ANALYSIS OF SUBSIDIES, INFLATION, EXCHANGE RATES, BI RATES ON FISCAL SUSTAINABILITY IN INDONESIA

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ABSTRACT

This study aims to analyze the effect of subsidies, inflation, exchange rates and BIR in the short and long term on fiscal sustainability in Indonesia. This study uses annual time series data from 1975–2017. To find out the long-term balance relationship between the research variables is carried out by long run Bounds test. While for short-term balance using ARDL estimation. The research results obtained in the long term subsidies and BIR have a positive and significant effect on fiscal deficits. While the exchange rate has a negative and significant effect on fiscal deficits. In the short term, in the previous 3 years, subsidies and SBI have a positive and significant effect on fiscal deficits, while inflation has a negative and significant effect on the fiscal deficit. For the previous 2 years period, subsidies have a negative and significant effect on fiscal deficits. For the current period, subsidies are not significant for fiscal deficits, and inflation and BIR have a positive and significant effect on fiscal deficits. While the exchange rate has a negative and significant effect on the fiscal deficit. Likewise, the estimated results of long run Bounds Test subsidies, exchange rates and SBI have a balance relationship in the long run with fiscal sustainability. While inflation does not have a balance relationship in the long term fiscal sustainability. ARDL test results show subsidies, inflation, exchange rate, BIR has a balance in the short term with fiscal sustainability.

Keywords: Subsidies, Inflation, Exchange Rate, BI Rates, Fiscal Sustainability and ARDL

1. Introduction

Indonesia is currently carrying out fiscal agreements within the framework of fiscal sustainability and stable economic growth. This effort overcomes major challenges, which are contrary to government expenditures, high subsidized energy, instability in the rupiah exchange rate against the USA Dollar and current allocation deficits. This condition has been exacerbated by primary deficits since 2012 until now. Fiscal success incurred when the fiscal is in progress issued by the

government from time to time (Adams, 2011). Fiscal sustainability shows financial policy in stabilizing the budget through long-term financial solvency, which is managed through: optimal revenue, quality expenditure, and managed expenditure management (Balassone and Franco, 2000). The solvency agreed upon by the government requirements fulfills the requirements in carrying out the functions of distribution, allocation and stabilization (Trilogy of Musgrave). Fiscal success can also be seen from the fiscal capacity to finance all expenditures for an unlimited period of time (Langenus, 2006; Yeyati and Sturzenegger, 2007). Consequently, it must determine fiscal risk. Contingent liabilities (Brixi and Mody, 2002).

In the case of facing a deficit, it can be done through spending adjustments or allowing the deficit to grow by itself, while trying to find sources of income to cover the deficit, or through the withdrawal of new debt. Deficit reduction efforts are important to increase fiscal space. If the decrease in deficit is defined as a decrease in spending, it is feared that it will have an impact on the Growth of Gross Domestic Product (GDP), which causes a gap in the welfare of society, (Subagjo, 2005). The study conducted by Yadirichukwu (2012) mentions the role of expansive fiscal policy in economic stability, through increasing government spending. Government expenditure has a positive and significant effect on the increase in real GDP per capita. Mankiw (2009), Todaro (1985) mention fiscal policy designed to increase national income and control inflation, encourage economic growth, and increase GDP as an indicator in its measurement. Another study of fiscal sustainability occurs if the current level of debt is below a certain threshold (Siddique and Selvanathan 2016 and Baharumshah et al., 2017). After the 2008 global financial crisis it affected the increase in debt and fiscal deficits. There is a significant increase in debt and results in failure to pay debt in countries that are not tolerant of debt. Increasing debt at an alarming level needs to be watched out. High debt position, can reduce the debt to GDP ratio. Fiscal risks stemming from excessive debt have become the focus of fiscal policy. As a result of failure to make repayments. Thus to realize sustainability, good fiscal consolidation and debt stabilization are needed. The approach to assessing fiscal sustainability that is commonly used is a time-bound budget constraint. There has been great concern in overcoming fiscal sustainability issues, so the need to carry out fiscal consolidation and debt stabilization has become stronger (Belhocine and Dell' Erba, 2013). This requires a government debt threshold, as a signaling tool for controlling fiscal risk.

Cuddington, at al., (1989) states that if there is an increase in debt and accompanied by interest rate instability, it can adversely affect fiscal financing. Icaza (2018) an increase in debt in the process of fiscal consolidation in the long term does not always lead to a reduction in the debt to GDP ratio. This shows that the deficit can stop adjusting after the debt reaches a certain limit. Jha, at al., (2014) oil price fluctuations significantly influence fiscal sustainability through the amount of energy subsidy pathways and increased inflation. Besides the fluctuating (rising)

exchange rate conditions have caused debt to increase. The increase in oil prices has caused spending to increase energy subsidies. Inflationary pressure was triggered by a surge in global commodity prices, especially oil prices. Simorangkir and Adamatri (2010) an increase in oil prices not only boosted inflation, but also increased fuel prices, following a decision to raise the price of subsidized fuel. Besides fluctuating exchange rate conditions have caused debt to increase (Mark, 2004; Jha, 2009; and Marisa, 2015). Exchange rates are an important variable in international trade transactions. The weakening of the exchange rate has caused an increase in the price of goods containing imported components. The depreciation of the rupiah against the USA dollar has resulted in increased government spending, especially for operational expenses related to foreign exchange. Exchange rate fluctuations also result in increased debt. Debt as a deficit financing solution, but it can reduce fiscal space in planning and spending (Zuhroh et al., 2007, Taylor, L. et al, 2012). Debt growth is also caused by increased government spending, including an increase in subsidy spending. Average subsidy expenditure reaches around 3.1 percent of annual GDP since fiscal 2010. Realization of subsidy spending far exceeds the budget limit of subsidies. The subsidy policy, which is intended to encourage production and equal distribution of income in the poor, has burdened the fiscal sector. In the midst of debt growth exceeding the growth of state revenues, the step in subsidizing expenditure efficiency is important to do. Efficiency of subsidy spending is intended to reduce the rate of debt growth (Wangke, 2012; Dartanto, 2013; Hidayat, 2014).

