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Government Revenue and Government Spending Nexus: A Testing Hypothesis for Indonesia[†]

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ABSTRACT

There are still differences of opinion about the connection between government expenditure and revenues. This study aims to test hypotheses related to the direction of the relationship between Indonesian government revenues and expenses. By utilizing quarterly time-series data in the period 1969:q2–2020:q4, the test was implemented using the Vector Autoregressive (VAR) model. The test results show that an increase in total government revenue and tax revenue causes an increase in government spending during the study period. The results of this study provide supporting evidence for the revenue-and-expenditure or tax-and-spending hypothesis for the Indonesian government budget. The implication is that the government budget is always in deficit, and the need for financing (i.e. loans) is unavoidable.

Keywords : Budget Deficit; Fiscal Policy; Government Revenue/Spending; Vector Autoregressive

JEL Classification : C22, E62, H20, H30, H41, H50, H61, H70,

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A. INTRODUCTION

For a long time, political experts and economists have assumed that the dynamics of budget development are determined by government spending and set revenue in a rather passive and accommodative role (Bröthaler & Getzner, 2015; Alesina, 2012). This allegation arises against the background of steps taken by policymakers by determining government spending at the first stage while securing an adequate revenue stream to meet the public sector's interim budgetary constraints at a later stage. Policymakers take these steps in the context of providing optimal public goods and services in the long term, which are relatively more autonomous than the source of financing.

Government officials and experts widely oppose the views of economists and political experts. This group argues that revenue progress, rather than spending, dominates the budget decision-making process. From policymakers' perspectives, revenue is relatively more autonomous than spending, so spending needs are adjusted to revenue, not vice versa. This view is also relevant when the maximum level of deficit to the Gross Domestic Product (GDP) is capped by the law, as in the case of Indonesia and many other countries. Both views have the basis of their respective arguments. The general interpretation that underlies the first group is an increase in the share of government activities in the Gross Domestic Product (GDP) in the long term. It is due to the permanently higher income elasticity of demand for public goods than private interests, as postulated in Wagner's Law (Magazzino C., 2012; Inchauspe, MacDonald, & Kobir, 2022; Ghazy, Ghoneim, & Paparas, 2021).

Meanwhile, the second group argues that GDP growth in government activities occurs due to the too-high elasticity of government income (Alesina, Favero, & Giavazzi, 2019; Karceski & Kiser, 2020; Paparas, Richter, & Kostakis, 2019). Despite these disagreements, interest in conducting research related to the causal relationship between state revenues and expenditures continues to grow. As shown in Solikin (2018) and will be discussed further in the literature review section, different research results exist depending on variables included in empirical models and specific conditions of the country of interest.

This study is also intended to scrutinize the relationship between government revenue and outlay in Indonesia. Because of the decision-making process of the state budget (APBN), Indonesia is strongly expected to tend to agree with theoretical arguments in Wagner's law. In preparing the APBN, the government's reference base is the direction of national development policies and priorities. It describes government affairs and/or development priorities are described following the President's vision and mission, whose formulation reflects certain areas of government affairs that are the responsibility of the State Ministries/Agencies (Directorate General of Budget, 2014). It

means that the policy direction contains one or several programs to achieve the strategic goals of governance and development with measurable performance indicators that meet government spending needs. Based on the policy direction and development priorities, an estimate of fiscal capacity (i.e. resource envelope) is prepared, including an indicative ceiling for the planned budget year for government spending, potential sources of government revenues and grants, and budget financing capabilities.

In this study, the existence of a long-term nexus between government revenue and spending is still a key question. As shown in the literature review, although there are numerous empirical studies, the results are different and contradictory. Therefore, knowledge of this relationship is crucial in formulating a strong fiscal policy to prevent or reduce an unsustainable (fiscal) budget deficit. In addition, knowledge of the relationship between government incomes and spending is also very important to evaluate the role of government in the distribution of resources. Empirical findings from this study are expected to contribute to shaping appropriate policies to tackle some of the fiscal challenges faced. Compared to the previous literature, this article offers some innovation in terms of: (1) using total government spending, as well as total government revenue and tax revenue, and (2) including a structural break for the economic crisis in the 1997/1998 and Covid-19 pandemic in 2020.

