

## Fiscal Resilience Index - A Proposition and Evidence of Emerging Market

Yusuf Munawar<sup>1</sup>, Ita Nurmanti Manurung<sup>2</sup>

<sup>1</sup>Universitas Katolik Parahyangan

<sup>2</sup>Researcher Aether Group

### Abstract

Fiscal resilience is essential to maintain economic stability and sustainability. Until now, there are no mutually agreed indicators to show a country's fiscal resilience. This study aims to explore the possibility of forming the index of fiscal resiliency that captures more than one underlying variable that are more comprehensive as opposed to the most current practices that use only one narrow variable. The Principal Component Analysis (PCA) method is applied to build the foundation of the index, whilst the trial is experimentally conducted as a case study of Indonesia as an emerging market in 1995-2020. Using the PCA method produces an index model of fiscal resiliency formed by the variables of government revenue, spending, debt, and macroeconomic conditions. The use of such Fiscal Resilience Index (FRI) as the case of Indonesia in the period 1995-2020 shows a reasonably consistent result which is in line with the underlying condition of the country during such period. It gives a negative figure, which means Indonesia is in a bad fiscal condition due to its budget deficit strategy.

**Keywords:** fiscal resilience, budget deficit, public finance



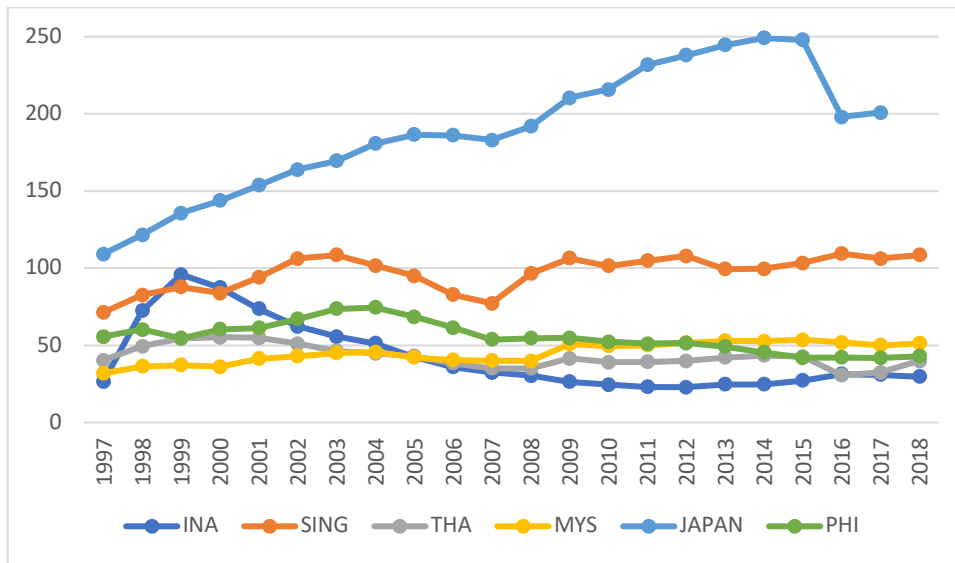
This is an open access article under the CC-BY-NC license.

### INTRODUCTION

In managing fiscal policy, it is necessary to pay attention to aspects of fiscal resilience because it will be related to the stability and sustainability of the country's economy. The concept of fiscal resilience can be viewed from various perspectives. Blanchard & Das (2017) defines fiscal resilience as how far the current fiscal policy can be maintained without causing debt problems in the future. Meanwhile, the Ministry of Finance of Indonesia stated three pillars of fiscal resilience, namely optimal state revenues, quality government spending, and sustainable financing management. Mokoginta & Asfari (2015) found that the leading indicators of fiscal resilience are the budget deficit to GDP ratio and debt to GDP ratio. Meanwhile, the IMF (2020) states that diversified revenue or the Tax Revenue Diversification Index (RDI) is an important indicator to see fiscal resilience through the revenue (tax) structure.

Based on the concepts and findings presented on fiscal resilience, no agreed-upon indicators will become a reference for a country's fiscal resilience. This creates difficulties in stating whether a country has good fiscal resilience or not—for example, measuring the condition of fiscal resilience using debt management indicators (see Figure 1).