II. LITERATURE REVIEW

2.1 Fiscal Deficit

Expansive fiscal policy contributes to increasing government spending to encourage economic growth. A fiscal deficit occurs as a result of government spending greater than state revenues. According to Musgrave (1980) fiscal surplus or deficit can be formulated as follows:

$$GB = (R + G) - [E + (L - Re)] \ldots\ldots\ldots\ldots\ldots (2.1)$$

Where:
GB = Government Balance,
R = Revenue
G = Grant
E = Expenditure
L = Lending
Re = Repayment

Subagjo (2005) budget adjustments or the withdrawal of debt both have implications for economic performance, namely reducing the potential for output. The act of adjusting the budget through construction or fiscal reflection influences the decline in output and a slowdown in

economic growth. Thus the case of deficit financing through debt has resulted in a decrease in government spending on investment and capital. Expenditures are absorbed to pay off debt principal and interest. As a result, potential output and economic growth experience decline.

2.2 Gross Domestic Product (GDP)

Fiscal stimulus through improved revenues and expenditures in an effort to increase GDP. Keynes's theory states, when a recession occurs, the government needs to implement an expansive fiscal policy, through additional expenditure and reducing (countercyclical) taxes. Research in some developing countries tend to carry out pro cyclical policies, through decreasing expenditure and raising taxes in times of recession. This fiscal policy has an impact on inflation and income, which places expenditure beyond revenue. As a result there is an increase in deficit every year. In the case of deficits through withdrawal of foreign debt is a momentary effort. Furthermore, the view given by Kunarjo (2001) in his study stated that the larger budget deficit had a negative impact on GDP growth in the country.

2.3 Fiscal Sustainability

The fiscal sustainability study by Buiter (1985) focuses on the problem of public budget deficits and public debt burdens in the application of Medium Term Financial Strategy (MTFS). Blancard (1990) in his study, measured changes in fiscal policy and analyzed the impact of fiscal policy through budget and debt deficits. Fiscal sustainability studies then develop and produce varied methods and measurement applications. Fiscal sustainability studies are needed by policymakers as an indication of the need to correct a country's fiscal policy. Fiscal sustainability is a continuation of government revenues and expenditures, both on the planner and implementation side. In a deficit situation, less income is spent. Financing planning is an important part to be taken into account in fiscal sustainability. In the literature of public finance, it is discussed with inter temporal budget constraint keywords. Besides the amount of debt and the primary balance, the magnitude of the real interest rate is the burden of government payments on existing debt. And the magnitude of the level of economic growth greatly determines fiscal sustainability. Thus fiscal sustainability is rooted in two problems, namely primary balance and debt management problems. Fiscal sustainability is closely related to regulating public debt (Aldama, 2018). Fiscal sustainability is needed so that economic growth can occur in short and long term positions. The primary balance is the difference between state income and expenditure, not including the payment of debt and interest installments. While the fiscal deficit is the difference between state income and expenditure including debt payments. Government debt to GDP ratio. Fiscal policy can be said to be sustainable if it does not cause excessive accumulation debt, and the government can maintain the debt ratio at a certain level (Blanchard, 1990 and Buiter (1985).

Fiscal sustainability needs to pay attention to the relationship between the primary balance and the outstanding debt. This relationship assumes that the present value of the primary balance surplus in the future is equal to the outstanding debt at a certain time the present value approach If the outstanding debt from year to year increases, then the primary balance surplus from year to year also increases with the trend of increasing the same, or greater than the increase in debt so that the debt repayment period becomes shorter. Fiscal sustainability using this approach is based on the government fiscal financing constraint model (Cuddington, 1989). This model states that:

$$B_t = (1 + r_t) \, B_{t-n} \text{ x SURPB} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(2.2)}$$

Where:

B_t = number of outstanding government bonds (outstanding) in year t;
r_t = interest rate;
SURPB = surplus in primary balance.

The above equation states that the outstanding amount of government debt is equal to the difference between interest and government debt installments with a primary surplus. The primary surplus itself is the difference between the budget for revenue and budget for government expenditure outside of interest and debt repayments. Based on equality (1) above can be described again into:

$$B_t - B_{t-n} = r_t \, B_{t-n} - \text{SURPB} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(2.3)}$$

Or:

$$\Delta B = r_t \, B_{t-n} - \text{SURPB} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(2.4)}$$

Information:

Where ΔB is additional government debt.

From the equation it can be concluded that: (1) If SURPB = 0, then the debt will increase by the interest on the previous debt. (2) If SURPB is lower than r, then B is positive, which means the principal of government debt continues to increase. (3) If SURPB is greater than r B_{t-n}, then B is negative, which means the principal of government debt continues to decline.

2.4 Subsidy Policy

Moor (2001) subsidy is a policy to alleviate certain consumers in order to obtain products at prices below market prices, or in the form of policies to help producers to obtain income above the price paid by consumers, by providing assistance directly or indirectly. However, the policies

carried out must be right on target. The mentions market failures that often occur in developing countries such as market distortions where buyers do not get perfect information, the number of small companies, public goods, the weak protection of the copyright of goods in the economy. To overcome this, the government issued a subsidy policy to reduce inefficiencies in the market. With the existence of subsidies will increase the demand for these goods and then responded by the company by increasing production. In the 2017 of APBN, subsidies are one mechanism to carry out the distribution function. Application of the distribution function in the APBN as an effort to equalize people's welfare. Subsidies are intended to alleviate the burden of the community in fulfilling their basic needs, and at the same time maintain the producers to be able to produce sufficient basic needs for the community, at affordable prices. The provision of subsidies is also intended to maintain the stability of prices of goods and services in the country, provide protection for low-income communities, increase agricultural production, and provide incentives for businesses and society.

Amid the limitations of the state budget, freeing from the shackles of subsidies clearly provides a lot of fiscal space in accelerating infrastructure and physical spending in the regions. The problem faced by the government is always the limited fiscal space in the APBN, due to the high burden of mandatory spending allocated annually. Mandatory expenditures are expenditures that have been determined by law, cannot be changed, are fundamental and are sought to be allocated annually such as: education, health, regional transfers and subsidies. As a tool in the mechanism of public policy. So that the fuel subsidy must still be allocated as a manifestation of the state's concern for the small-scale economy. Although referring to the Susenas (National Socio-Economic Survey) data in year 2008, in 77 percent of those who enjoyed fuel subsidies actually came from rich middle class people. In the future, a more basic and structural reform of the fuel subsidy policy needs to be done in support of efforts to create a more efficient and targeted fuel subsidy design. Another alternative policy is the targeted subsidy mechanism, where there will be a shift from price subsidies to people's subsidies. In theory, the targeted subsidy policy is often considered to be the best solution in reducing the rate of consumption in addition to the price mechanism. Therefore, targeted subsidy is more implementable than the fuel oil fixed subsidy policy.