B. LITERATURE REVIEW

In the theoretical and empirical literature, the analysis of the relationship between government revenue and spending is quite numerous and obtains a fairly prominent proportion. Theoretically, there are at least four hypotheses that are often recommended to be used to explain the relationship between government revenue and spending, namely (Apergis, Payne, & Saunoris, 2012; Jaén-García, 2019; Saunoris, 2013; Tashevskaja, Trenovski, & Trpkova - Nestorovska, 2020; Vamvoukas, 2012; Athanasenas, Katrakilidis, & Trachanas, 2013; Karlsson, 2020): (1) tax-and-spend hypothesis (or revenue-spend) hypothesis, (2) spend-andtax hypothesis (or spend-revenue) hypothesis, (3) fiscal synchronization hypothesis, and (4) fiscal independence hypothesis (or institutional separation) hypothesis.

The hypothesis testing of tax-and-spend or revenue-spend is carried out to show the intertime relationship between revenue and government spending. Economists who support this hypothesis include Friedman (1978), Wagner (1976), and Buchanan & Wagner (1977; 1978). According to Friedman (1978), an increase in tax revenue, which surges the cost of resources obtainable to the public sector to reduce the budget deficit, will lead to a rise in government spending. Therefore, if revenue positively affects spending, a decrease in revenue will result in smaller spending, and vice

versa. A positive, unidirectional causality between government revenue and spending characterizes the tax-and-spending hypothesis.

From another perspective, Wagner (1976) and Buchanan & Wagner (1977; 1978) stated that an increase in revenue will lead to decreased spending due to fiscal illusion. Therefore, government spending funded through several means other than direct taxes will lead to public perceptions that the actual costs of government spending are less than those due to direct taxes. Although taxpayers are likely to pay less through direct taxes, the fiscal illusion arises because people pay indirect taxes through high-interest rates. As a result, a substitution effect happens in the economy in general, and inflation causes a shift in the classification of the tax system (tax brackets). Therefore, in Buchanan and Wagner's view, government spending is funded through three main sources: direct taxes, debt issues, and indirect taxes through inflation. A unidirectional causality relationship between government revenue and spending empirically characterizes this hypothesis.

Meanwhile, the spend-and-tax hypothesis or the spend-revenue hypothesis pioneered by Peacock & Wiseman (1979) states that government spending decisions are completed first and followed by revenue adjustments (i.e. tax revenue) to meet spending needs. Peacock & Wiseman (1979) offer an alternative elucidation for the spend-and-tax hypothesis that during times of crisis, a temporary increase in government spending will induce a permanent increase in taxes. Thus, the spend-and-tax hypothesis suggests that a reduction in government spending leads to a reduction in the deficit, which means that deficit control can be attained through an unexpected increase in fiscal pressure or through strict regulatory limits on the level of government spending. In the group supporting this hypothesis, Barro (1979), who cast doubt on Buchanan and Wagner's fiscal illusion hypothesis, stated that in line with the Ricardian equivalence, any amount of current government borrowing would increase the tax burden in the future, which, finally, is paid by taxpayers. In the Ricardian theory context, government spending increases lead to taxes increases, either in parallel with growth in government spending or with a possible delay. This hypothesis is empirically characterized by a causality that runs in the same direction from government spending to government revenue.

In the fiscal synchronization hypothesis, government revenues and spending are determined simultaneously, and the results show a two-way causal relationship between government revenues and spending. This hypothesis is influenced by the views of Musgrave (1966) and Meltzer & Richard (1981), which state that decisions about the appropriate level of government spending and revenue are also influenced by voters who compare marginal benefits and marginal costs of government programs. This viewpoint is supported by Barro's tax-smoothing model (1979), which is based on a

similar argument as Ricardian equivalence, that a fiscal surplus or deficit can occur under these conditions because the government has different economic policy objectives. However, decisions about revenue and spending go hand in hand.

Furthermore, the fiscal independence or institutional separation hypothesis, or the fiscal neutrality hypothesis, states that different institutions make independent decisions about tax revenues and government spending. Expenditures are determined based on the needs of citizens, and revenue will depend on the maximum sum of taxes that the community can bear. As a result, the fiscal balance achieved was simply accidental. Empirically, the absence of causality between government revenue and spending confirms the evidence for this institutional split hypothesis.

From the description above, at least three main reasons for the important characteristic of the relationship between government revenues and expenditures. First, if the tax-and-spend hypothesis is held (i.e., government revenues lead to government spending), the budget deficit can be eradicated or avoided by applying policies that increase government revenues. Second, if the spend-and-tax hypothesis is held (i.e., government spending generates government revenue), the government must set spending first and then raise taxes to cover spending needs. This situation can lead to capital outflows due to consumers' anxiety about paying higher taxes in the future. Third, if the fiscal synchronization hypothesis is not accurate (if there is no twodirectional causality between government revenue and government spending), the government spending decisions are made without referring to government revenue choices, and vice versa. This situation can lead to a high budget deficit if government spending increases faster than government revenues.

