive Distributed Lag (ARDL) method. The study found that debt had a negative effect on GDP in the short and long run. Meanwhile, it did not affect investment in the short run but had a negative effect in the long run. The study model also had good stability as a result of Cusum and Cusum of Squares testing. Thus, appropriate debt management policies are needed to support economic growth.*

***Keywords***: *Debt, Economic Growth, Investment*

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## Introduction

Debt and economic growth have become an in-depth discussion among academics and practitioners (Ali & Mustafa, 2012; Teică, 2012; Eberhardt & Presbitero, 2015). External debt is a funding source of development for developing countries. It is because their economic output of low savings and investment is insufficient to conduct development (Ramzan & Ahmad, 2014). Based on Crude Keynesianism, public debt can cause a budget deficit that burdens the government, which then increases taxes (Phelps, 2022). According to the literature, debt has both positive and negative impacts on economic growth (Hajian et al., 2022). Ali & Mustafa (2012) explained that debt could have a positive impact through the inflow of foreign capital, industrial development, to the transfer of technology and knowledge. Several studies have also proven that debt negatively impacts economic growth (Ali & Mustafa, 2012; Azam et al., 2013; Lee & Ng, 2015; Nwannebuike et al., 2016; Al Kharusi & Ada, 2018).

Numerous studies have focused on the effect of debt on economic growth. Hayat et al. (2010) research on debt in Pakistan identified a negative effect of debt on economic output and a slowdown in the country's economic pace. Slightly different from the results of the study of Sheikh et al. (2010), where it was found that domestic debt had a positive impact on Pakistan's economic growth, but debt repayment had a more negative impact on Pakistani economy. Dritsaki (2013) found a unidirectional causality of government debt with Greece's

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economic growth. Maria & Mudayen (2017) noticed that the primary balance was the main factor for boosting economic growth, while the lag of foreign debt and fiscal sustainability had a significantly positive effect on Indonesia's economic growth for the 1979-2016 period. In the study of debt in Indonesia, one of them, Cholifihani (2008), found the phenomenon of debt overhang in the long term due to the burden of debt repayment. Mencinger et al. (2014) noticed a significant effect of public debt on economic growth in the European Union during the 1980-2010 period.

Developing countries' challenges are reducing poverty, unemployment, and social problems due to high debt (Azam et al., 2013), especially during the Covid-19 pandemic. The increase in debt occurred in almost all countries, especially for handling the impact of the Covid-19 pandemic. Azam et al. (2013) mentioned that Asian countries began to face debt problems in the early 1970s and 1979 when there was a shock in oil prices which triggered an increase in debt, including Indonesia. The debt of the Indonesian government continued to pile up during the 1997 monetary crisis. Maria & Mudayen (2017) described the role of debt in Indonesia, including fulfilling capital, facilitating international trade, and as a part of fiscal policy in encouraging the real sector. The record of Bank Indonesia (2020) on the foreign debt in each borrower group until 2018 was that the government reached 178.843 million USD, the central bank reached 32.40 million USD, and the banks reached 31.83 million USD. In addition, Non-bank Financial Corporations reached 10.40 million USD, and Non-financial Corporations reached 135.270 million USD.

The study aims to analyze the impact of debt on Indonesia's economic growth with a dataset from 1970 to 2018. This study is motivated by the high level of Indonesia's debt. The impact of debt needs to be analyzed so that the correct policy solutions can be determined, especially policies by fiscal policy instruments. The study has two contributions. First, this study investigates the effect of debt on economic growth and investment using the ARDL method because ARDL can estimate the long and short runs simultaneously to avoid autocorrelation problems. Second, the estimation uses time series data which is long enough so it can employ empirical modelling of time series by including the lag variable element.