The expenditure policy for subsidies, especially fuel oil has been holding the state budget every year. Taking into account the resistance posed, the government gradually began to reduce fuel subsidy spending, while combining it with a fixed subsidy policy for diesel fuel. With the savings on government subsidy spending, it has a savings budget. Subsequent savings amounts are allocated to increase the education, health and other infrastructure budgets. The amount of energy subsidy expenditure is very dependent on parameters, including: ICP, the exchange rate of the rupiah against the USA dollar, and the volume of consumption. The policy of allocating

energy subsidy spending in the APBN is to provide fuel oil at affordable prices. The fuel oil is a strategic commodity for the community and an important commodity for development. Therefore, the state has an interest in providing fuel for the wider community. The fuel subsidy expenditure policy has created a dilemma. From several studies, the subsidy policy has so far not been on target and tends to hamper national economic growth. The beneficiaries of the most fuel expenditure are the household groups that are capable compared to poor households. So that the implementation policy so far has caused economic injustice and widened the income gap of the people. Subsidies have resulted in new distortions in the economy, inefficiencies and the creation of forms of subsidies that are not enjoyed by those who are entitled. Dartanto (2013) further stated that there was an urgent need to stop fuel subsidies in Indonesia. This is caused by a severe fiscal deficit and deterioration in the income distribution of the community. Where fuel subsidies are almost 72 percent enjoyed by 30 percent of income groups with good income. With consuming an average of 63.8 percent of the total subsidy between 1998 and 2013.

2.5 Inflation

According to Keynesian structural theory the causes of inflation are demand-pull inflation and cost-push inflation. Demand-pull inflation is inflation caused by too strong an increase in aggregate demand (AD) from the community towards production in the market for goods and services. The increase in AD is due to the increase in consumption (C), Investation (I), government expenditure (G), export (X) and Import (M). While cost-push inflation is inflation that occurs due to the impulse of costs as a result of the increased production costs of domestic and foreign goods and services in the production market, which results in an increase in commodity prices in the commodity market. The concept of inflationist theory from the structuralize point of view states that inflation is a long-term phenomenon that emphasizes the rigidity of the economic structure of a country, especially developing countries, such as the inability of export and domestic production receipts (Boediono, 1990). Meanwhile, according to Keynes, inflation is the trigger for inflation to be government spending, although the contribution of this factor is small on the inflation rate. Government expenditure has a limit that is no more than the Gross Domestic Product (GDP). In line with this, the focus of attention related to inflation is greater in fiscal policy capability. In line with the development of the inflation theory, there is a theory that explains that inflation is a fiscal phenomenon. This theory is known as fiscal theory of price level (FTPL). This theory explains that inflation is caused by government debt, current and future taxes, government expenditure plans, and there is no direct relationship with monetary policy. FTPL explains the effect of wealth on government debt is an additional route of fiscal influence on inflation, or an increase in government debt will increase the wealth of consumer households, resulting in increased demand for goods and services, and will suppress inflation to rise. However, this traditional view is challenged by the fiscal theory of price level,

which states that fiscal policy plays an important role in determining prices through the budget constraint associated with debt, expenditure and taxation policies. The Fiscal theory of the price level approach is an FTPL Weak form, assuming that the central bank will respond by creating storage in order to avoid default. Therefore this theory also states that fiscal policy also determines inflation through money growth futures. This theory simply states that the main cause of the money supply is the fiscal authority. In other words, fiscal policy is exogenous while the movement of money supply is endogenous (Surjaningsih et al., 2012). The study conducted in relation to the relationship between fiscal policy and monetary in explaining the price level. This study explains that in the Ricardian Regime, it is the fiscal authority that covers all government debt, and government debt only has a small effect on the price level. The study of the impact of fiscal policy on inflation is carried out through the relationship between fiscal policy and monetary. In the macroeconomic framework, monetary policy and fiscal policy will influence inflation through changes in the aggregate demand and supply side. If the government can intervene in monetary policy, there is a possibility that it will use that power to support the policies taken. To finance the deficit, for example, the government asked the central bank to keep interest rates at a low level so that the interest costs to be paid by the government were low. Likewise if a conflict occurs, the government can force the central bank to support its policies (Sargent & Wallace, 1981).

2.6 Exchange rates (ER)

In developing countries exchange rates are important in disciplining fiscal (Taregul and Obsffelt, 2000). Exchange rates are the price of one country's currency against another country's currency (Krugman and Obsfelt, 1994). The nominal exchange rate is the relative price of the two countries' currencies and the exchange rate between two countries is the agreed price level of the population of the two countries to trade each other (Mankiw, 2009). According to Krugman and Obstfelt (2000) there are several main factors such as: relative inflation rate, relative income level, relative interest rate expectations, money supply (M2) and balance of payments which affect the high and low exchange rates of domestic currencies against foreign currencies. Pareshkumar at al., (2014) further stated that the factors that affect exchange rates are inflation, capital account balances, the role of speculators, industrial costs, national debt, gross domestic product, political stability and economic performance, data work, relative strength of other currencies, macroeconomics and geopolitical event.

Sarwono and Warjiyo (1998) state that there are basically four transmission lines that show how the monetary policy can affect the economy, namely: the exchange rate channel, the interest rate channel, the set price line and the banking credit line. The exchange rate path assumes that the exchange rate movements are most influential for the economy. If international interest rates do not change, it will encourage the entry of funds from abroad. So that the exchange rate tends to

appreciate, export activities will decline and conversely imports will increase. Krugman and Obstfeld (1994) mention that changes in exchange rates can be divided into two, namely depreciation and appreciation. Depreciation is a decrease in the value of the domestic currency against foreign currencies, while appreciation is an increase in the value of the domestic currency against foreign currencies. If other conditions remain (ceteris paribus), then the depreciation of a country's currency makes the price of the country's goods cheaper for foreign parties while the price of foreign goods becomes more expensive for foreign parties. And vice versa, the appreciation of a country's currency causes the price of the country's goods to be expensive for foreign parties while the price of foreign goods becomes cheaper for domestic parties. The classic inflation theory argues that the price level, mainly determined by money supply, can be explained by the relationship between the value of money and the amount of money, as well as real money and prices (Mankiw, 2000). The currency value of a country that tends to decline indicates that the country has a high level. A country's inflation is higher compared to other countries, which means that the price of goods in that country rises faster than other countries. This results in exports going down and imports going up because the prices of goods of the country concerned are more expensive compared to other items (Depari, 2009).

