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THE IMPACT OF FISCAL SPACE ON INDONESIA'S FISCAL BEHAVIOR

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ABSTRACT

This study investigates the impact of fiscal space on the probability that the government of Indonesia will be able to implement counter-cyclical fiscal behavior. We use ordinary least squares and probit methods to estimate the fiscal policy reaction function. This study confirms that increasing fiscal space can increase the probability of the government to execute its counter-cyclical behavior policy. A proposal to increase the space includes generating alternative sources of government revenues from taxes and non-taxes and redesigning subsidies toward selected targeting recipients to reduce the non-discretionary part of the government budget.

Keywords: Fiscal policy; Fiscal space; Fiscal deficit; Business cycle; Macroeconomic stabilization.
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I. INTRODUCTION

Our main objective is to determine whether fiscal policy is pro-cyclical or counter-cyclical during the period 2001-2019. In addition, this study aims to identify whether fiscal space (as a flexible and non-binding component of expenditure) induces pro-cyclical or counter-cyclical fiscal behavior. If fiscal space positively influences counter-cyclical behavior, the government must maintain sufficient fiscal space to generate this specific behavior. The study is essential since empirical research confirms that fiscal policy is necessary to maintain economic stability. The fiscal crisis that caused the public debt default in several member states of the European Union (e.g. Greece, Portugal, Ireland, Spain, and Cyprus) has proven the importance of fiscal management. In 2009, Japan also experienced a debt crisis when it reached twice its GDP.

Our study is motivated by the fact that Indonesia initiated fiscal reforms in 2001 to accommodate fiscal decentralization and increase budget security. The Government of Indonesia has increased budget allocations for education, health, and poverty safety nets. The State Finances Act of 2003 obligatates the allocation of 20% of total government expenditures to education and 5% to health. In addition, there is a budget component that must be transferred to provinces, cities, districts, and villages. The transfers are respectively classified as Balance Fund, Regional Incentive Fund, Special Autonomy Fund, Special Status, and various Village Funds. The government must set a threshold for the budget deficit and public debt at a maximum of 3% and 60% per GDP. On top of the mandatory spendings, the government must allocate some funds to obligatory expenditures, including contracts and operations, such as personnel expenditures, interest payments, debt repayments, and subsidies. These expenditure components reduce the flexibility of the government budget for its counter-cyclical policy. The implementation of this counter-cyclical policy is crucial since it manages the business cycle. Furthermore, research on fiscal space is important for measuring Indonesia's fiscal resilience. However, research into this matter that covers Indonesia does not exist.

Hubbard *et al.* (2012) define two types of fiscal policy: Discretionary fiscal policy and automatic stabilizers. Ideally, they are both counter-cyclical. However, according to Kaminsky *et al*. (2004) and Magud (2008), budgetary behavior is not always counter-cyclical and at sometimes it is also pro-cyclical. According to Lane (2003), counter-cyclical behavior is characterized by a surplus fiscal balance (contractive fiscal policy) when the output gap is positive and by a deficit balance (expansive fiscal policy) when the output gap is negative.

The government needs a financial reserve as fiscal space to carry out counter-cyclical policies, especially when the economy is below the potential output. Fiscal space is the availability of funds in the government budget that allows the government to provide funds for a purpose without causing problems in the government's financial position (Ghosh *et al*., 2013; Romer and Romer, 2019). A high amount of fiscal space makes the budget flexible so that it provides sufficient funds for emergency purposes, including fiscal stimulus during a recession. If fiscal space is not available, the government uses debt. However, excessive debt is harmful to fiscal sustainability since it might increase the deficit ratio above the mandatory thresholds of 3 percent for several periods. A study by Ko (2020) on 17 welfare states has established the relation between fiscal space and fiscal sustainability.

The potential of fiscal policy to affect the economy is determined by its ability to control the business cycle due to external and internal shocks (see Afonso and Sousa, 2012; Fetai, 2017). McKay and Reis (2016) explain that fiscal policy can moderate the adverse effects of extreme economic fluctuations by encouraging economic growth during a recession and preventing overheating during expansion. Corden (2011) states that Counter-cyclical fiscal policy reduces crisis risk. Furthermore, a study by Rizvi *et al.* (2021) finds that fiscal policy affects the economy in the short run through its effect on the stock market in four major ASEAN countries.

Nerlich and Reuter (2016) and Aizenman *et al.* (2019) state that the ability of a country to accumulate fiscal space is a crucial factor that determines fiscal behavior (pro-cyclical or counter-cyclical fiscal behavior). The mandatory policy is a constraint for a country to collect fiscal space that can be used when the economy is down (Schick, 2009).

The fiscal space is a concept used to measure the government's flexibility in allocating the budget for discretionary purposes. Nerlich and Reuter (2016) and Aizenman *et al*. (2019) found that the relatively high availability of fiscal space could shape counter-cyclical fiscal behavior in various countries. Schick (2009) defines fiscal space as the availability of a government's financial resources in the budget to implement a policy (Schick, 2009). Ghosh *et al*. (2013) also explain that fiscal space is the availability in the budget that allows the government to provide funds for a purpose without causing problems to the government's financial position. According to Romer and Romer (2019), the ability of a country's budget to make (discretionary) expenditures depends on the availability of fiscal space. However, although many studies examine the relationship between them, no study has so far examined the role of fiscal space to increase the probability of the government applying counter-cyclical policy.

Schick (2009) found that the mandatory component in public expenditure was increasing and relatively dominant. As a result, it reduced fiscal space in OECD member countries over the period 1960 to 2000. Furthermore, Aizenman *et al*. (2019) consider data for developed and developing countries over the perid 1960 to 2016 and found a negative relationship between the public debt to tax base ratio and the accumulation of fiscal space. The tax revenues are primarily used to pay state debt so that it limits the country's ability to accumulate fiscal space. Therefore, the government continues to increase taxes regardless of the business cycle. The situation makes fiscal behavior tend to be pro-cyclical, particularly, during an economic downturn.

This study contributes to the literature in following ways. The estimation model is constructed based on the fiscal reaction function, which in turn is based on the intertemporal government budget constraint model. This study measures the fiscal space in state expenditure, which is different from research conducted by Nerlich and Reuter (2016) and Aizenman *et al*. (2019). This study defines fiscal space as the ratio of total expenditure minus the mandatory component to total state expenditure. The policy is defined as expansionary if the actual deficit budget is above the average deficit and as contractionary if the deficit budget is below the average deficit. A two-step estimation procedure using ordinary least square (OLS) and probit model has been employed for this purpose.