**Literature Review**

Barro (1979) explains that besides using taxes, the government can use debt as a development funding source. Government spending (G) is assumed to be exogenous. The government receives income from taxes (τt). At the same time, aggregate income is symbolized by (Yt). Public debt is denoted bt. The government usually issues bonds with a price P and a rate of return r, within a certain time period (t). Thus, the equation for government spending is as follows:

$$G_t + rb_{t-1} = \tau_t + (b_t - b_{t-1}) \quad (1)$$

The Government Budget constraint is as follows:

$$\frac{\sum_1^\infty [G_t]}{(1+r)^t} + b_0 = \frac{\sum_1^\infty [\tau_t]}{(1+r)^t} \quad (2)$$

The impact of debt on the economy is a particular issue, especially for developing countries. Many studies have shown external debt's positive and negative impacts on economic growth. In Pakistan, it was found that there was a negative effect of external debt and debt servicing on GDP with the ordinary least squares method (Hayat et al., 2010). In Greece, Dritsaki (2013) analyzed the variables of economic growth, exports, and government debt in Greece in 1960–2011 with Vector Error Correction Models (VECM) and Granger

causality, with the result of unidirectional causality from economic growth to government debt and causality in the direction of exports to economic growth. However, in the short term, found a causal relationship between government debt and exports. Maria & Mudayen's study (2017) in Indonesia using the Two Stage Least Square method concluded that the key variables to stimulate the Indonesian economy are primary balance, lag of foreign debt, and fiscal sustainability. While central bank interest rates and the lag of foreign debt negatively affect fiscal policy. In Malaysia, there are indications of the negative effect of debt on economic growth (Lee & Ng, 2015). For the case of debt studies in developed countries such as in Europe, Mencinger et al. (2014), with panel data estimates, found a significant effect of public debt on GDP per capita. Bittencourt's study (2015) in South American countries found that steady economic growth will reduce debt levels.

**Data and Research Methods**

This study used two alternative models to estimate the effect of debt on economic growth and investment, with a cointegration analysis of Autoregressive Distributed Lag (ARDL). The estimation model and variables referred to the theoretical framework and the recent development in which the first model was based on the studies from Akram (2011), Ramzan & Ahmad (2014), and Al Kharusi & Ada (2018). The second model was based on Al Kharusi & Ada (2018), Somjai et al. (2019). The analysis in this study utilized time series data with a sample from the 1970-2018 period. The economic growth indicator employed GDP (constant 2010 US$), while the debt variable employed external debt stocks. Empirical estimation using the ARDL regression test was first conducted with a stationarity test on the research variables. Stationarity testing with Augmented Dickey-Fuller (ADF) and Phillips–Perron (PP) tests was conducted to achieve variable conditions at the level I(0) or 1st difference I(1). Furthermore, cointegration testing is carried out Bound Testing to determine the existence of cointegration in the model. According to Pesaran & Shin (1999), the ARDL equation used in this study was:

$$\Delta Y_t = \alpha + \sum_{i=1}^{p} \delta_{1i} \Delta Y_{t-i} + \sum_{i=1}^{q} \delta_{2i} \Delta D_{t-i} + \sum_{i=1}^{q} \delta_{3i} \Delta I_{t-i} + \sum_{i=1}^{q} \delta_{4i} \Delta T_{t-i} + \beta_1 Y_{t-1} + \beta_2 D_{t-1} + \beta_3 I_{t-1} + \beta_4 T_{t-1} + \varepsilon_t \quad (3)$$

$$\Delta I_t = \alpha + \sum_{i=1}^{p} \delta_{1i} \Delta I_{t-i} + \sum_{i=1}^{q} \delta_{2i} \Delta D_{t-i} + \sum_{i=1}^{q} \delta_{3i} \Delta M_{t-i} + \sum_{i=1}^{q} \delta_{4i} \Delta Y_{t-i} + \sum_{i=1}^{q} \delta_{5i} \Delta T_{t-i} + \beta_1 I_{t-1} + \beta_2 D_{t-1} + \beta_3 M_{t-1} + \beta_4 Y_{t-1} + \beta_5 T_{t-1} + \varepsilon_t \quad (4)$$

**Table 1: Definition of Operational Variables**

| Data/Variable | Definition of Operational Variable | Data Source |
|---|---|---|
| GDP (Y) | The total gross value consists of the results of the productivity of the population, income from taxes, excluding subsidies, excluding depreciation. (constant 2010 US$) | The World Bank (2021d) |
| External Debt Stock (D) | Total debt originating from abroad, both short-term and long-term debt to gross national income. (% of GNI) | The World Bank (2021c) |
| Gross Capital Formation (I) | Expenditure incurred on the purchase of fixed assets plus the net change in total inventory to form gross capital formation in the economy. (% of GDP) | The World Bank (2021e) |

| Data/Variable | Definition of Operational Variable | Data Source |
|---|---|---|
| M3 | The money supply in society consists of savings, current accounts, foreign exchange deposits, securities, and current accounts. (% of GDP) | The World Bank (2021a) |
| Openness to International Trade (T) | The volume of exports and imports of goods and services produced in an economy. (export-import as % of GDP) | The World Bank (2021b, 2021f) |