2.7 Bank Indonesia Rates (BIR)

The Keynesian view that states the interest rate is a monetary phenomenon. The interest rate is determined by the supply and demand for money (determined in the money market). Money affects the economic level (GDP), as long as this money will affect the interest rate. Changes in interest rates further influence the desire to invest, which affects the GDP of Keynes, saying that money supply has a positive influence on output growth and the economy. This condition has an impact on increasing investment, which in turn will create an increase in output and trigger economic growth (Nopirin, 1992). Interest rates are an important variable in the macro economy, which is expressed from the burden of borrowed money. The interest rate in essence is price. Interest rate stability is intended to maintain domestic investment, exchange rate stability and economic growth. Interest rates become the government's instrument in controlling the money supply. Thus the government can regulate the circulation of money in an economy. Raising interest rates is the central bank's tool in tapping the inflation rate, through restrictions on money circulating in the community. High interest rates make borrowing costs more expensive and economic activity decreases. High interest rates cause the cost of money to be expensive and weaken competitiveness so it is not passionate about investment, production will decline and economic growth will stagnate (Boediono, 2004).

III. RESEARCH METHODS

This study analyzes the effect of subsidies, inflation, exchange rates and interest rates on Bank Indonesia in the short and long term on fiscal sustainability in Indonesia. In the face of deficits, efforts are made through withdrawing new debt or making budget adjustments (revenue and expenditure). New debt withdrawals in conditions of primary balance deficits are certainly not the right choice. Considering the addition of debt will be the formation of excessive debt accumulation, and this has the potential for fiscal risk. The study conducted a study in connection with secondary expenditure policy on fiscal sustainability in Indonesia. The level of the ratio of fiscal deficit to GDP becomes a measure in fiscal sustainability. The variables in this study consist of the dependent variable, namely fiscal sustainability (KF) and independent variables in the form of: subsidies, inflation, exchange rates and interest rates. The research period starts in 1975 until 2017.

3.1 Data Stationer Test

The first step taken for time series data is stationer test. Each time series data is a data generated from the results of the stochastic process. A stochastic process data can be said to be stationary if it meets three conditions, namely: if the average and its variants are constant over time and the covariance between the two time series data depends only on lag between the two time periods. Stationary time series data on average, the variance and covariance at each lag will be the same every time. If the data is not stationary then the data does not meet these requirements or in other words the data has an average and the variants change over time, (Widarjono, 2006).

Data that is not stationary will produce ambiguous regression, which is a regression that connects two or more variables that appear to be statistically significant, but not as a regression result. To find out stationary data, unit roots test is done. Unit root testing used by using ADF (Augmented Dick Fuller). The concept of ADF-test testing is if a time series data is not stationary at zero order, I (0), then the data stationer can be searched through the next order so that the stationary level in the first order (first difference) or I (1) is obtained. Or second difference or I (2), and so on. This test has the following:

$$Y_t = \beta_0 + \beta_1 X_{1t} + \beta_2 X_{2t} + ... + \beta_P X_{Pt} \ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.1)$$
$$\Delta Y_t = \beta_0 + \beta_1 X_{1t} - X_{1t-1} + \beta_2 X_{2t} - X_{2t-2} + ... + \beta_P X_{Pt} - X_{Pt-1}. \ldots\ldots\ldots (3.2)$$

Where:
Y = Stationary level
ΔY_t = First difference from y
β_0 = Constant value or intercept
β_1 = regression coefficient for trend

t   = time

3.2 Determination of Optimum Lag

The optimum lag setting in the model is done to know the lag combination in the ARDL model (p, q). Optimal lag is chosen based on Akaike Information Criterion (AIC) base values, Schwarz Bayesian Criterion (SC), and Hanna Quinn Criterion (HC). According to Pesaran, at al., (2001) ARDL-AIC and ARDL-SC show better abilities in the majority of experiments conducted. This shows that the Schwarz Bayesian Criterion (SC) is a consistent model selection criterion when the Akaike Information Criterion (AIC) is inconsistent. Determination of the optimum lag is done by selecting the smallest criterion value.

3.3 Cointegration Approach

Cointegration test is done by testing whether the variables that are not stationary in the data are cointegrated level between one variable and another variable. This cointegration is formed when a combination of variables that are not stationary produces stationary variables. If there are equations as follows:

$$y_t = \beta_0 + \beta_1 X_1 + \varepsilon t \ \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \ \dots\dots \ .. \ (3.3)$$

Hence, the variant of the equation can be written as:

$$\varepsilon_t = y_t - \beta_0 - \beta_1 X_1 \ \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \ \dots\dots. \ (3.4)$$

Note that εt is a linear combination of X_1 and X_2. The cointegration concept introduced by Engle and Granger (1987) requires that et must be stationary at I (0) to be able to produce a balance in the long run.

In this study, researchers used Bounds Test Cointegration with the ARDL approach introduced by Pesaran, at al., (2012). This method is done by comparing the calculated F-statistical value with the critical value compiled. If the F-statistic value is below the lower bound value, it can be concluded that there is no cointegration. If the F-statistic value is above the upper bound value, it can be concluded that there is cointegration. But if the F-statistic is between the lower bound and upper bound values, the result is inconclusive.

3.4 Autoregressive Distributed Lag (ARDL) Estimation Method

ARDL method is one form of econometric model introduced, which is a combination of Autoregressive and Distributed Lag methods. Lag means a past value that will be used to see future values. Autoregressive (AR) method is a method that uses one or more past data from a variable *Y*, while Distributed Lag (DL) is a regression method that involves data at the present time and past time from a variable *X*. The ARDL model has several advantages (Gujarati, 2009):

    a. ARDL is not concerned with stationary data level (different from the Vector Auto regression (VAR) method and Vector Error Correction Model (VECM) which requires stationary on the same order, but ARDL cannot be used if the data is stationary in the form of 2nd differencing).

    b. ARDL does not issue a small number of samples or observations

The ARDL method can see short-term and long-term balance relationships. To see long-term relationships by involving the existence of a cointegration concept among time series variables. This test is intended to estimate long-term relationships, such as bassed residuals Engle-Granger (1987) and Johansen (1988). This study uses the ARDL Bound Test developed by Pesaran, at al). The procedure in ARDL is believed to be able to estimate parameters in the long run correctly, and can estimate t-statistics. Bound Approach Test Cointegration has three advantages, which can be used in short series data (short series) and does not require pre-estimation. Cointegration test in this method is done by comparing the value of F-statistics with F table.