The research uses the output gap, fiscal balance per GDP, public debt to GDP, and fiscal space over the period 2001 to 2019. Using a two-step procedure, this study has established the existing pro-cyclical fiscal policy in Indonesia and the role of fiscal space in implementing counter-cyclical fiscal policies. The result implies that the government must maintain the fiscal space to make the budget flexible and, therefore, increase the government's probability to influence the economy using a counter-cyclical fiscal policy. This study has also performed a robustness test involving various variables and functions to determine whether the variables affect budgetary behavior. The result of the robustness test indicates that the conclusion drawn by the best functions can be used to explain fiscal behavior.

This paper is organized in the following manner. Section II explains the data and specifies the empirical model while Section III explains the preliminary analysis of the data. Section IV discusses the main findings. Section V concludes the study.

II. DATA AND MODEL SPECIFICATION

A. Model Specification

This study uses intertemporal government budget constraints to observe fiscal behavior in policies controlling the economic cycle (for reference, see Polito and Wickens, 2005; Bohn, 2007; Hubbard *et al*., 2014: Ch.15; Asiama *et al*., 2014, and Insukindro, 2018). This model adopts a simple intertemporal government budget constraint model, which can be explained using the following equation:

$$G_t + TR_t + i_t B_{t-1} = T_t + \Delta B_t + H_t \tag{1}$$

The left side of Equation (1) represents government spending, and the right side represents government revenue. Government spending consists of the government's expenditure on goods and services (G), transfer payments (TR) and interest payments (iB). The right-hand side of Equation (1) stands for the sources of government revenue, namely revenue from tax (T), new issuance of government bonds (ΔB) and grants (H). Furthermore, the budget deficit (DF) can be written as follows:

$$G_t + TR_t - T_t - H_t + i_t B_{t-1} = \Delta B_t \tag{2}$$

The left side of Equation (2) is a budget deficit. The deficit can also be formulated as:

$$DF_t = G_t + TR_t + i_t B_{t-1} - T_t - H_t \tag{3}$$

The substitution of Equation (3) into Equation (2) will result into the following:

$$DF_t = \Delta B_t \tag{4}$$

Furthermore, the reaction function can be arranged based on the intertemporal budget constraint as follows:

$$DFt = \alpha_0 + \alpha_1 \Delta B_t \tag{5}$$

The reaction function which is used as a counter-cyclical policy will accommodate the output shock as shown in the following model:

$$DF_t = f(B_t, \hat{y}_t) \tag{6}$$

where $\hat{y}_t$ is the output gap. Equation (6) can be rewritten as follows:

$$SF_t = f(B_t, \hat{y}_t)$$
$$SF_t = \beta_0 - \beta_1 \Delta B_t + \beta_3 \hat{y}_t \tag{7}$$

where SF_t is the *surplus budget.* Equations (6) and (7) show that the counter-cyclical fiscal policy responds to the reduction of the output gap by increasing the deficit budget (or decreasing the surplus budget). Coefficients -α_3 and β_3 imply that the fiscal policy behaves in a counter-cyclical way.

In this study, counter-cyclical and pro-cyclical behavior are categorized based on the combination of the output gap, positive or negative, and type of policy, expansionary or contractionary. The policy is classified as pro-cyclical fiscal policy when the output gap is positive (or negative), in which case the government adopts the expansionary (or contractionary) fiscal policy. Furthermore, the policy is categorized as a counter-cyclical policy when the output gap is positive (or negative). In that case, the government adopts the contractionary (or expansionary) fiscal policy. Table 1 describes the categories of budgetary behavior.

Table 1.
Fiscal Behavior

This table presents details regarding Indonesia's fiscal behavior.

		Fiscal Policy	
		Contractionary	**Expansionary**
Output Gap	Expansive	Counter-cyclical *Output gap* expansive Contractionary fiscal policy	Pro-cyclical *Output gap* expansive Expansionary fiscal policy
	Contractive	(III) Pro-cyclical *Output gap* contractive Contractionary fiscal policy	Conter-cyclical *Output gap* contractive Expansionary fiscal policy

The average output gap (closer to zero) is used during the period as the limit of output are categorized as expansion or contraction. Furthermore, the average value of fiscal budget (deficit or surplus) per GDP is used as the critical limit to determine whether the policy is expansionary or contractionary. The output gap

value and the value of fiscal budget must be normally distributed so that their average can be employed as a critical limit. For this reason, it is necessary to carry out normality tests.

Fiscal behavior can be arranged as pro-cyclical or counter-cyclical using the information presented in Table 1. Furthermore, fiscal space can be included in Equation (7) to develop a model that measures the effect of fiscal space and the change of public debt on the probability of government's fiscal policy to shift to a counter-cyclical policy. Therefore, the model can be specified as follows:

$$PF_t = f\left(\frac{RF_t}{GDP}, \frac{\Delta B_t}{GDP}\right) = f(rf_t, \Delta b_t) \tag{8}$$

where *rf* is fiscal space per GDP and Δb_t stands for the change of public debt per GDP.

B. Data

This study uses quarterly time series data over the period 2001:Q1 to 2019:Q4. Our data starts from 2001 because Indonesia had carried out fiscal reforms in 2001 to fix the state budget due to the 1997 Asian financial crisis. Table 2 presents detail information of all variables used in this study. The business cycle is measured by way of the output gap, i.e. the difference between actual and potential output. When the economy expands, the actual output is greater than the potential output. During contraction, the actual output is below the potential output[1]. Changes in the expansion (prosperity) and contraction (recession) of the output gap over time are known as business (economic) cycle.

The fiscal balance is the gap between government revenue and expenditure. If the budgetary balance is positive, the revenue is greater than the expenditure or a surplus budget. Conversely, a negative fiscal balance means that the revenues are smaller than the expenditures amounting to a deficit budget. Meanwhile, the fiscal balance ratio is the fiscal balance divided by GDP. The constant price of 2010 is consistently used.

The budget deficit financing is used for the constant price of 2010 to measure the change of state debt. Meanwhile, the budget deficit financing divided by GDP is used as a ratio of the debt change per GDP. Moreover, fiscal behavior is defined as counter-cyclical behavior or pro-cyclical behavior. A dummy variable is employed to quantify the fiscal behavior with category value one while its behavior is counter-cyclical and zero while it is pro-cyclical.