**Finding and Discussion**

Table 2 describes descriptive statistical research data consisting of the mean, median, maximum value, minimum value, and variable standard deviation. The external debt variable had an average value of 51,897, a median of 39,639, a maximum value of 168,198, and a minimum value of 25,296. In contrast, the economic growth variable, proxied by GDP, had an average value of 26,580, a minimum value of 25,207, and a maximum value of 27,768. Table 3 describes the results of the stationarity test using the Augmented Dickey-Fuller test and the Phillips-Perron test. All variables proved to be stationary at the 1st degree of difference. Only the openness to international trade variable was stationary at the level and the 1st degree of difference. A stationarity test is required to avoid spurious regression.

**Table 2: Descriptive Statistic Variable**

| | GDP | I | D | M3 | T |
|---|---|---|---|---|---|
| Mean | 26.580 | 26.424 | 51.897 | 34.319 | 50.813 |
| Median | 26.725 | 27.247 | 39.639 | 38.389 | 50.180 |
| Maximum | 27.768 | 35.072 | 168.198 | 59.860 | 96.186 |
| Minimum | 25.207 | 13.623 | 25.296 | 9.611 | 28.682 |
| Std. Dev. | 0.729 | 5.712 | 25.691 | 14.136 | 10.923 |

Source: Author's own Estimation

**Table 3: Stationary Testing Results**

| | Augmented Dickey-Fuller | | | | Phillips-Perron | | | |
|---|---|---|---|---|---|---|---|---|
| | Level | | 1st Difference | | Level | | 1st Difference | |
| | Intercept | Intercept & Trend | Intercept | Intercept & Trend | Intercept | Intercept & Trend | Intercept | Intercept & Trend |
| GDP | -1.688 (0.430) | -2.418 (0.366) | -4.917 (0.000)*** | -5.009 (0.001)*** | -1.536 (0.507) | -2.158 (0.501) | -4.939 (0.000)*** | -4.977 (0.001)*** |
| I | -1.940 (0.312) | -2.264 (0.445) | -7.2162 (0.000)*** | -6.961 (0.000)*** | -1.937 (0.313) | -2.305 (0.423) | -7.025 (0.000)*** | -6.963 (0.000)*** |
| D | -2.571 (0.106) | -2.543 (0.307) | -7.930 (0.0000)*** | -7.851 (0.000)*** | -8.133 (0.000) | -2.469 (0.341) | -8.133 (0.000)*** | -8.120 (0.000)*** |
| M3 | -1.547 (0.501) | -0.103 (0.929) | -0.384 (0.005)*** | -4.010 (0.015)** | -1.745 (0.402) | -0.867 (0.951) | -3.837 (0.005)*** | -4.0215 (0.015)*** |
| T | -3.547 (0.011)** | -3.389 (0.065)* | -10.152 (0.000)*** | -10.301 (0.000)*** | -3.454 (0.014)*** | -3.282 (0.082)* | -10.329 (0.000)*** | -11.762 (0.000)*** |

Note: ***,**, and * indicates significance at 1%, 5%, and 10% level respectively. Figures within parenthesis indicate critical values.
Source: Author's own Estimation

The selection of the most suitable ARDL model for the optimal combination of lag was based on the Akaike Info Criterion (AIC). Based on AIC selection, the best ARDL model for this research model was ARDL (4, 2, 2, 2). The Adjusted R-Squared value was 0.91, meaning that 91% of the variation in the dependent variable Y could be explained by each independent variable of the selected ARDL model. The numeric value in the brackets of certain variables, such as Y(-1), indicates the lag value of that variable, which means the lag of the Y variable in the previous year. From the short-term ARDL estimation (see Table 4), the debt variable had the most significant coefficient value with a negative mark, meaning that debt in Indonesia in this study period negatively impacted economic growth. Other independent variables that had a significant effect were Y(-2) and T(-1), which indicated a positive effect of trade openness on Y and were more attractive to I. I(-1) and I(-2) were significant to Y, which signifies capital formation, while D(-2) also proved significant to Y.