The approach using the ARDL model requires lag (different time). Lag can be defined as the time needed for the emergence of a response (Y) due to an influence (action or decision). Selecting the right lag for the model can be done using the Schawrtz-Bayesian Criteria (SBC), Akaike Information Criteria (AIC) basis or by using other criteria information. A good model has the smallest criterion information value. The next step in the ARDL model is to estimate parameters in the short term. In estimating the long term, the important thing is that the error correction term (ECT) must have a negative and significant value. Negative values in ECT indicate valid models. All coefficients in short-term equations are coefficients that connect dynamic models in the short term convergent to equilibrium. This shows an imbalance due to the shock in the previous year adjusted for the long-term balance of the previous year.

The next stage that is carried out in the ARDL method is to ensure that the estimation model is free from autocorrelation, non-normality, and heteroscedasticity. By using the OLS (Ordinary Least Square) method, such as: Jarque-Bera Test, Ljung-Box Test and ARCH test on each model. Although in the estimated model there is cointegration, it can occur from uncertain estimation results, as a result of non-constant parameters. To test the stability of model parameters in the long term, the Cumulative Sum of Recursive Residual (CUSUM) test is performed. The CUSUM results of this test will be in the form of a line plot with a real level of 5%. If the cumulative sum is outside the line area, the estimated parameters are not stable.

3.5 ARDL model

Analysis of variable fiscal sustainability (KF), Subsidies, Inflation, ER and BIR using ARDL. The ARDL equation in this study is:

$$KFt = \alpha_0 + \alpha_1 \, KF_{t-1} + ... + \alpha pKF_{t-p} + \beta_1 LSubsidies_t + \beta_2 LSubsidies_{t-1} + ... + \beta qLSubsidies_{t-q} + \gamma_1 Inflation_t + \gamma_2 Inflasion_{t-1} + ... + \gamma rInflasion_{t-r} + \rho_1 LER_t + \rho_2 LER_{t-1} + ... + \rho sLER_{t-s} + \mu_1 BIR_t + \mu_2 BIR_{t-1} + ... + \mu tBIR_{t-t} + \varepsilon_t \, ... \, 3.5$$

Where:

KFt	: Fiscal Sustainability (Percent) at t
KF_{t-1}	: Fiscal Sustainability (Percent) at time t-1
L Subsidies$_{t-1}$	: Subsidized Log (Rp) at t-1
Inflation$_{t-1}$	: Inflation (Percent) at t-1
LER$_{t-1}$	: Log Exchange Rates (Rupiah) at t-1
BIR$_{t-1}$	: Bank Indonesia Rates (Percent) at t-1
E$_t$	: Term Error

IV RESULTS AND DISCUSSION

4.1 Stationary Data Test Results

Unit root testing is done using the Augmented Dickey-Fuller test (ADF-test). This test is intended to ensure that all variables used are stationary, both in order (I (0)) and in I (1), with a confidence level of $\alpha = 5\%$. The results of root unit testing for each variable as shown in Table 4.2.

Table 4.1
Unit Root Test Results with ADF - Test

Variable	t-Statistic ADF	Mackinnon Critical Value (5%)	Information
KF	-7,851336	-5,175710	stationary at I (0)
L Subsidies	-7,800914	-5,175710	stationary at I (1)
Inflation	-21,89620	-5,175710	stationary at I (0)
LER	-7,261487	-5,175710	stationary at I (0)
BIR	-6,358395	-5,175710	stationary at I (0)

Source: Data processed, 2018

Based on the results of the variable stationary test (LKF and Inflation) in the first test (level), the ADF statistic value is smaller than the Mackinnon value of 5% critical value or the probability value is smaller than α = 5%, then H_0 is accepted. This means that the variables KF, LER, Inflation and BIR are stationary at the level (I (0)), with the test results obtained ADF statistical values are smaller than the value of MacKinnon critical value (5%) for L Subsidies variables, meaning the variables are stationary at Level. Whereas for L Subsidies variable continued on testing the first difference level, with the test results obtained the ADF statistical value is smaller than the critical value Mackinnon value (5%) for the L Subsidies variable, meaning that the variable is stationary at first difference. From the results of testing the stationer of these variables can be a reference for the selection of the ARDL model. The next step is to perform optimal lag determination.

4. 2 Optimal Lag Determination

To determine the optimal lag that will be used in the redemption of the ARDL model can be done through the Akaike Information Criteria Graph, as shown in Graph 4.1.
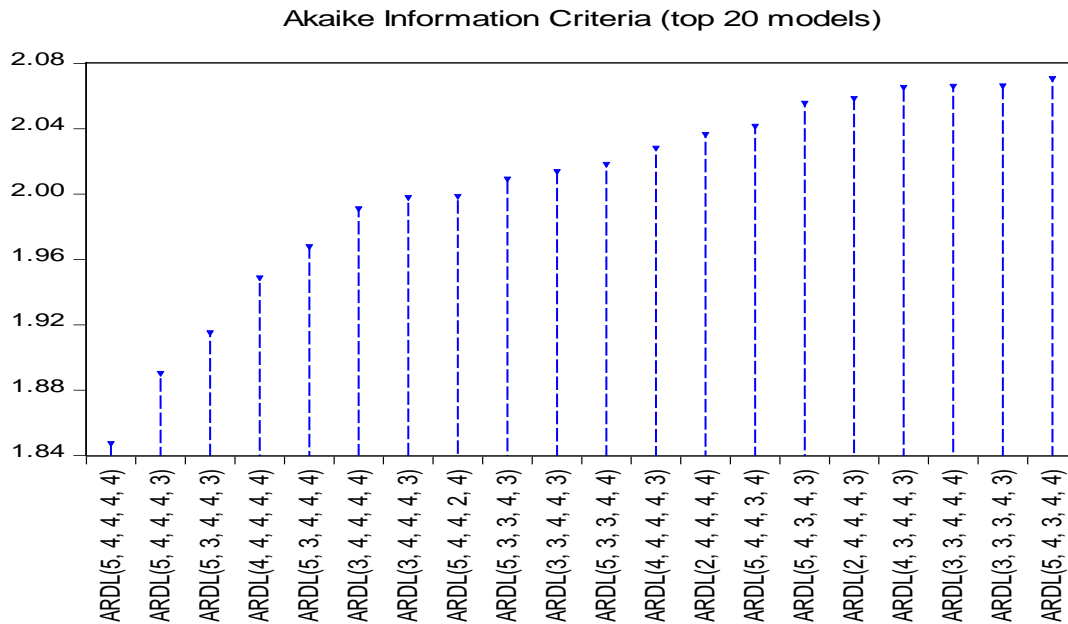
Graph: 4.1
Akaike Information Criteria Graph