[1] GDP is used at a constant price to measure the actual output because the constant GDP reflects actual economic conditions (Cimadomo, 2012). According to Lane (2003), a positive output gap indicates high aggregate demand and production above its potential level. A positive output gap results in over-employment and increasing the price level (inflation). However, the negative output gap reflects the production as being below optimal, which results in rising unemployment. Fiscal policy is applied to avoid these extreme conditions (Cimadomo, 2012; Kaminsky *et al.*, 2004).

Table 2.
Variable Description

This table reports detail description of all variables used in this study. We use deflator GDP constant price 2010. Our data is sourced from Statistical center bureau of Indonesia (BPS) and Ministry of Finance (MoF). The potential GDP is estimated using Hodrick Prescott (HP) filter.

Variable	Sign	Explanation	Sources
Real output	Y	$\mathbf{Y_t = \frac{GDP}{Deflator\ GDP}}$	(BPS)
Output gap	$\hat{y}$	$\hat{y}_t = \left(\frac{\text{Real GDP}_t - \text{Potential GDP}_t}{\text{Potential GDP}_t}\right) \times 100\%$	BPS
Fiscal balence	SF	$\mathbf{SF_t = (T_t + H_t) - (G_t + TR_t + i_t B_{t-1})}$ $\mathbf{SF_t > 0}$: surplus budget; $\mathbf{SF_t < 0}$: deficit budget Constant price 2010 T: Tax revenue; H: revenue from Grant; G: expenditure; TR: transfer payment; iB: interest and principal payment of loan.	(MoF)
Fiscal balance to GDP ratio	sf	Fiscal balance (surplus or deficit) to GDP ratio $\mathbf{sf_t} = \left(\frac{\text{SF}_t}{\mathbf{GDP_t}}\right) \times 100\%$ $\mathbf{sf_t > 0}$: surplus budget; $\mathbf{sf_t < 0}$: deficit budget	MoF
The change of public debt	ΔB	Deficit financing	MoF
The change of public debt to GDP ratio	Δb	The change of public debt to GDP ratio $\Delta \mathbf{b_t} = \frac{\Delta \mathbf{B}t_t}{\text{GDP}_t}$	MoF
Fiscal space	rf	Ratio of the non-binding component of state expenditure divided by total state expenditure $\mathbf{RF_t = \left[1 - \left(\frac{non-binding\ component\ of\ state\ expenditure_t}{Total\ state\ expenditure_t}\right)\right] \times 100\%}$	MoF
Fiscal behavior	PF	Dummy variable: Countercyclical fiscal policy: 1 Procyclical fiscal policy: 0	

This study defines fiscal space as the ratio of the non-binding component of state expenditure divided by total state expenditure. We use the classification of expenditures based on the scopes (explicit and implicit) and obligations (direct and contingent) that have been proposed by Brixi and Mody (2002). Table 3 shows four categories of state expenditures. (1) Explicit liabilities are regulated based on laws and regulations (mandatory by law), while (2) implicit liabilities are the moral obligations of the government to the community. (3) Direct liabilities are the obligation that have already been planned, while (4) contingent liabilities can arise unexpectedly. Components (1) and (2) of state expenditures are urgent because they are mandatory by law. Meanwhile, the components (3) and (4) of state expenditures are based on moral obligations to the citizens, which, if not fulfilled, will have political implications. Furthermore, the expenditure components (1) and (3) are categorized as bound expenditures. The higher the components 1 and 3, the lower the accumulation of fiscal space, which causes a limited budget to accommodate uncertainty.

Table 3.
Types of Government Expenditure

Sources of Obligations	Direct Liabilities	Contingent Liabilities
Explicit	Direct explicit liabilities Expenditure composition (non-discretionary spending)	Contingent explicit liabilities State guarantees for non-sovereign borrowing by and other obligations of sub-national government and public and private sector entities, state guarantees on private investments
Implicit	Direct implicit liabilities Future public pensions, social security schemes	Contingent implicit liabilities Environmental recovery, banking failure

Source: Brixi and Mody (2002, p. 23 & 26)

C. Estimation Method

We perform the following procedure to estimate the specific fiscal behavior. The first stage is the stationarity test using the standard Augmented Dickey-Fuller (ADF) unit root test (with and without breaks). These tests were carried out to determine whether the variables were stationary at level I (0) or first difference I (1). If the variable is stationary at I (0), the fiscal reaction function (Equation 7) is estimated using the OLS method. However, if it is stationary at I (1), using the OLS will produce spurious regression results (see Gujarati and Porter, 2009: 762). The data is said to be stationary if at least one test out of the five assumptions states that the variables are stationary. The fiscal policy reaction function is estimated using the OLS method if all variables are stationary. Finally, we test whether there are problems of autocorrelation, heteroscedasticity, non-normal, and non-stationary of residual. The estimation results will show whether the fiscal policy is pro-cyclical or counter-cyclical. Moreover, the residual test provides additional information about fiscal policy behavior.

At the second stage, a fiscal reaction function is estimated with the dependent variable being policy behavior, pro-cyclical or counter-cyclical (see Equation 8). When the fiscal behavior is pro-cyclical, the value is zero, and it is value one when fiscal behavior is counter-cyclical. The data are categorized as pro-cyclical if the output gap and fiscal policy move in the same direction. If the output gap is expansive (contractive), the fiscal policy is expansionary (contractionary). The data are categorized as counter-cyclical if the output gap and fiscal policy move in opposite direction. If the output gap is expansive (contractive), the fiscal policy is contractionary (expansionary). The average of the output gap is set as a critical limit to determine whether the economy is expansive or contractive. The average fiscal budget is also set as a critical limit to determine whether the fiscal policy is expansionary or contractionary. Jarque Bera (JB) normality test is employed to determine whether the data is normally distributed. The average value of the variable can be employed as a critical limit as long as the data is normally distributed.

The fiscal reaction function (8) is estimated using the probit method. The probit method is employed to find the effect of changes in the debt to GDP ratio, Δb_t, and the fiscal space to GDP, rf_t, on the probability of the government carrying

out a counter-cyclical fiscal policy. The negative sign of coefficient Δb_t indicates that the increase in Δb_t causes the decrease in the probability of the government's implementation of a counter-cyclical fiscal policy. The positive coefficient of rf_t suggests that the increase in rf_t causes the increase in the probability of the government's implementation of a counter-cyclical fiscal policy. Hendry's general to a specific approach has been adopted to choose the lag of variables[2].