**Table 4: ARDL Estimation Results**

| Variable | Coefficient | Std. Error | t-Statistic | Prob.* |
|---|---|---|---|---|
| Y(-1) | 0.195 | 0.158 | 1.238 | 0.227 |
| Y(-2) | 0.293 | 0.154 | 1.902 | 0.068 |
| Y(-3) | 0.114 | 0.151 | 0.753 | 0.458 |
| Y(-4) | 0.199 | 0.150 | 1.332 | 0.194 |
| D | -8.660 | 3.100 | -2.792 | 0.009 |
| D(-1) | 2.790 | 2.730 | 1.019 | 0.318 |
| D(-2) | 2.830 | 1.540 | 1.834 | 0.078 |
| I | 2.110 | 9.110 | 2.317 | 0.029 |
| I(-1) | -1.880 | 1.020 | -1.839. | 0.077 |
| I(-2) | 1.640 | 8.280 | 1.982 | 0.058 |
| T | -2.380 | 3.690 | -0.645 | 0.525 |
| T(-1) | 6.220 | 3.460 | 1.799 | 0.084 |
| T(-2) | -4.090 | 2.580 | -1.589 | 0.124 |
| C | -2.250 | 1.790 | -1.252 | 0.222 |
| R-squared | 0.946 | F-statistic | 3.518 | |
| Adjusted R-squared | 0.919 | Prob(F-statistic) | 0.000 | |

Source: Author's Estimation

In performing ARDL estimation, it is necessary to test the cointegration of the model so that it can test the resulting parameters. From the Bound Testing Cointegration results, the F-statistic value was more significant than I1 Bound, indicating that all variables were cointegrated at a significance level of 5% (see Table 5). It means that the independent variables on economic growth were appropriate and related in the long run.

**Table 5: Bound Testing**

| Statistic Test | Value | k |
|---|---|---|
| F-statistic | 4.622 | 3 |
| Critical Value Bounds | | |
| Significance | I0 Bound | I1 Bound |
| 10% | 2.592 | 3.454 |
| 5% | 3.1 | 4.088 |
| 1% | 4.31 | 5.544 |

Source: Author's Estimation

It is not enough to analyze the influence of debt on economic growth just to be based on short-term information. It is necessary to analyze its effect in the long run. From the long-term ARDL estimation (see Table 6), the debt negatively affected economic growth, while investment positively affected economic growth. A large debt coefficient indicates the significant impact of debt on the Indonesian economy during the study period. Debt growth of 1% would reduce GDP by 1,540 US$. Meanwhile, every 1% increase in foreign investment would increase GDP by 9.5 US$. Regarding the trade factor, the trade openness variable did not affect Indonesia's economic growth.

**Table 6: ARDL Long-Term Estimation**

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| D | -1.540 | 7.930 | -1.94 | 0.063 |
| I | 9.470 | 3.060 | 3.092 | 0.005 |
| T | -1.260 | 1.630 | -0.077 | 0.939 |
| C | -1.140 | 8.690 | -1.310 | 0.202 |

Source: Author's Estimation

The results of this study were in line with Zhang et al. (2020), who found that debt causes high uncertainty and risk, triggers liquidity problems, crowds out, and burdens the state budget. Several previous studies have also indicated a negative effect of debt on economic growth. For example, studies from Al Kharusi & Ada (2018) in Oman, Nwannebuike et al. (2016) in Nigeria, Lee & Ng (2015) in Malaysia, Ali and Mustafa (2012) in Pakistan, and Azam et al. (2013) in Indonesia. It was contrary to the findings of Kasidi & Said (2013) who found a positive effect of external debt on Tanzania's economic growth. Debt management in Indonesia needs strategic attention and policies for the state expenditure budget so that its distribution is accurate for advancing development. Debt is ideally intended to stimulate the growth rate according to the target so that there is an improvement and fair distribution of development. Debt that is not managed wisely can burden and disrupt the exchange rate stability of the currency, disrupt the industrial sector, disrupt economic stability, reduce growth, and potentially increase poverty.

Then, the Cusum and Cusum of Square test for stability was conducted To verify the robustness of the research model. From the test results, the research model was stable during the research period, and the data range was at a significance of 5% for the Cusum Test. A data movement tended to be out of significance in the middle of the research period for the Cusum of Square Test. The results of the robustness test can be seen in Figure 1.