Based on the results of the variable stationary test (LKF and Inflation) in the first test (level), the ADF statistic value is smaller than the Mackinnon value of 5% critical value or the probability

value is smaller than α = 5%, then H_0 is accepted. This means that the variables KF, LER, Inflation and BIR are stationary at the level (I (0)), with the test results obtained ADF statistical values are smaller than the value of MacKinnon critical value (5%) for L Subsidies variables, meaning the variables are stationary at Level. Whereas for L Subsidies variable continued on testing the first difference level, with the test results obtained the ADF statistical value is smaller than the critical value Mackinnon value (5%) for the L Subsidies variable, meaning that the variable is stationary at first difference. From the results of testing the stationer of these variables can be a reference for the selection of the ARDL model. The next step is to perform optimal lag determination.

4. 2 Optimal Lag Determination

To determine the optimal lag that will be used in the redemption of the ARDL model can be done through the Akaike Information Criteria Graph, as shown in Table 4.2.

Table 4.2
ARDL Bounds Test Results

| Test statistic	Value	K
F-statistic	5.112865	4
Critical Value Bounds		
Significance	I(0) Bounds	I(1) Bounds
10%	2,2	3,09
5%	2,56	3,49
2,5%	2,88	3,87
1%	2,29	3,37

Source: Data processed, 2018

4.4 Cusum and CusumQ Tests

To find out whether the model used is good or not (stable), it can be done through CUSUM and CUSUMQ testing. The test results are as shown in Graph 4.2 Cumulative sum (CUSUM) of Recursive Residuals and 4.3. Cumulative sum of squares (CUSUM) of Recursive Residuals. From this test, the CUSUM statistical value and CUSUMQ statistic are among the significant 5% critical values. This proves that the regression coefficients are stable.
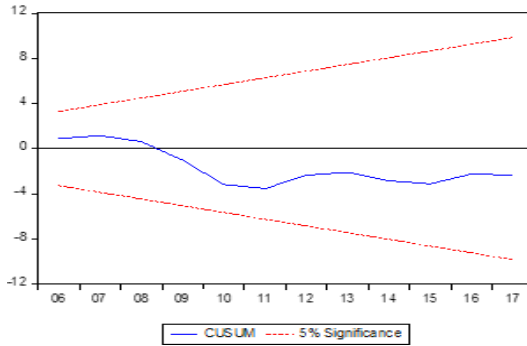
Graph 4.2
CUSUM of Recursive Residuals
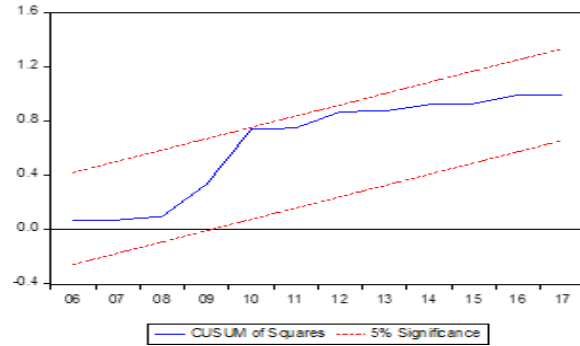
Graph 4.3
CUSUM of Recursive Residuals

4.5 Test of Classical Assumptions

a. Autocorrelation Test Results

The autocorrelation test can be done using the LM Test approach. LM Test results can be seen in table 4.3.

Table 4.3
Serial Correlation Diagnostic Test Results

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 5 lags

F-statistic	1.555973	Prob. F(5,33)	0.1998
Obs*R-squared	8.203415	Prob. Chi-Square(5)	0.1454

Source: Data processed, 2018

The following serial correlation occurs because observations made in sequence occur all the time. The problem of serial correlation arises because residuals are not free from one observation to another. This problem often occurs in the use of time series data. The assumption that must be fulfilled in the regression model is the absence of serial correlation symptoms. From the test results Serial correlation using LM Test shows Obs * R-Square equals 8.203415 with greater F-

statistics percent equal to 1.555973. So that it can be concluded that the error in the model did not experience serial correlation problems.

b. Heteroscedasticity Test

To find out whether there is a deviation from classic assumptions, heteroscedasticity testing is needed, namely the presence or absence of similarity of the residual variants for all observations in the regression model. For this, the regression model must be fulfilled in the absence of symptoms of heteroscedasticity. Based on the test as shown in table 4.4. Based on the table, the value of Obs * R-Squared is equal to 19.36454, which is greater than the alpha F-statistic of 5 percent, which is 0.498779. So that it can be concluded that there is no heteroscedasticity.

Table 4.4
Test results diagnosed with Heteroscedasticity

Heteroscedasticity Test: Breusch-Pagan-Godfrey
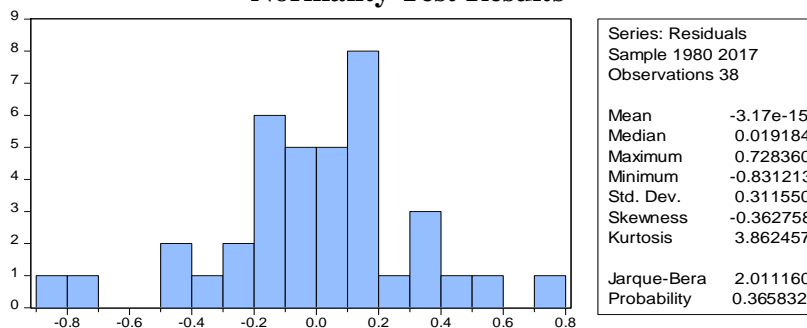Null hypothesis: Homoskedasticity

F-statistic	0.498779	Prob. F(25,12)	0.9311
Obs*R-squared	19.36454	Prob. Chi-Square(25)	0.7793
Scaled explained SS	2.763830	Prob. Chi-Square(25)	1.0000

Source: Data processed, 2018

c. Normality test

After 2 stages of testing, the next step is to carry out the normality test, which is the test result as shown in table 4.5.