III. PRELIMINARY ANALYSIS

Mandatory components in the state expenditure of Indonesia are constrained by law and contract. The laws that regulate the state budget include Law No. 20/2003 on the National Education System stating that the education expenditure must be 20 percent of the total state expenditure. Law No. 36/2009 concerning Health obligates that expenditure on health must be five percent of the total expenditure. Law No.33/2004 on Fiscal Decentralization regulates that percentage share of the domestic revenue to regions; Law No. 11/2006 and Law No. 35/2008 concerning the Special Autonomy Fund for Nanggroe Aceh Darussalam Province, Papua Province, and West Papua Province that each will receive two percent from the General Allocation Fund of applicable provinces; Law No. 13/2012 concerning the Special Region of Yogyakarta regulates the Special Regional Fund; Law No. 6/2014 regarding Village Funds regulates that 10 percent of the Balanced Fund must be allocated to districts or cities in the State Budget minus the Special Allocation Fund. Law 17/2003 concerning State Finances regulates that the maximum ratio deficit/GDP must be three percent, and the ratio of the public debt per GDP is 60 percent. State expenditures are also bounded by contracts and operations of state administration, such as personnel expenditures, principal and interest payment of public debt, and subsidies. Table 4 shows the expenditure component in 2012 as an example. It shows that the mandatory component includes personnel expenditure, interest and principal payment, subsidies, social assistance, and transfers to the region and rural funds. The mandatory element for 2012 is 78.97 percent in the budget. Consequently, 21.03 percent is the fiscal space.

Table 5 presents detail description of variables, namely output gap ($\hat{y}_t$), the change of public debt (ΔB_t), the change of public debt per GDP (Δb_t), the budget surplus per GDP (SF_t), the primary surplus per GDP (sf_t), and the fiscal space (rf_t). The 2010 constant price is used for ΔB_t and SF_t. The mean quarterly output gap ($\hat{y}$) is nearly zero and normally distributed. The probability of the JB-test is higher than α=5%. With a normal data distribution, the mean can be employed as a limit to determine the expansion or contraction of the economy, $\hat{y}_t$=0.

[2] For this procedure see Campos *et al*. (2005), page 3.

Table 4.
2012 Expenditure Components

In this table, authors have computed Indonesia expenditure components using 2012 data.

State Expenditure (I+II)		100.000	
I. Central Government Expenditures		67.758	
a.	Personnel expenditures		13.267
b.	Goods expenditures		9.446
c.	Capital expenditures		9.729
d.	Interest		6.740
e.	Subsidies		23.228
f.	Other expenditures		0.273
g.	Grants		0.005
h.	Social assistance		5.070
II. Transfer to Region and Rural Funds		32.228	
Shortage due to rounding		0.014	
Mandatory spending-to-state expenditure (%)			
Mandatory spending: a+d+e+h+II*			78.97

Source: Authors' calculation

Table 5.
Descriptive Statistics

This table reports descriptive statistics, namely mean, median, maximum (Max.) and minimum (Min.) values, and standard deviation (St. dev.). of variables used in this study. In the final two rows, we have reported Jarque–Bera test results which examines the null hypothesis of normal distribution. All variables are defined in Table 2.

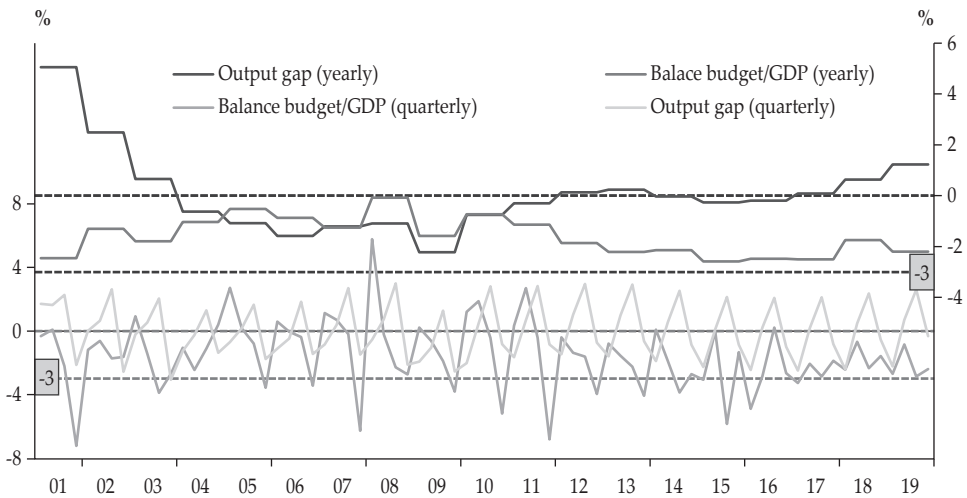
	$\hat{y}_t$	ΔB_t	Δb_t	sf_t	sp_t	rf_t	SF_t	SF_t	sf_t	sp_t
Frequency				**Quarterly**					**Yearly**	
Obs.	76	76	76	76	76	76	76	19	19	19
unit	%	Billion Rp	%	%	%	%	Billion Rp	Billion Rp	%	%
Mean	0.004	37088.5	2.227	-1.562	0.671	12.917	-29488.2	-136292.7	-1.607	0.626
Median	-0.241	37422.0	1.962	-1.565	0.863	11.605	-18691.3	-84399.4	-1.752	0.589
Max.	2.995	189742.9	18.151	5.776	7.513	38.600	85633.6	-4121.2	-0.083	3.514
Min.	-3.068	-33928.7	-2.577	-7.237	-5.783	3.520	-149492.0	-348646.3	-2.590	-1.236
Sta. dev.	1.702	37062.7	2.742	2.182	2.615	6.595	43461.0	124967.0	0.745	1.358
JB-stat.	4.251	30.574	665.480	5.061	0.405	20.888	3.596	2.346	4.402	0.926
Prob.	0.119	0.000	0.000	0.080	0.817	0.000	0.166	0.310	0.111	0.629

The average quarterly sf_t is -1.562, and with α=5 percent, thus, the data distribution can be considered normal. With normal data distribution, the average of -1.562 can be employed as the limit to determine the expansionary or contractionary fiscal policy. Based on this limit, the government's behavior at a given time will be pro-cyclical or counter-cyclical.