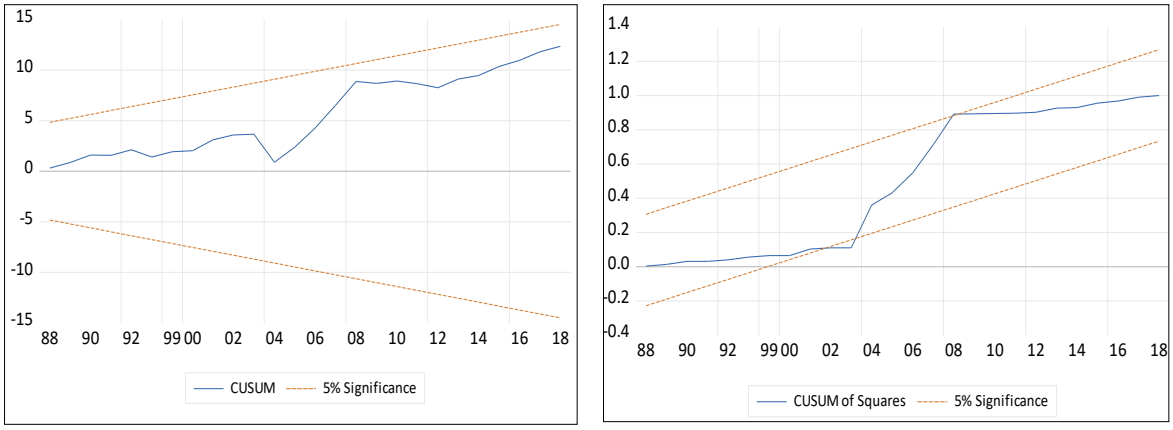


**Figure 1: Model Stability Test**

Source: Author's Estimation

The second model in this study analyzed the influence of debt on the inflow of foreign capital. The test also used the identification of the ARDL model, which found the most suitable ARDL model (1, 1, 1, 0, 0). The Adjusted R-Squared value was 0.89, which means that the variation of the independent variable had an effect of 89% on the investment (see the model on the methodology). Variable I (-1) was proven significant; surprisingly, D and D(-1) were also significant. The following variable, M3 and M3(-1), had a significant effect on each direction on each positive and negative coefficient. While intriguingly, Y and T had no significant effect on investment.

**Table: 7 ARDL Estimation Results**

| Variable | Coefficient | Std. Error | t-Statistic | Prob.* |
|---|---|---|---|---|
| I(-1) | 0.675 | 0.084 | 8.066 | 0.000 |
| D | -0.018 | 0.022 | -0.830 | 0.411 |
| D(-1) | -0.032 | 0.021 | -1.542 | 0.131 |
| M3 | 0.399 | 0.149 | 2.670 | 0.011 |
| M3(-1) | -0.313 | 0.149 | -2.101 | 0.042 |
| Y | 2.040 | 1.730 | 1.1834 | 0.244 |
| T | -0.026 | 0.045 | -0.579 | 0.566 |
| C | 8.837 | 2.439 | 3.622 | 0.00 |
| R-squared | 0.915 | F-statistic | 5.990 | |
| Adjusted R-squared | 0.899 | Prob(F-statistic) | 0.000 | |

Source: Author's Estimation

The next stage was the model cointegration test with Bounds Testing. The table shows the estimated results of the Bounds cointegration test in which the F-statistic value is more significant than the I1 Bound. Thus it can conclude that all variables in the model of the two studies were related in the long run.

**Table 8: Bound Testing**

| Test Statistic | Value | k |
|---|---|---|
| F-statistic | 4.676 | 4 |
| Critical Value Bounds | | |
| Significance | I0 Bound | I1 Bound |
| 10% | 2.402 | 3.345 |
| 5% | 2.85 | 3.905 |
| 1% | 3.892 | 5.173 |

Source: Author's Estimation

After the research variables were cointegrated, the following analysis was the long-term ARDL estimation (see Table 9). From the test results, debt was significantly negative on the inflow of foreign capital into Indonesia during the study period. The coefficient signifies that every 1% increase in debt would reduce investment by 0.15%. M3 also had a significant impact with the positive coefficient: every 1% increase in M3 would increase investment by 0.2%. Variables Y and T were not significant to I. This finding is interesting because, in the long run, investors will no longer consider Indonesia's economic output and trade openness.