Empirical Studies

Empirical work related to the direction of the causal relationship between government revenues and spending has been widely carried out. The existing empirical studies test the four hypotheses proposed in the previous section, focusing on other countries and periods. Empirical results from these studies are varied and even contradictory. The causal direction and the short-term and long-term impacts on government policies are also found to be different. This proves that a consensus has not been reached on the relationship between government revenues and spending.

Several empirical studies show results that support the spend-and-tax hypothesis, as pointed out by Richter & Dimitrios (2013) in the case of Greece. Meanwhile, studies that focus on proving the tax-and-spend hypothesis are shown by Saunoris (2015) for the United States and Apergis et al. (2012) for Greece. Another interesting study by Karlsson (2020) in China showed that in two to four quarters of government, revenue causes government spending (i.e. tax-and-spend hypothesis). While

in the period of eight to sixteen quarters, causality appears to exist in two directions between government revenues and government spending (i.e. fiscal synchronization hypothesis). Several empirical studies tested the fiscal synchronization hypothesis and evidence to support it, including Al-Zeud (2015) for Jordan; and Irandoust (2018) for Sweden. Meanwhile, a study that proves the institutional separation hypothesis was shown by Magazzino (2014) for Thailand and Brunei. In addition, in the case of Thailand, Jiranyakul (2022) found fiscal institutional separation in the short run but spend-tax hypothesis in the long run.

In a broader range of cases, the study of Tashevskia et al. (2020) used a sample of six Southeast European countries and found evidence of a two-way causality between government revenues and expenditures (i.e. supporting the fiscal synchronization hypothesis) for Macedonia and a unidirectional relationship between government revenues and expenses for Albania, Bulgaria, Croatia, Serbia, and Slovenia. Magazzino reported mixed results. On the one hand, evidence supports the tax-spend hypothesis for Indonesia, Laos, Malaysia, the Philippines, and Singapore. On the other hand, for Cambodia and Vietnam, the results support the fiscal synchronization hypothesis. Furthermore, for Myanmar, evidence is found to support the spend-tax hypothesis; while for Thailand and Brunei, evidence is exhibited the fiscal neutrality or institutional separation. The results may underscore the relevance of specific conditions of each country in shaping the relationship between revenues and expenditures.

A Plethora of different results is shown in other research. A study was conducted by Paleologou (2013) for three European Union countries (Sweden, Greece, and Germany as a comparison). Evidence supports the fiscal synchronization hypothesis in Sweden and Germany and the spend-tax hypothesis in Greece. Linhares & Nojosa (2020), dividing the study period before and after the 2008 global financial crisis 2008, found several changes in the direction of the causal association between government income and spending in Germany, England, France, Italy, etc. and Spain. Before the crisis, the institutional separation hypothesis dominated the fiscal framework in all analyzed countries. However, after the crisis, when these countries restructured in support of fiscal policies implemented to reduce the negative impact of the crisis, strong evidence was found for the tax-spend hypothesis in Germany, the U.K., and Italy. While in France, the spend-tax hypothesis was dominant, and only in Italy, which shows the strength of the fiscal synchronization hypothesis.

Mutascu (2016) investigates the causality between government revenues and spending for ten East European economies. The results show evidence of a unidirectional causality between government spending and revenues (i.e. spend-and-tax) in Bulgaria. The unidirectional causality in which income affects spending (i.e. tax-and-spend). It is seen in the Czech Republic, Hungary, and

Slovenia; bidirectional causality (i.e. fiscal synchronization) exists in the Slovak Republic. Moreover, Mutascu (2016) found evidence supporting the fiscal neutrality hypothesis for Estonia, Latvia, Lithuania, Poland, and Romania.

Different methods were applied in the previous studies (Solikin, 2018). For example, Mutascu (2016) and Magazzino (2014) used Granger causality, while Khan et al. (2021) used Johansen cointegration and VECM. Different methods may influence the results, in addition to countries' or regions' characteristics. Hence, the study method will be explained in the following section.