Additionally, data presented in Table 5 show that, in general, fiscal policy is a deficit. The SF_t, has a quarterly average of IDR -29,488 billion and an annualy average IDR -136,292 billion. Both have an α of five percent indicating a normal distribution. Meanwhile, the value of sf_t amounts to -1.562 and -1.607 percent, which also shows that fiscal policy is generally in deficit. The distribution of the fiscal balance (surplus balance) data per GDP with an α *of* 5 percent indicates a normal distribution. The normal distribution of data shows that expansionary or contractionary fiscal policy is carried out in a balanced way by the government to control the output gap, which is also normally distributed. The maximum annual deficit per GDP is 2.59 percent or surplus -2.59 percent, meaning that it does not violate the limit of deficit per GDP which is three percent in one fiscal year even though quarterly deficit per GDP can exceed three percent, with the highest deficit per GDP value amounting to 7.24 percent. Figure 1 plots that the quarterly and annual deficit per GDP during the period 2001-2019. The plot indicates that even if there is a limit to the deficit regulation, the government can still use the fiscal balance to control the business cycle.

Figure 1.
Output Gap and Deficit-to-GDP Ratio

We use left scale for quarterly output gap and quarterly balance badget per GDP. The right scale is used for yearly output gap and quarterly balance budget per GDP.



Source: Ministry of Finance

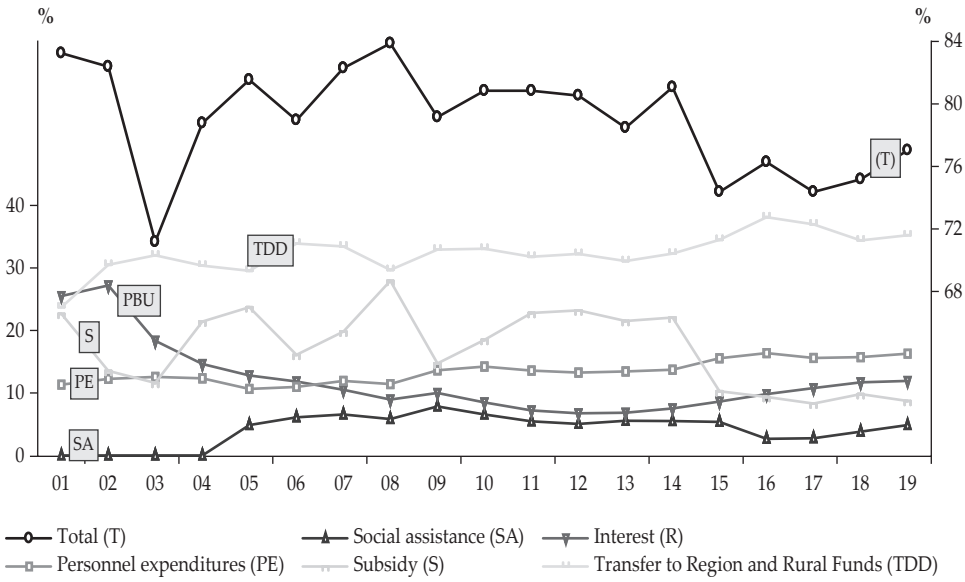
The annual deficit and annual output gaps indicate pro-cyclical fiscal behavior. A low fiscal deficit accompanied the decrease in the output gap from 2001-2010. The rise in the deficit is also followed by the increase in the output gap from 2011-

2019, which indicates an expansionary budgetary deficit. As for quarterly data, it is not easy to find patterns of counter-cyclical or pro-cyclical fiscal behavior. The indications of counter-cyclical behavior can be seen in 2001, 2005-2010, and 2015-2018. The data show that the government uses its fiscal policy to influence the output gap.

Other information to be derived from Table 5 is the value of the fiscal balance by removing the principal and interest payments from the calculation so that the primary deficit per GDP (sp_t) is obtained. The average quarterly and annually primary balance amounts to a surplus of 0.671 and 0.626, respectively. The distribution of primary balance is normal. This information shows that fiscal policy is sustainable since the government can pay off its debts and instalments.

The average ΔB_t, and, Δb_t, were IDR 37,088 billion and 2.227 percent, respectively. This result confirms the fiscal balance data, which is always in deficit. The non-normal distribution of ΔB_t and Δb_t indicates that the deficit financing policy rose and came across as being non-uniform, adjusted for the shortage of state revenues to finance expenditures.

Figure 2.
Components of State Expenditure, 2001-2019



Source: Ministry of Finance

Furthermore, Figure 2 shows the trend of the ratio of binding expenditure components compared to the total state expenditure. Total spending binds use the scale on the right while others use the one on the left. In general, there is a downward trend in government binding spending from 2001-2019. This decrease was driven by reducing the subsidy component and payment of interest on debt and instalments. The reduction of the fuel subsidy itself began in 2005 by limiting the provision of subsidies to only three types of fuel, namely premium, diesel, and

kerosene. Overall, in 2014 the fuel and electricity subsidies were abolished, and only given to homes with electricity power up to 450VA and 900VA. In addition, the government has implemented a fiscal rule that limits the maximum loan amount to 60% of GDP so that the amount of debt interest payments and instalments can be reduced. The decision to restrict energy subsidy to selected households reduces the portion of the subsidy in total government expenditures. The proceeds derived from subsidy reduction can be used to finance other government programs.

Figure 2 shows an increase in personnel expenditure, transfer of funds to the regions and village (rural) funds, and social assistance. Several government policies offer evidence that the government's fiscal reforms increase the composition of binding expenditure in the budget. Indonesia has implemented a fiscal decentralization policy since 2001. The central government is delegating authority (except in foreign policy, defence, religious affairs, security, judiciary, and monetary and fiscal policies), including the transfer of funds from the center to the regions. The policy aims to reduce the regional gap (horizontal imbalances) and the center and areas (vertical imbalances). The government implemented a so-called hold harmless or indemnity (waiver of liability) system until 2008 to ensure that the regions received the General Allocation Fund (DAU). The latter was more significant than or amounted to the same as the previous year. However, the hold harmless system does not minimize disparities between regions but makes the burden of binding state expenditures increase sharply. Figure 2 shows that the transfer of funds to the regions and village (rural) funds holds the highest portion of the total government expenditures, and the part is increasing, indicating increasing fiscal autonomy for regional governments.