Table 4.5
Normality Test Results

Series: Residuals	
Sample 1980 2017	
Observations 38	
Mean	-3.17e-15
Median	0.019184
Maximum	0.728360
Minimum	-0.831213
Std. Dev.	0.311550
Skewness	-0.362758
Kurtosis	3.862457
Jarque-Bera	2.011160
Probability	0.365832

Source: Data processed, 2018

From the results of the normality test obtained Jarque-Bera equal to 2.011160 is greater than F-statistic alpha 5 percent is equal to 0.365832. Thus it can be concluded that the residual value of

each variable is normally distributed. These results indicate that the classical assumption test with respect to normality has been fulfilled.

4.6 ARDL Estimates (Short Term Estimates)

The ARDL estimate is intended to see the short-term balance between the independent variables (L Subsidies, Inflation, LER and BIR) to the dependent variable (KF). ARDL estimation results as shown in Table 4.6.

<div align="center">

Table 4.6
ARDL Estimation Results Short Term Balance

</div>

Variable	Predictive Hope Theory	Short Term ARDL Estimation Results	**Prob.***
L Subsidies L Subsidies (-2) L Subsidies (-3)	Positive	Not significant -0,0044 0,0041	0,0811 0,0094 0,0328
Inflation Inflation (-3)	Positive	0, 075653 -0,075455	0,0250 0,0168
L ER	Negative	-5,495335	0,0013
BIR BIR (-3)	Positive	0,193601 0,171554	0,0093 0,0128

Source: Data processed, 2018

- Log (1,01) x (-1,028668) = -0,0044

a. Subsides

From the estimation results as shown in Table 4.1.6, it can be interpreted, L Subsidies in the previous 3 years period, the subsidy has a positive and significant effect on the fiscal deficit. This result is interpreted, if subsidy expenditure is reduced by 1 percent, the fiscal deficit decreases by 0.0041 percent. Furthermore L Subsidies in the previous 2 years period, subsidies have a negative and significant effect on fiscal deficit. This result can be interpreted, if the subsidy expenditure is reduced 1 percent, the fiscal deficit will increase 0.0041 percent. Whereas for the current L Subsidies period, changes in subsidy spending have no significant effect on changes in fiscal deficits. From the results of testing for period 3, the t-statistic value is equal to 2.411632 smaller than the t-table at α = 5% equal to 2.711558. Thus rejecting H$_0$, meaning that there is a

short-term balance between the subsidy variable and the fiscal deficit in this period. And for period 2, the value of t-statistic is equal to -3, 085364 smaller than t-table at α = 5% equal to 2,711558. Thus reject H_0, meaning that in this period there is a short-term balance between the subsidy variable and the fiscal deficit variable. From the results of L Subsidies testing for the previous 3 years period and the previous 2 years, the subsidy has an influence and is significant on the fiscal deficit at the 95 percent confidence level.

b. Inflation

Inflation in the previous 3 years period, inflation has a negative and significant effect on the fiscal deficit. This can be interpreted, if inflation falls 1 percent, the fiscal deficit increases 0.075455 percent. This result is not in accordance with the predictive expectations of the theory. The increase in the deficit was due to an increase in subsidy spending. However, the effect of subsidies on the price of goods is lower (a decrease in inflation). While in the current period inflation has a positive and significant effect on fiscal deficits. This result can be interpreted, if inflation increases 1 percent, the fiscal deficit increases 0.075653 percent. From the results of testing for period 3, the t-statistic value is equal to -2.774921 smaller than the t-table at α = 5% equal to 2.711558. Thus rejecting H_0, meaning that in this period there is a short-term balance between the inflation variable and the fiscal deficit variable. And for the current period, the value of t-statistic equals 2.560935 is smaller than the t-table at α = 5% equal to 2.711558. Thus rejecting H_0, meaning that there is a short-term balance between the inflation variable and the fiscal deficit variable in this period. This result is in accordance with the predictive expectations of the theory. From the results of Inflation testing for the previous 3 years period and the current period, inflation has a significant and significant effect on the fiscal deficit at a 95 percent confidence level.

c. Exchange Rates

Exchange rates in the current period have a negative and significant effect on fiscal deficits. Strengthening the rupiah exchange rate against the USA dollar will affect the reduction of the fiscal deficit. From the test results, it shows that if the exchange rate strengthens 1 rupiah against the USA dollar, the fiscal deficit will decrease 5.495335. From the test results obtained by the value of t-statistic is equal to -4, 150201 smaller than the t-table at α = 5% equal to 2,711558. Thus reject H_0, meaning that in this period there is a balance in the short term between the exchange rate variable and the fiscal deficit variable. This result is in accordance with the predictive expectations of theory. From the results of testing the exchange rate in this period it has a significant and significant effect on the fiscal deficit at a confidence level of 95 percent.

d. BI Rates

BIR s in the previous 3 years and in the current period have a positive and significant effect on fiscal deficits, with coefficients of 0.193601 and 0.171554. From the results of this test it can be interpreted, if the BIR in the 3-year period rises 1 percent, it will cause an increase in the fiscal deficit of 0.0194601 percent. Likewise for BIR in the current period, if the BIR increases 1 percent, it will cause an increase in the fiscal deficit of 0.171554 percent. From the results of testing for period 3, the t-statistic value is 2.920471 greater than the t-table at $\alpha = 5\%$ equal to 2.711558. Thus accept H_0, meaning that in this period there is no short-term balance between the BIR variable and the fiscal deficit variable. Likewise for the current period, the value of t-statistic is 3.093369 which is greater than the t-table at $\alpha = 5\%$ equal to 2.711558. Thus accept H_0, meaning that there is no short-term balance between the inflation variable and the fiscal deficit variable in this period. This result is in accordance with the predictive expectations of the theory. From the results of Inflation testing for the previous 3 years period and the current period, inflation has a significant and significant effect on the fiscal deficit at a 95 percent confidence level.