C. METHOD

The dynamic and influencing relationship direction between government revenue and spending in this study was tested using a vector autoregressive (VAR) model. The VAR model is estimated by regressing each model variable on its lag and the lag of other model variables until some predetermined maximum lag order, which is so-called ρ . A VAR model with autoregressive lag is called a VAR (ρ) model. The VAR model is based on the idea that each model variable depends on its lag as well as the lag of every other model variable, which imposes an exception restriction on the interaction of non-credible lag variables (Kilian & Lütkepohl, 2017, p. 1-2; Stock & Watson, 2020, 649-652).

In this study the direction of the dynamic and mutually influencing relationship between government revenue (R_t) and government spending (G_t) in period t can be formulated in the following two systems of equations:

$$G_t = \alpha_1 + \alpha_2 R_t + \alpha_3 G_{t-1} + \epsilon_{1t} \quad (1)$$

$$R_t = \beta_1 + \beta_2 G_{t-1} + \beta_3 R_{t-1} + \epsilon_{2t} \quad (2)$$

The two equations can then be simplified by substituting equation (2) into equation (1) so that the government spending equation is obtained, as follows:

$$\begin{aligned} G_t &= \alpha_1 + \alpha_2(\beta_1 + \beta_2 G_{t-1} + \beta_3 R_{t-1} + \epsilon_{2t}) + \alpha_3 G_{t-1} + \epsilon_{1t} \\ &= (\alpha_1 + \alpha_2 \beta_1) + (\alpha_3 + \alpha_2 \beta_2) G_{t-1} + \alpha_2 \beta_3 R_{t-1} + (\alpha_2 \epsilon_{2t} + \epsilon_{1t}) \end{aligned} \quad (3)$$

or it can be written in a simple form as follows:

$$G_t = \alpha_{11} + \alpha_{12} G_{t-1} + \alpha_{13} R_{t-1} + v_{1t} \quad (4)$$

A simple equation for state revenue can also be obtained by substituting equation (1) into equation (2) so that the results can be seen in the following equation:

$$R_t = \alpha_{21} + \alpha_{22}G_{t-1} + \alpha_{23}R_{t-1} + v_{2t} \quad (5)$$

Equations (4) and (5) can be arranged in matrix notation as follows:

$$y_t = \begin{bmatrix} G_t \\ R_t \end{bmatrix}; A_o = \begin{bmatrix} \alpha_{11} \\ \alpha_{21} \end{bmatrix}; A = \begin{bmatrix} \alpha_{12} & \alpha_{13} \\ \alpha_{22} & \alpha_{23} \end{bmatrix}; v = \begin{bmatrix} v_{1t} \\ v_{2t} \end{bmatrix} \quad (6)$$

which can then be written as the following equation:

$$y_t = A_o + Ay_{t-1} + v_t \quad (7)$$

Equation (7) is called an autoregressive vector of order 1 with two variables (bivariate) which is commonly written as VAR(1). A_o is a vector of size $M \times 1$ (M = number of observed variables) and matrix A_i ($i= 1, 2, \dots, p$) each measuring $M \times M$. With a formulation like this, the model to be estimated will have many degrees of freedom, if the model contains many variables with a relatively long lag (p).

Analysis was carried out at the national level. Therefore, this study utilizes quarterly (time series) data of total government revenues and total government expenditures in the year of 1969:q2 – 2020:q4, sourced from the Ministry of Finance. To inquire whether exist difference impacts of types of revenue, in the equation (4) and equation (5), total government revenues (R) are included into the model by using total government revenue or tax revenues. In addition, to smooth the effect of seasonality on government revenues and expenditures, a seasonal adjustment was made to all data used in the study period. Furthermore, the test was carried out by including an exogenous (dummy) variables as a representation of the structural break that occurred due to the 1997/1998 economic crisis and the Covid-19 pandemic that had occurred since the second quarter of 2020.

D. RESULT AND DISCUSSION

The findings in this study are presented in two main parts, namely: (i) statistical test results before estimation (pre-estimation), which includes data stationarity tests and optimal lag lengths and (ii) Vector Autoregression (VAR) model estimation followed by model stability testing, Impulse Response Function (IRF), and Forecast Error Variance Decomposition (FEVD).

Based on the results of the unit root test using the ADF test method, it is known that all variables are stationary or have a unit root at a level of the significance level of 1% ($\alpha = 0.05$). This means that the data has met the stationarity requirements and the previously specified equation can be estimated further using the VAR model. Meanwhile, the determination of lag based on the existing criteria shows that lag 4 is the optimal lag to estimate the VAR equation model. Then the model stability test was carried out and the results indicated that the VAR model at lag 4 was stable because

the characteristic root modulus was smaller than one, so the IRF and FEVD analyzes were carried out to be valid.