The following policy, social safety net programs, such as Direct Cash Assistance (BLT) in 2005 and 2008 and the Family Hope Program (PKH) in 2007 aimed to help communities, predominantly low-income people, that had been affected by the fuel price increase and the global financial crisis. The Healthy Indonesia Card (KIS) and the Smart Indonesia Card (KIP) are part of PKH so that the community can access health and education facilities. In addition, the village fund, initiated in 2015, increases biding expenditure in the government budget. According to the Ministry of Village, Development of Disadvantaged Regions and Transmigration (Kemendesa) (2019[a]), in 2015, the government provided approximately IDR 280.3 million per village with an absorption rate of 82.72 percent per village and continued to increase this sum until 2018, namely to IDR 800.4 million per village with a higher absorption rate than 2017 (exceeding 98.74 percent). Village funds are used for several purposes, one of which is to establish Village-Owned Enterprises (BUMDs) to stimulate the village economy, infrastructure and even improve the quality of life in the village (Ministry of Village, Development of Disadvantaged Regions and Transmigration, 2019[b])

IV. MAIN FINDINGS

We begin by discussing results reported in Table 6. More specifically, we report unit root test results in Table 6 and find that all variables used in our study follows stationary process. Additionally, we employ the Granger causality test to determine the relationship between the $\hat{y}$, and SF and report results in Table 7. We

document that the null hypothesis that the output gap does not cause fiscal balance is rejected, while the hypothesis that fiscal balance does not cause the output gap is accepted. This implies that the fiscal balance, budget deficit or surplus, is the government's reaction to the output gap. The government attempts to balance the output gap using its deficit or surplus budget policy.

Table 6.
Augmented Dickey Fuller Test Results

This table reports ADF unit root test results. The null hypothesis examined is that the series contain a unit root. * and *** denotes statistical significance at 5% and 1% level, respectively.

	ADF			ADF with Break Test	
ADF Assumption	**None**	**Intercept**	**Intercept & Trend**	**Intercept**	**Int. & Trend Break: Int. & Trend**
$\hat{y}_t$	-1.4803	-2.7976	-3.5145*	-9.0630**	-9.0718**
ΔB_t	-0.3378	-1.4792	-5.9682**	-12.2021**	-11.9748**
Δb_t	-3.2089**	-8.4329**	-8.7399**	-9.4306**	-9.8944**
SF_t	-0.6181	-1.6170	-3.1301	-8.2750**	-10.0714**
sf_t	-1.4803	-2.7975	-3.5145*	-8.22997**	-8.4076**

Tabel 7.
Pairwise Granger Causality Tests

This table reports Granger causality test results. We consider lag length of 2 in our test.

Null Hypothesis	***F*-statistic**	**Probability**
$\hat{y}_t$ does not Granger Cause *SF*	13.4850	0.0000
SF does not Granger Cause $\hat{y}_t$	1.81727	0.1702

Results obtained by estimating Equation (7) are reported in Table 8. Our tabulated results show that the size of the fiscal balance (deficit or surplus) is influenced significantly by the previous government debt, ΔB_{t-1}, and the previous output gap, $\hat{y}_{t-1}$. The negative debt coefficient indicates an increase in government debt is used for the deficit. The estimation results also show that the previous output gap has a significant negative effect. The negative coefficient of the previous output gap indicates the pro-cyclical behavior of the government budget. An increase in the output gap (expansion) will be followed by a deficit policy, while a contractionary fiscal policy will decrease the output gap (recession). The result confirms the outcome of the Granger causality test.

Table 8.
The Estimation of Fiscal Reaction Function

This table reports results obtained from estimating Equation (7). * and ** indicates statistical significance at 5% and 1% levels, respectively.

	Dependent Variable: *SF*		
Independent Variable	**Coefficient**	***t*-statistic**	**Probability**
ΔB_t	-0.198628	-1.636664	0.1062
ΔB_{t-1}	-0.401091*	-2.143927	0.0355
$\hat{y}_t$	3169.030	1.217175	0.2276
$\hat{y}_{t-1}$	-13107.48*	-5.085165	0.0000
c	-14742.29*	-1.809483	0.0747
R-squared	0.328597	Adjusted *R*-squared	0.290231
F-statistic	8.564820	Prob(*F*-statistic)	0.000011
Durbin-Watson stat.	2.021807		
ADF-test stat. for Residual			
t-statistic	-2.174270	Prob.	0.0295
Heteroskedasticity Test: Breusch-Pagan-Godfrey- Null Hypothesis: Homoskedasticity			
F-statistic	0.806327	Prob. F (4,70)	0.5253
Obs**R*-squared	3.303475	Prob. *Chi*-Square (4)	0.5084
Normality Test for Residual			
Jarque-Bera	3.6683	Prob.	0.1597

Additionally, resuls obtained using the Durbin-Watson test shows no autocorrelation problem in our data. These results indicate that the residuals between periods are not interrelated. The absence of autocorrelation also demonstrates that the fiscal deficit is more discretionary than an automatic stabilizer. The current fiscal policy is not significantly affected by the previous policy. Heteroscedasticity testing using the Breusch-Pagan-Godfrey test shows a homoscedastic residual as well. These results indicate that the mean and variance of the residuals do not vary over the period studied. These results indicate a predictable fiscal policy with an output gap and changes in debt. There are indications of a disciplined fiscal rule on the output gap and additional debt. The results of autocorrelation and heteroscedasticity tests have also been confirmed by the stationary residual test. Moreover, the estimation results show that the residuals are normally distributed.