**Figure 1. Debt to GDP Ratio (%) in ASEAN-5 and Japan 1997-2018**

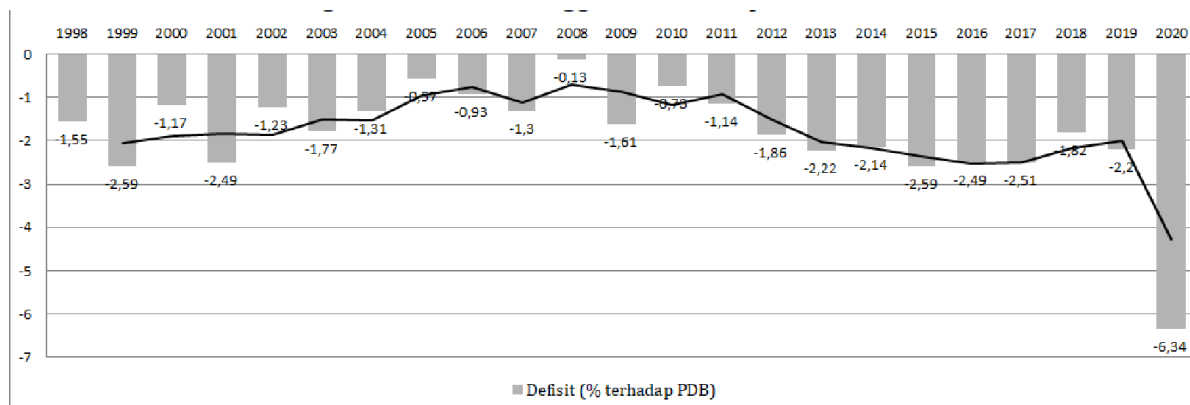


Source: World Bank, 2020 (processed)

When viewed from the condition of the debt to GDP ratio, Indonesia's situation seems to be better than other countries. For example, Japan has a debt to GDP ratio of more than 150% between 2000 and 2018. In ASEAN, Singapore has a debt to GDP ratio of about 100% in 2008-2018. If seen from figure 1, Indonesia is in the lowest position compared to Japan and other ASEAN countries.

Another example of measuring fiscal resilience is using the ratio of budget deficit to GDP as indicators. In Indonesia (see Figure 2), the government tends to adopt a budget deficit policy, with the average ratio of Indonesia's budget deficit since 1998-2019 is +/- 2% . In 2020, the COVID -19 pandemic forced the Indonesian government to renew the limit of budget deficit ratio to GDP from its original condition of 3% to 6%.

**Figure 2 . Development of the Budget Deficit Ratio to GDP in Indonesia 1998-2020**



Source: Indonesia Ministry of Finance, 2020 (processed)

If we look at the conditions that occur in Indonesia based on figures 1 and 2, it is difficult to say whether Indonesia has good fiscal resilience or not. Refers to the conditions in figure 1, Indonesia seems to have good fiscal resilience because it has the lowest debt-to-GDP ratio. However, in figure 2, Indonesia does not have good fiscal resilience because it has experienced a budget deficit since 1998-2020. This condition raises the question of how resilient is Indonesia's fiscal condition? Is it enough to measure a country's fiscal resilience only by using indicators from the revenue and spending side

only (with a proxying the ratio of the budget deficit to GDP) or using indicators in terms of debt management only (by proxying the ratio of debt to GDP)?

Alijoyo (2021) states that, with the urgency of fiscal resilience, it is necessary to have indicators that can describe a country's fiscal resilience more comprehensively. The indicators can use the index approach. This study tries to apply the Fiscal Resilience Index (FRI) approach using the Principal Component Analysis (PCA) method with a case study of Indonesia in the period 1995-2020. This period is used to look at fiscal management in dealing with three crises faced by Indonesia, namely the economic crisis in 1997-1998, the global financial crisis in 2008, and the economic crisis resulting from the COVID-19 pandemic.

## **LITERATURE REVIEW**

Regarding the concept of fiscal resilience, there are no mutually agreed definitions, standards, or methods to measure fiscal resilience. Several previous studies and kinds of literature define fiscal resilience as follows:

- According to Blanchard & Das (2017), fiscal resilience can be defined as how far the current fiscal policy can be maintained without causing debt problems in the future.
- According to Mankiw (1987), fiscal resilience will be related to managing a country's revenue and spending conditions, with the condition of government spending at its optimum point. The optimum point will be reached with the combination and mix of fiscal and monetary policies.
- According to Klimanov et al. (2019), fiscal resilience is defined as the budget system's ability to pay off all debt obligations and recover from the effects of external shocks.