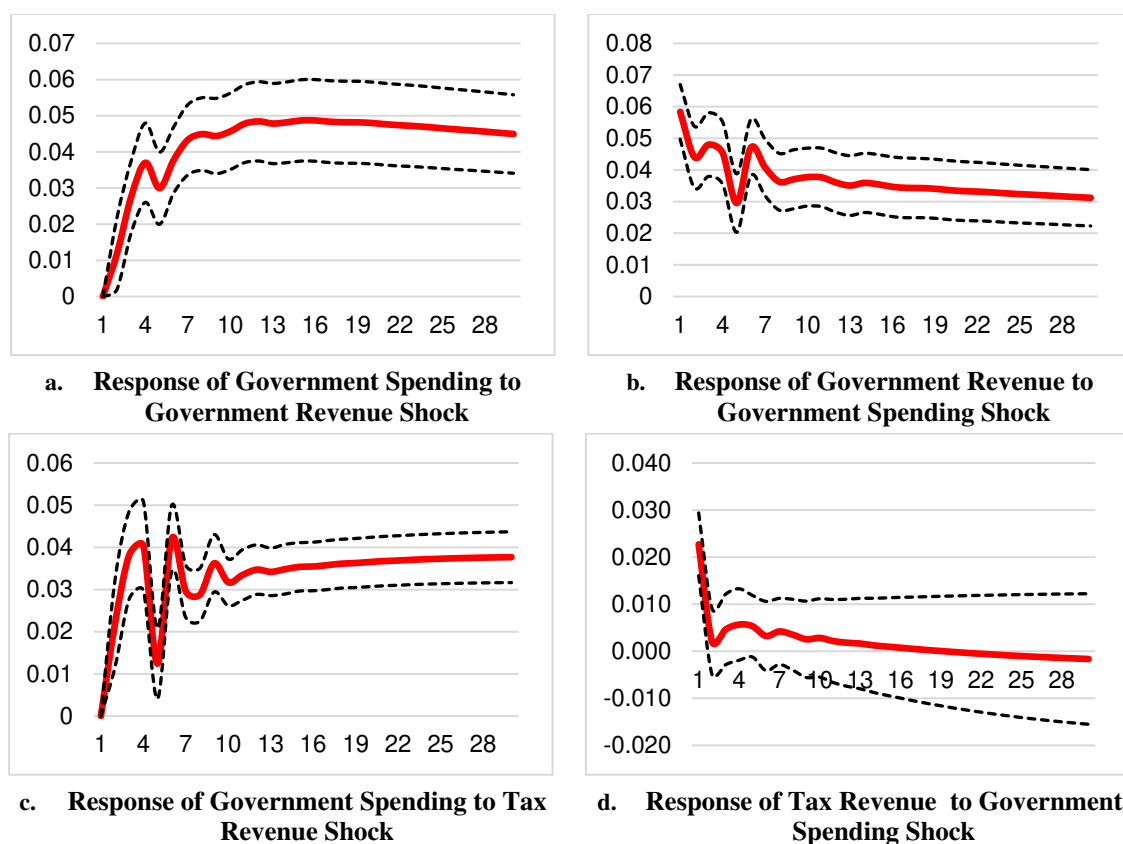
To find out the effect of government expenditure on government revenues or vice versa (i.e. the effect of government revenues on government spending) using the VAR model, the IRF and FEVD are considered. The IRF function is used to see the behavior or response to changes in government spending to government revenues shock or conversely, the government revenues response to government spending shock. Meanwhile, variance decomposition is used to separate the influence of each innovation variable individually on the response received by a variable, including the innovation of the variable itself. In other words, FEVD analysis is used to find out which variables have the most important role in explaining changes in a variable.

Impulse Response Function Analysis

a. The Effect of Government Revenues on Government Spending

The effect of government revenue, which consists of total government revenue and tax revenue, on government spending follows equation (4) and is reported for 30 quarters can be shown in the IRF in Figure 1. The occurrence of a shock of one standard deviation of government revenue has a positive effect on overall government spending. In the first quarter, it still did not affect government spending. However, in the second period, the effect looks positive, which is 0.012, and then increases until the fourth quarter of 0.037. After experiencing a decline in the fifth quarter, the impact of the shock of government revenues on government spending continued to increase in subsequent periods (Figure 1.a). Thus, changes in government revenues will induce an increase in government spending. These results provide supporting evidence for the revenue-and-spend hypothesis with a unidirectional relationship between revenues and expenditures.