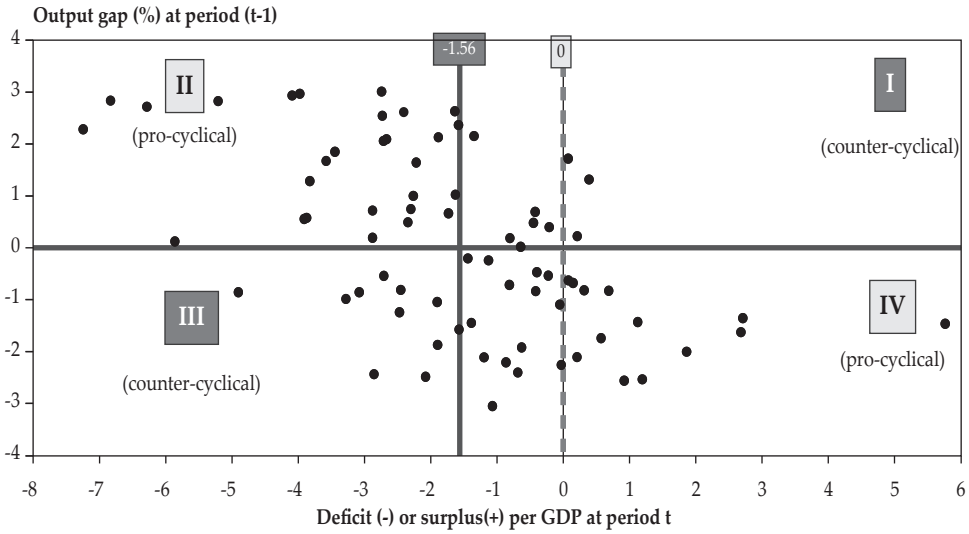
Furthermore, the dummy of fiscal behavior has been constructed based on the estimation results of the fiscal reaction function. Each point in Figure 3 combines the $\hat{y}_{t-1}$, and the *sf*. Lag length of one has been selected since the estimation result of the fiscal reaction function shows that the $\hat{y}_{t-1}$ is statistically significant. Since the government policies tend to be in deficit, and it is known that the average fiscal balance per GDP is -1.56 percent, the vertical zero axis is shifted to -1.56. We built criteria determining that the fiscal balances below -1.56% are expansionary policy and above -1.56% are contractionary policy.

Furthermore, the output gap above zero is defined as expansion and below zero as contraction of the economy. Figure 3 shows that the fiscal balance in quadrants II and IV are defined as pro-cyclical fiscal behavior. In addition, the fiscal balance in quadrants I and III is defined as counter-cyclical behavior. Based on Figure 3,

a dummy variable is constructed, with value one to indicate a counter-cyclical policy (output contractive and expansionary fiscal policy; output expansive and contractionary fiscal fiscal policy) and zero for a pro-cyclical policy (output expansive and expansionary fifcal policy; output contractive and contractinary fiscal policy).

Figure 3.
Pro-cyclical and Counter-cyclical Behavior

The cobination negative output gap and balance budget per GDP lower than -1.56 as well as positive output gap and balance budget per GDP higher than -1,56 are catagorized as counter-cyclical behavior.



This study employs the probit method to estimate the fiscal behavior reaction function based on dummy categories and report results in Table 9. The effect of debt on fiscal behavior in estimating the probit model shows that an increase in government debt per GDP reduces the probability of the government implementing a counter-cyclical fiscal policy. This condition is reasonable since there is a state debt limit to finance the deficit. The statement also is confirmed by a mean value of Δb_{t-1} in the categorical descriptive pro-cyclical category is 2.82 being higher than the caunter-cyclical one 1.67.

Table 9.
The Estimation of Fiscal Behavior Reaction Function

This table reports result obtained using a probit model. * and ** indicates statistical significance at 5% and 1% levels, respectively.

	Coefficient	***Z*-statistic**	**Probability**
Δb_{t-1}	-0.158336**	-2.233887	0.0255
rf_{t-1}	0.062971**	2.466889	0.0136
C	-0.458715	-1.280159	0.2005
McFadden R-squared	0.099451		
LR statistic	10.33883	Prob(LR statistic)	0.005688
Obs with Dep=0	37	Obs with Dep=1	38
		ADF-test stat. for residual	
ADF test statistic	-17.44773	Prob.	0.0000
		Normality test for residual	
Jarque-Bera	3.3030	Prob.	0.1918
	Categorical Descriptive Statistics for Explanatory Variables		
		mean	
	Obs with Dep=0: 37	**Obs with Dep=1: 38**	**All = 75**
Δb_{t-1}	2.814854	1.670652	2.235125
rf_{t-1}	11.52324	14.47026	13.01640
		Standard Deviation	
Δb_{t-1}	3.373635	1.868552	2.759404
rf_{t-1}	6.145243	6.745484	6.581994

Furthermore, these results indicate that rf_{t-1} increases the government's probability of carrying out a counter-cyclical fiscal policy. The mean of categorical descriptive statistics shows that the mean value of observations in the counter-cyclical category, 14.47, is greater than the pro-cyclical one, 11.52. This result indicates that higher fiscal space increases the probability of counter-cyclical fiscal behavior in the next period.

A. Robustness Check

We have also considered a robustness test which includes various variables, functions, and tests to determine whether the model and these variables affect fiscal behavior. More specifically, we use the primary fiscal balance and total fiscal balance andfound that the estimation using the total fiscal balance better explains fiscal behavior. The functions have been estimated with other independent variables, including trade balance, exchange rate volatility, inflation rate, interest rates, decreased foreign exchange reserves, and capital flows with government finances[3]. The current fiscal reaction function is better since none of the variables affects fiscal behavior. Finally, this study includes different lag lengths of variables and found that the current model was better.

[3] The variables are chosen based on the studies of Bario *et al.* (2016), Neaime and Gaysset (2017), Tan *et al.* (2020).

V. CONCLUDING REMARKS

This study concludes that the government uses fiscal balance (budget deficit or surplus) to stabilize the output gap. The fiscal deficit is more discretionary than an automatic stabilizer and there are indications of a disciplined fiscal rule regarding the output gap and additional debt. The results confirm that the theoretical prediction that the government manages a discretionary fiscal policy so that fiscal policy is a form of resilience against shock.

This study finds that the availability of fiscal space as proxied through state expenditures can increase the possibility of the government carrying out counter-cyclical fiscal policies in Indonesia. The lower the composition of expenditure binding to total spending, the higher the accumulation of fiscal space so that the government is more flexible in implementing counter-cyclical policies. These results support conclusions made by Nerlich and Reuter (2016) and Aizenman *et al*. (2019) [4], that fiscal space influences fiscal behavior.

Fiscal policy has an essential role in maintaining economic stability. Furthermore, economic stability requires a fiscal policy that is inversely proportional to the business cycle or counter-cyclical policy. This study shows that the macroeconomic policy needs adequate fiscal space to fund a fiscal stimulus package as a form of expansionary fiscal policy when the economy weakens.