**Table 9:ARDL Long-Term Estimation**

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| D | -0.155 | 0.067 | -2.311 | 0.026 |
| M | 0.265 | 0.141 | 1.873 | 0.069 |
| Y | 6.290 | 4.900 | 1.283 | 0.207 |
| T | -0.079 | 0.136 | -0.584 | 0.563 |
| C | 2.719 | 5.906 | 4.605 | 0.000 |

Source: Author's estimation

With the current condition of the world economy, which is still affected by the Covid-19 pandemic, debt management is more complicated. Significant findings from this study have similarities with Azam et al. (2013), using Indonesia's debt data from 1980–2012 with the Least Squares technique, with the result that external debt negatively affects Indonesia's economic growth. In addition, a multi-country debt study by Eberhardt & Presbitero (2015) showed a negative relationship between public debt and growth in all countries.

Robustness tests were carried out using the Cusum and Cusum of Square Stability tests to ensure that the first model has valid parameters. The graphics of Cusum testing show that the variables in the research model were relatively stable; the data range was at a significance level of 5% during the research period. Likewise, from the Cusum of the squares test chart, the data distribution has a significance level of 5%.

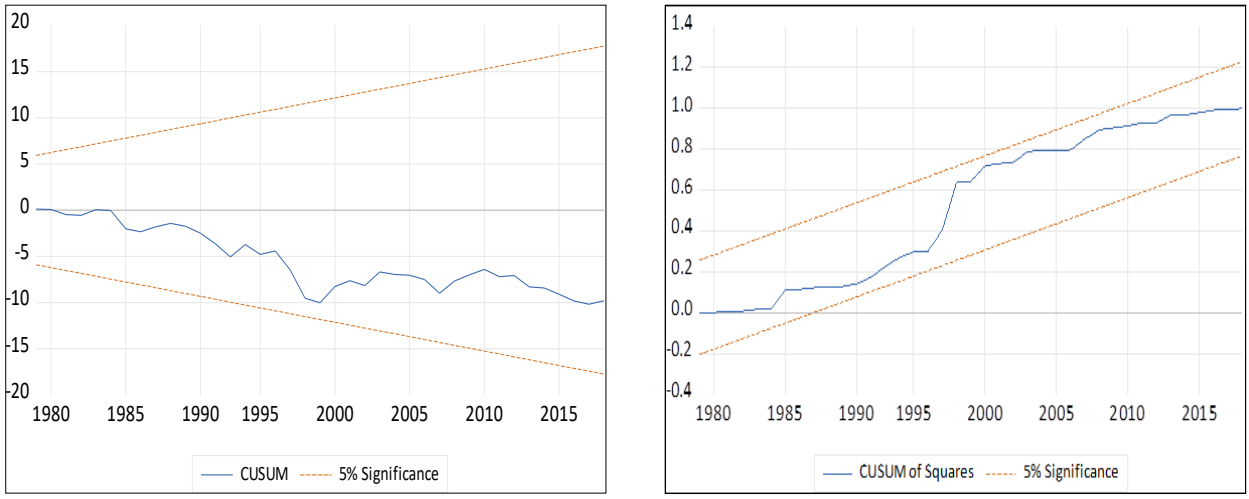


**Figure 2: Model Stability Test**

Source: Author's Estimation

## Conclusion

Development financing needs require a specific strategy between fiscal policy and monetary policy. Debt as one of the fiscal policy schemes is very familiar to be used to maintain the sustainability and balance of fiscal policy, especially in Indonesia. This study empirically examines the impact of debt on Indonesia's economic performance from 1970 to 2018. The main finding is evidence that debt significantly burdens economic performance in Indonesia. In both the short and long terms, debt negatively affects the outputs. Another important finding from the empirical test results is that debt has been shown not to affect investment for short-term analysis but has a positive effect on long-term analysis. Based on a macroeconomic perspective, investment, as one of the primary capital shapers, can drive the production

sector, and exports also encourage the addition of state income. The recommendations that can give are the need to establish institutional efficiency in encouraging investment and debt management policies that have a more positive multiplier effect on an ongoing basis so that debt has economic value added. In addition, increasing exports is necessary to reduce foreign dependence.

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