On the other hand, the shock of one standard deviation of government spending was responded positively by government revenues with an increase of 0.058 in the first quarter and continued to decline by 0.030 in the fifth quarter, and again increased by 0.047 in the sixth period. After that, changes in government spending were responded negatively by government revenues until they continued to decline in subsequent periods (Figure 1.b).



Source : Authors (result of data processing)

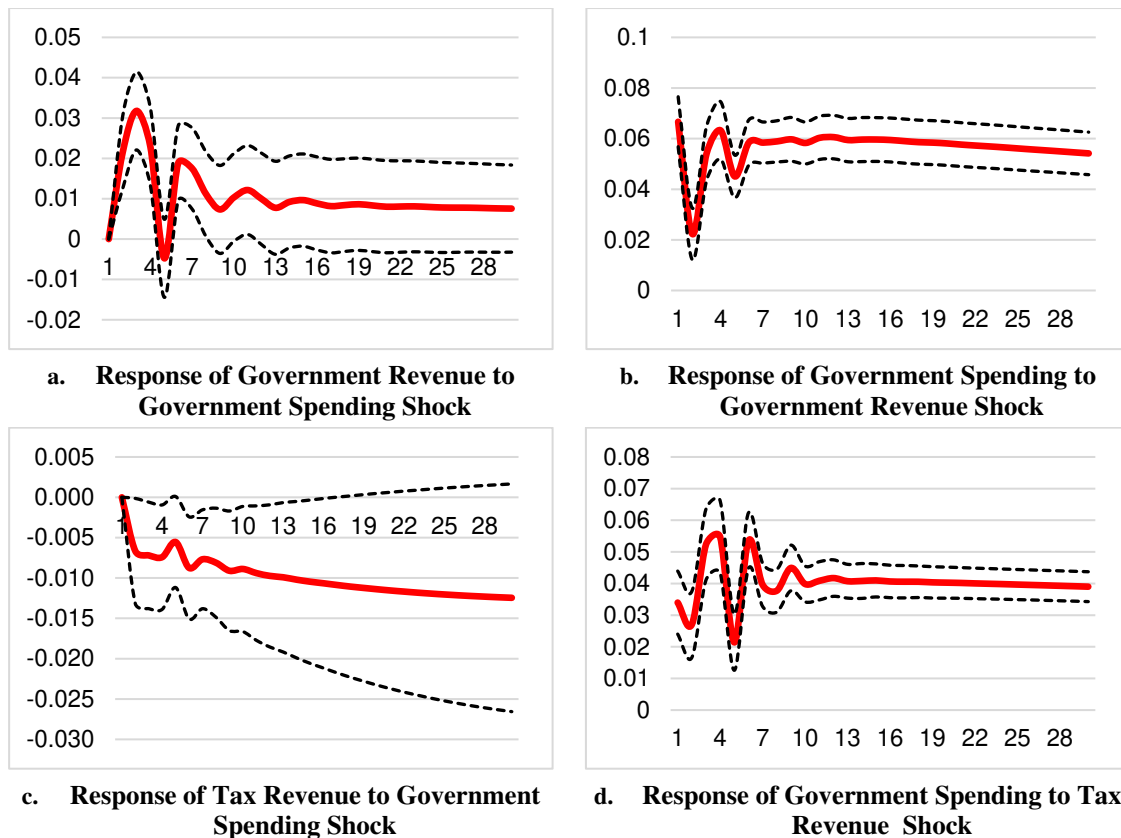
Figure 1. Impulse Response Function of Government Spending, Government Revenue and Tax Revenue

Meanwhile, if there is a shock of one standard deviation in tax revenues, the effect will increase government spending from zero in the first quarter to 0.040 in the fourth quarter. After showing a decrease of 0.012 in the fifth quarter, changes in tax revenues tend to increase government spending in subsequent periods (Figure 1.c). The results of this IRF analysis also show a positive effect of changes in tax revenues on government spending. This finding supports the tax-and-spend hypothesis with a one-way (unidirectional) relationship. It is because changes (shock) in government spending hurts tax revenues (Figure 1.d). The results align with Magazzino (2014), who also found the tax-spend phenomenon in the Indonesian case. However, the results are at odds with Febriani & Rambe (2022), who found that the taxspend hypothesis only applies in certain regions, namely Papua and Maluku. The results indicate that different results may exist due to data disaggregation, which allows for different results based on regional characteristics.