From the various definitions of fiscal resilience described above, there is a typical pattern of factors affecting fiscal resilience, which involves managing revenue budget instruments, government spending, and financing through debt.

Some of the literature and research that has examined fiscal resilience is:

- Sriyana (2005) conducted a study about fiscal resilience in Indonesia and Malaysia. Using the berument method, it was found that in the period 1966-2002, there were differences in the condition of fiscal resilience in the two countries. In Malaysia, the increase in government spending is in line with the increase in tax revenues. In Indonesia, the increase in spending is not in line with the increase in tax revenues, meaning that Indonesia must obtain financing sources other than tax revenues. In addition, there is a difference in terms of government debt. Malaysia has a larger amount of domestic debt than the amount of foreign debt so that the negative impact on fiscal resilience is relatively low. This does not apply in Indonesia. Debt which is a source of financing for large spendings, and accompanied by a higher proportion of foreign debt than domestic, causes Indonesia's fiscal resilience to be vulnerable.
- Kuncoro (2011) studied budget sustainability and its implications for Indonesia's financial system stability for 1999-2009. Using the VAR method found that fiscal risk will be a significant challenge in realizing fiscal sustainability. One source of fiscal risk is the proportion of government debt. This study recommends the need to restructure the proportion of government debt, particularly foreign debt, to prevent external risks, such as exchange rates and inflation.
- Mokoginta & Asfari (2015) conducted a study to measure the index of fiscal pressure in Indonesia in the period 1990-2013. The fiscal risk index is built based on indicators of GDP, interest rates, the amount of subsidy financing, the amount of tax revenue, and the exchange rate. Using the signalling process method and the fiscal risk index, it was found that there was a bad signal in the fiscal situation three years before the 1990-2000 crisis in Indonesia.

- Insukindro (2018) examines the sustainability and dynamics of fiscal policy in Indonesia. Using the VECM approach, it was found that in 2001-2016, domestic sources of financing that were larger than foreign financing could reduce external risks (especially exchange rate fluctuations) to maintain fiscal resilience ultimately. In addition, this study also finds that exchange rate fluctuations and foreign debt have a positive relationship.
- Shastri et al. (2018) conducted a study about fiscal sustainability in five South Asian countries, namely India, Pakistan, Bangladesh, Sri Lanka, and Nepal, for the period 1985-2014. The ARDL (Auto-Regressive Distributed Lag) method found that weak fiscal sustainability caused more significant spending than government revenues. This condition put pressure on the amount of government debt.
- Dzigbede (2020) conducted a study to analyze the economic impact of COVID -19 on fiscal policy in Ghana in 2020. Using the Ghana Living Standards Survey (GLSS) found that during the COVID -19 period, fiscal policy was allocating government spending to social funds, and food creates fiscal pressure so that it is feared that it can worsen fiscal sustainability in African countries. The need for policy options that can reduce this condition, among others, by increasing tax diversification and reducing the budget for less productive expenditures, such as the operational expenditure side.
- In the local government context, Klimanov et al. (2020) conducted a study to analyze regional fiscal resilience in Russia in the 2007-2016 period by building a fiscal resilience index through three indicators, namely public debt, regional budget, and total grant revenue. The findings show that there is a relationship between fiscal resilience and socio-economic resilience.

The government certainly has fiscal rules mandated by the constitution, such as limits on the budget deficit and the amount of financing that comes from debt. However, ideal fiscal policy does not only talk about fulfilling the constitutional mandate; The ideal fiscal policy considers the potential side of government revenues and spendings. According to this definition, fiscal resilience can be seen from the government's budget management regarding revenue, spending, and debt financing.

## **RESEARCH METHODOLOGY**

To achieve the research objective on the Fiscal Resilience Index (FRI), the researcher uses the Principal Component Analysis (PCA) method. The PCA procedure aims to simplify the observed variables by shrinking or reducing their dimensions. This is done by eliminating the correlation between independent variables by transforming the original independent variable into a new variable that is not correlated or is often called the principal component (Santosa, 2002).