4.7 Long Term Balance Estimates

To find out the long-term equilibrium relationship between the independent variables and the dependent variable, it is done by using the long run Bounds Test. The test results are as shown in table 4.7.

Table 4.7
Long-Term Balance Bounds Test Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LSUBSIDIES	1.211102	0.490552	2.468857	0.0296
INFLATION	0.062676	0.071962	0.870952	0.4009
LER	-2.934406	1.133593	-2.588588	0.0237
BIR	0.355444	0.113129	3.141924	0.0085
C	8.379381	4.101965	2.042773	0.0637

Source: Data processed, 2018

From the results of the bounds test in connection with the presence or absence of balance in the long term of each. The test results are listed in table 4.1.7. The results of this estimation can be interpreted: in the long-term balance of L Subsidies, LER, and BIR variables it has a significant effect on the fiscal deficit variable, at $\alpha = 5\%$. This variable in the long run has a long-term

balance relationship. While the inflation variable is not significant, meaning that it does not have a long-term balance. Furthermore, the long-term balance models obtained in this study are:

EC = KF- (1, 2111 * LSUBSIDIES + 0, 0627 * INFLATION -2, 9344 * LER + 0, 3554 * BIR + 8, 3794)

From this model can be interpreted, if the subsidy decreases by 1 percent, it will result in a reduced deficit of 0.0052 percent. Furthermore, if inflation falls by 1 percent, it will result in a decline in the fiscal deficit of 0.0627 percent. But the effect of inflation on fiscal deficit is not significant. If the Exchange strengthens by 1 percent against the USA dollar, it will result in a decrease in the deficit ratio of 0.0126 percent. Furthermore, if the BIR increases by 1 percent, the fiscal deficit will increase by 0.3554 percent. This increase in deficit indicates that sustainability has decreased.

V. CONCLUSION

5.1 Conclusions

National fiscal challenges are currently more caused by fiscal deficits, negative primary balance and increased debt. If the ratio of deficit to GDP is a measure to determine fiscal sustainability, then the condition of the deficit so far is still within safe limits. This ratio is not a measure that can be used to measure fiscal sustainability. The negative primary balance condition which since 2012 until now is also worthy of consideration. Primary balance that describes the actual fiscal condition. Under conditions of negative balance, it requires that some debt and debt repayments be financed through the withdrawal of new debt. The condition of fiscal sustainability is also exacerbated by the rupiah exchange rate against the USA dollar, which tends to weaken, thus contributing to the increasingly heavy fiscal burden. In response to existing conditions, efforts to adjust the budget are the right choice to reduce the increase in deficits. Subsidies have tended to aggravate deficits and make fiscal space narrower. Adjustment of subsidies is important to do. The ARDL estimation results show that in the short term in the previous 3 years (-3), L Subsidies and BIR have a positive and significant effect on the fiscal deficit. If subsidies and SBI increase, the fiscal deficit will also increase, and vice versa. Inflation has a negative and significant effect on fiscal deficits. If inflation falls, the fiscal deficit will increase. An increase in fiscal deficits occurred as a result of an increase in subsidy spending. The effect of giving subsidies is that the price of goods falls (inflation falls). In the previous 2-year period (-2), L Subsidies had a negative and significant effect on the fiscal deficit.

If the subsidy is lowered, the fiscal deficit will increase. The increase in deficit is due to an increase in other spending. Furthermore, the short term in the current period, L Subsides has a positive and not significant effect on fiscal deficits. While Inflation and BIR have a positive and

significant effect on fiscal deficits. If subsidies and BIR increase, the fiscal deficit will increase, and vice versa. Whereas LER have a negative and significant effect on fiscal deficits. If the rupiah exchange rate strengthens against the US dollar, the fiscal deficit decreases, and vice versa. This result is in accordance with the predictive expectations of the theory. Furthermore, in the long run, L Subsidies and BIR have a positive and significant effect on fiscal deficits. If subsidies and BIR increase, the fiscal deficit will increase, and vice versa. Inflation has a positive and not significant effect on fiscal deficits. LER have a negative and significant effect on fiscal deficits. If the rupiah exchange rate against the US dollar strengthens, the fiscal deficit decreases, and vice versa. From the results of the ARDL estimation test showing Subsidies, Inflation, LER, BIR has a balance in the short term with fiscal sustainability. The estimated results of the Bounds Test on L Subsidies, Exchange Rate and SBI have a balance relationship in the long run with fiscal sustainability. While inflation does not have a balance relationship in the long term fiscal sustainability.

5.2 Suggestions

Based on the results of the research and conclusions, suggestions can be given as follows: In an effort to reduce fiscal deficits, the government needs to adjust subsidies, especially energy subsidies and other expenditures. This adjustment is intended to limit the rate of debt growth, especially when the primary balance condition is negative. Rationalizing spending does not contribute to increasing GDP. However, it still guarantees the fulfillment of basic needs and minimum expenditure allocation. The role of Bank Indonesia in safeguarding the rate of inflation, the BI rate and interest rates as a result of the reduction in subsidy spending. Bank Indonesia can regulate the money supply in the community. It is necessary to rationalize debt, to avoid increasing fiscal deficits and also to reduce the occurrence of fiscal risks, as a result of excessive debt accumulation. Rationalization of debt by paying attention to the primary balance and current deficit.

5.3 Implications and Recommendations for Advanced Research

The fiscal deficit that has plagued the state budget has been caused more by expansionary government policies that place spending greater than income. This policy certainly becomes inappropriate when the primary balance deficit. As a result the deficit has increased and has the potential for fiscal risk. For this, efforts are needed to reduce the deficit, so that fiscal can truly function as an instrument in economic growth. One of the efforts that can be made is through adjustments to spending, especially energy subsidy spending. Adjustment of subsidy spending needs to be done, as an effort to reduce spending on dam to reduce the deficit. The reduction in subsidies is an urgent need, this is due to subsidies so far contributing to fiscal becoming unhealthy. The results of this study have not contributed to the impact of adjusting subsidies on

increasing fiscal space. However, from this study, subsidies in the short and long term can affect fiscal sustainability in Indonesia. The measure of fiscal sustainability is the fiscal ability to finance all of its expenses without an increase in debt in the long run.

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