b. The Effect of Government Spending on Government Revenues

Figure 2 is an IRF showing the response of government revenues to the shock of government spending reported for 30 quarters. In Figure 2.a, it can be seen that the shock of one standard

deviation of government spending has not been responded to by government revenues in the first quarter and has a positive effect in the second quarter and reaches its peak in the third quarter, where government revenues increase by about 0.032. Furthermore, the effect of changes in government spending is negative (around -0.005) on government revenues in the fifth quarter. Its influence increased again in the sixth quarter and after that, it tends to decrease in subsequent periods. On the other hand, the response of government spending to the shock of government revenue looks much bigger, which is around 0.067 in the first quarter and then decreases to around 0.022 in the second quarter. Since the third quarter, it has increased again and become bigger, which is around 0.063 in the fourth quarter. In subsequent periods, the response of government spending to changes in government revenues, although still positive, tends to decline (Figure 2.b).



Source : Authors (result of data processing)

Figure 2. IRF of Government Spending, Government Revenue and Tax Revenue

Furthermore, changes in government spending, as a whole over 30 periods, were responded to negatively by tax revenues (Figure 2.c). In the first quarter, the government spending shock has not been responded to by tax revenues, and since the second quarter, changes in government spending have harmed tax revenues. This situation continued in subsequent periods. Meanwhile, government spending responded positively to the overall change in tax revenue (Figure 2.d). In the

first quarter, the shock of one standard deviation of tax revenue had a positive effect on government spending, and then it increased and peaked in the fourth quarter with an effect of 0.055. In the fifth quarter, the change effect in tax revenues decreased to 0.021 but increased again to 0.054 in the sixth quarter. In subsequent periods, government spending responded positively to the effect of tax changes, although it was lower than in previous periods. This positive response to government spending on changes in tax revenues strengthens the evidence for the applicability of the tax-and-spend hypothesis in the Indonesian government budget. Again, the results conform with Magazzino's (2014) buffer from the results of Marimutu, Khan & Bangash (2021), who found bidirectional causality between government expenditure and government spending, supporting the fiscal synchronization hypothesis in the ASEAN region. While they did not specifically research Indonesia's case, their results may bring insights for future research. The different results may stem from the distinct characteristics of the countries.

Variance Decomposition Analysis

Variance decomposition in the VAR model is used to separate the influence of each innovation variable individually on the response received by a variable, including the innovation of the variable itself. In other words, FEVD analysis is used to find out which variables have the most important role in explaining changes in a variable.

Table 1. Variance Decomposition: Government Spending and Government Revenue (in per cent)

Variables	Quarter	S.E.	Decomposition	
			Government Spending	Government Revenue
Government Spending	1	0.148	100	0
	5	0.190	91.246	8.754
	10	0.236	77.512	22.488
	15	0.273	67.552	32.448
	20	0.303	61.117	38.883
	30	0.352	53.800	46.200
Government Revenue	1	0.130	20.247	79.753
	5	0.180	32.529	67.471
	10	0.231	34.945	65.055
	15	0.268	34.778	65.222
	20	0.300	34.371	65.629
	30	0.349	33.851	66.149

Source : Authors (result of data processing)

Based on the results of the tests carried out, as shown in Table 1, it was found that an important source of variation in government spending was shocked by government spending itself. In the first quarter, the variation in government spending originating from itself reached 100% and then continued to decline to reach 53.8% in the 30th quarter. Meanwhile, government revenue, which in the first quarter did not show any effect, continued to show an increasing influence until it reached 46.2% in the 30th quarter. This means that in the long term changes in government revenues will make a greater contribution to influencing changes in government spending. These results are consistent with the results of the IRF analysis and confirm that the revenue-and-spend hypothesis is observed in Indonesia.

On the other hand, the variation in government revenue in the first quarter was contributed by changes in government revenue itself, which was around 79.8% and the rest came from changes in government spending. The contribution of government spending to changes in government revenues continued to show an increase to reach 34.9% in the 10th quarter. However, in the following quarters, the contribution of government spending tends to decline to the variation in government revenues.