A proposal to increase this fiscal space includes generating alternative sources of government revenues from taxes and non-taxes. Moreover, the composition of tax revenues from individual income tax should be higher than corporate income tax. By doing so, the revenues can be less sensitive to the business cycle. Another proposal is to redesign subsidies toward selected targeting recipients to reduce the non-discretionary part of the government budget. Subsidies for electricity and energy should be redesigned accordingly. However, this policy requires an accurate recipient database to ensure that the subsidies are distributed to those who need them the most.

REFERENCES

Afonso, A., & Sousa, R. M. (2012). The Macroeconomic Effects of Fiscal Policy. *Applied Economics,* 44, 4439-4454.

Aizenman, J., Jinjarak, Y., Nguyen, H. T., & Park, D. (2019). Fiscal Space and Government-spending and Tax-rate Cyclicality Patterns: A Cross-country Comparison, 1960–2016. *Journal of Macroeconomics,* 60, 229-252.

Asiama, J., Akosah, N. & Owusu-Afriyie, E. (2014). An Assessment of Fiscal Sustainability in Ghana. *Bank of Ghana Working Paper*, WP/BOG/2014/09.

Bario, C., Lombardi, M. & Zampolli, F. (2016). Fiscal Unstainability and the Financial Cycle. *BIS Working Paper,* No. 552.

Bohn, H. (2007). Are Stationarity and Cointegration Restrictions Really Necessary for the Intertemporal Budget Constraint. *Journal of Monetary Economics*, 54, 1837-1847.

Brixi, H. P., & Mody, A. (2002). *Dealing with Government Fiscal Risk: An Overview.In H. P. Brixi, & A. Schick, Government at Risk: Contingent Liabilities and Fiscal Risk*

[4] Nerlich and Reuter (2016) and Aizenman *et al*. (2019) use state debt and tax revenue as fiscal space.

(pp. 21-58). Washington, DC & New York: World Bank and Oxford University Press.

Campos, J., Ericsson, N. R., & Hendry, D. F. (2005). General-to-specific Modeling: An Overview and Selected Bibliography. *FRB International Finance Discussion Papers 838*.

Cimadomo, J. (2012). Fiscal Policy in Real Time. *Scandinavian Journal of Economics,* 114, 440-465.

Corden, W. M. (2011). Ambulance Economics: The Pros and Cons of Fiscal Stimuli. *Open Economies Review,* 22, 235-245.

Fetai, B. (2017). The Effects of Fiscal Policy During the Financial Crises in Transition and Emerging Countries: Does Fiscal Policy Matter? *Economic Research-Ekonomska Istraživanja,* 30, 1522-1535.

Ghosh, A. R., Kim, J. I., Medoza, E. G., Ostry, J. D., & Qureshi, M. S. (2013). Fiscal Fatigue, Fiscal Space and Debt Sustainability in Advanced Economies. *Economic Journal,* 123, 4-30.

Gujarati, D. N., & Porter, D. C. (2009). Basic Econometrics (International Edition). *New York: McGraw-Hills Inc*.

Hubbard, R. G., O'Brien, A. P., & Rafferty, M. (2012). *Macroeconomics* (p. 720). Pearson, Sydney.

Insukindro (2018). The Effect of Twin Shock on Fiscal Sustainability in Indonesia. Economics and Sociology, 11, 75-84.

Kaminsky, G. L., Reinhart, C. M., & Vegh, C. A. (2004). When It Rains, It Pours: Procyclical Capital Flows and Macroeconomic Policies. *NBER Macroeconomics Annual, 19*, 11-53.

Ko, H. (2020). Measuring Fiscal Sustainability in the Welfare State: Fiscal Space as Fiscal Sustainability. *International Economics and Economic Policy,* 17**,** 531–554.

Lane, P. R. (2003). The Cyclical Behavior of Fiscal Policy: Evidence from the OECD. *Journal of Public Economics,* 87, 2661-2675.

Magud, N. E. (2008). On Asymmetric Business Cycles and the Effectiveness of Counter-Cyclical Fiscal Policies. *Journal of Macroeconomics,* 30, 885-905.

McKay, A., & Reis, R. (2016). The Role of Automatic Stabilizers in the U.S. Business Cycle. *Econometrica,* 84, 141-194.

Ministry of Village, Development of Disadvantaged Regions and Transmigration. (2019[a]). *Infographic: 4-Year Exposure of the Ministry of Villages PDTT-02*. Retrieved Agustus 24, 2021, from https://kemendesa.go.id/berita/content/detail_infografis/Paparan%204%20Tahun%20Kemendes%20PDTT-02

Ministry of Village, Development of Disadvantaged Regions and Transmigration. (2019[b]). *Infographic: 4-Year Exposure of the Ministry of Villages PDTT-04*. Retrieved Agustus 24, 2021, from https://kemendesa.go.id/berita/content/detail_infografis/Paparan%204%20Tahun%20Kemendes%20PDTT-04

Neaime, S., & Gaysset, I. (2017). Sustainability of Macroeconomic Policies in Selected Mena Countries: Post Financial and Debt Crises. *Research in International Business and Finance,* 40, 129-140.

Nerlich, C., & Reuter, W. H. (2016). Fiscal Rules, Fiscal Space and the Procyclicality of Fiscal Policy. *FinanzArchiv,* 72, 421-452.

Polito, V., & Wickens, M. (2005). Measuring Fiscal Sustainability. *Centre for Dynamic Macroeconomic Analysis Conference* (CDMC), 05/03, June.

Rizvi, S. A. R., Juhro, S. M., & Narayan, P. K. (2021). Understanding Market Reaction to COVID-19 Monetary and Fiscal Stimulus in Major ASEAN Countries. *Bulletin of Monetary Economics and Banking*, 24, 313-334.

Romer, C. D., & Romer, D. H. (2019). Fiscal Space and the Aftermath of Financial Crises. *Brookings Papers on Economic Activity*, 50, 239-313.

Schick, A. (2009). Budgeting for fiscal space. *OECD Journal on Budgeting*, 9, 1-18.

Tan, C. T., Mohamed, A., Habibullah, M. S., & Chin, L. (2020). The Impacts of Monetary and Fiscal Policies on Economic Growth in Malaysia, Singapore and Thailand. *South Asian Journal of Macroeconomics and Public Finance*, 9, 114-130.

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