Table 2. Variance Decomposition : Government Spending and Tax Revenue (in per cent)

Variables	Quarter	S.E.	Decomposition	
			Government Spending	Tax Revenue
Government Spending	1	0.144	100	0
	5	0.187	89.378	10.622
	10	0.225	81.237	18.763
	15	0.252	73.717	26.283
	20	0.266	69.013	30.987
	30	0.295	58.713	41.287
Tax Revenue	1	0.096	5.576	94.424
	5	0.135	3.313	96.687
	10	0.175	2.157	97.843
	15	0.206	1.586	98.414
	20	0.232	1.249	98.751
	30	0.275	0.905	99.095

Source : Authors (result of data processing)

The results of other tests, which are intended to determine the contribution of government spending to variations in tax revenues or vice versa, the contribution of tax revenues to changes in government spending, can be seen in Table 2. Based on the table, it can be seen that in the first quarter the variation in government spending only (100%) came from government spending itself and tax revenues did not contribute to this change. The contribution of government spending continues to decline, while the contribution of tax revenue continues to increase to changes in government spending. In the fifth quarter, tax revenues accounted for about 10.6% of the variation in government spending, meaning that the contribution of government spending to the change was reduced by the same percentage. In the long term, the contribution of variations in tax revenue to changes in government spending will become even greater. In the 30th quarter, government spending contributed about 58.7% of the change in spending itself, while the contribution of tax revenue increased to 41.3%. Based on these results it can also be said that tax revenue contributes to variations in government spending and strengthens the supporting evidence for the tax-and-spend (revenue-and-spend) hypothesis in the Indonesian government budget. Meanwhile, innovation on the tax revenue side in the first quarter contributed around 94.4% to tax revenue itself, while the variation in state spending only contributed about 5.6%. In the long term, variations in state spending contributed to a smaller contribution to tax revenues, as shown by the decomposition value in the 30th quarter of around 0.9% and the contribution of tax revenues reaching 99.1%.

Referring to the results of the IRF and FEVD analysis, it can be said that in the Indonesian government budget there is evidence supporting the application of the revenue-and-spend (i.e. tax-and-spend) hypothesis, where an increase (or decrease) in government revenue and tax revenue will lead to an increase (or decrease) in government spending. Meanwhile, an increase (or decrease) in government spending tends to encourage a decrease (or increase) in government revenues. The results are supported Rambe and Febraini (2021) in which by using regencies data in Indonesia they found that local taxes positively affect local government spendings in the majority of Indonesia's regions, except for Maluku and Papua region. However, the results are different from other studies which may occur if the revenues is defined differently. For example, Wibowo, et al. (2021) found that capital expenditures of ministries/institutions in Indonesia's central government positively affect revenues. The result is understandable since in this case, revenue is defined as non-tax revenue (*Penerimaan Negara Bukan Pajak*, PNBP). At the distric level in one of provinces in Indonesia, Ala, Manafe, and Ena (2022) conclude that revenue (which is defined as own source revenue or *Pendapatan Asli Daerah*, PAD) does not affect local government expenditures. They, therefore, could not prove revenue-spend hypothesis and suggest further studies to empirically test three other hypotheses.

Two interesting consequences are implicitly shown through the results of this study. First, the increase in government revenue adds to government spending, but the allocated expenditure has not succeeded in encouraging an increase in people's income which in turn can be a source of tax revenue. This is easy to understand, considering that more government spending is allocated for mandatory spending and is bound by fiscal rules, such as interest on debt, personnel spending, education budget, and general allocation funds. Second, because the increase in government revenue induces an increase in government spending, a budget deficit cannot be avoided and consequently, the need for financing sources is also inevitable. However, as suggested by Khan, Marimuthu, and Lai (2021) for Malaysia's case which exhibit similar tax-spend hypothesis, government should be careful in increasing tax rate to lessen budget deficit. The higher tax rate may result in higher tax revenues, but the higher tax revenues lead to higher expenditures which may induce inflation and fiscal illusion. Indonesian government may also choose alternative policies by increasing efficiency and effectiveness of budget expenditures.

E. CONCLUSION

In both the short and long term, the relationship between total tax revenues and expenditures in the government budget provides supporting evidence for the revenue-and-spend or tax-and-spend hypothesis. This means that a rise in total government revenue and tax revenue causes an increase in government spending. In contrast, rising government spending tends to reduce government revenue and tax revenue. Therefore, it is unsurprising that the government budget is always in deficit, and the need for financing (or loans) is inevitable. The government can increase revenue through tax and non-tax to overcome the deficit problem and reduce financing needs. Efforts to increase revenue must be made intensively and extensively, but at the same time, should be cautious by considering the effect of government revenue on government spending. Further research could investigate the nexus between government spending and revenues at a disaggregated level, showing the empirical evidence between direct and indirect taxation on the one hand and various other expenditure items on the other.

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