Several stages and testing requirements must be carried out to fulfill each variable's PCA method's assumption (Santosa, 2002). The first stage is the feasibility test of the variables used. The feasibility test can use the KMO and Barlett Test methods which are statistical tests to test the correlation between the independent variables involved in the model. The second stage is to see the value of Measures of Sampling Adequacy (MSA). The MSA value will determine whether each variable can be analyzed further or not. Variables that meet MSA criteria indicate that they can be analyzed and processed further, while variables that do not meet MSA criteria cannot be examined further. This MSA number or value can be seen in the Anti-Image Matrices Table. In the third stage, look at the components that are formed. The components formed show the factors included from several variables. The formed factors are used to build linear equations in creating the index by paying attention to each variable's component score values, which can be seen through the Component Score Coefficient Matrix.

Thus, the formed linear equation can be written as in equation one, namely:

$$IKF_t = \varphi_1 X_1 + \varphi_2 X_2 + \varphi_3 X_3 + \varphi_4 X_4 + \varphi_5 X_5 + \varphi_6 X_6 + \varphi_7 X_7 + \varphi_8 X_8$$

Where:

- IKF = Fiscal Resilience Index
- $X_1, X_2$  = The government revenue component consists of tax and non-tax revenues.
- $X_3, X_4, X_5$  = The government spending component consists of routine expenditures (Includes: Personnel Expenditures, Goods Expenditures, Capital Expenditures, Debt Interest Payments, Subsidies, Social Assistance, Other Routine Expenditures), development expenditures, and transfers to regions.
- $X_6$  = The indicator component of debt management is indicated by the outstanding amount of government debt.
- $X_7, X_8$  = Components of macroeconomic indicators such as the Exchange Rate against the US Dollar and economic growth (proxied by GDP growth).

## FINDING AND DISCUSSION

The Principal Component Analysis (PCA) method is used to form a FRI to achieve the research objectives. The first stage in the PCA method is to conduct a feasibility test using the KMO and Barlett's Test method. The analyzed variable's main requirement has passed the test : KMO (Kaiser-Meyer-Olkin) and Barlett's Test values ranging from 0.5 to 1 with the Barlett Test of Sphericity significance level below 0.5, which indicates a correlation between independent variables.

**Table 1. KMO and Bartlett's Test**

TEST	SCORE
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	0,818
Sig. Barlett Test of Sphericity	0,000

Table 1. is the processed result based on the variables used in this study. The data processing results show that the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy has 0.818 with a Barlett Test of Sphericity Significance of 0.000. This indicates that the variables used in the study are feasible to be studied further using the PCA method.

The second stage of PCA testing is to see the value of Measures of Sampling Adequacy (MSA). The MSA number ranges from 0 to 1 with the criterion value of MSA = 1, indicating that the variable can be predicted without other variable errors. MSA > 0.5 means the variable is still predictable and can be analyzed further. In contrast, MSA < 0.5 indicates that the variable cannot be predicted and examined further.

**Table 2. Anti -Image Matrices**

Variable	Tax	Non Tax	Routine	Development	Local	Debt	Exchange Rate	GDP
<b>Tax</b>	<b>.823<sup>a</sup></b>	-.623	.165	-.102	-.498	-.151	.132	.271
<b>Non Tax</b>	-.623	<b>.844<sup>a</sup></b>	-.316	.009	.191	.133	-.245	-.016
<b>Routine</b>	.165	-.316	<b>.832<sup>a</sup></b>	-.037	-.756	-.018	.098	-.170
<b>Development</b>	-.102	.009	-.037	<b>.878<sup>a</sup></b>	-.078	-.559	.267	-.033
<b>Local</b>	-.498	.191	-.756	-.078	<b>.808<sup>a</sup></b>	-.056	-.093	-.175
<b>Debt</b>	-.151	.133	-.018	-.559	-.056	<b>.843<sup>a</sup></b>	-.388	.103
<b>Exchange Rate</b>	.132	-.245	.098	.267	-.093	-.388	<b>.590<sup>a</sup></b>	.034
<b>GDP</b>	.271	-.016	-.170	-.033	-.175	.103	.034	<b>.782<sup>a</sup></b>

\*= Reference MSA values that meet the criteria >0.5

Table 2 has resulted from the Anti-Image Matrices table. According to table 2, all variable has an MSA value more than 0.5. It means that each variable fulfills the requirements for the PCA method's assumption and can be further analyzed.

**Table 3. Component Score Coefficient Matrix**

Variable	Score
<b>Tax</b>	0,030
<b>Non Tax</b>	0,013
<b>Routine</b>	0,056
<b>Development</b>	0,054
<b>Local</b>	0,071
<b>Debt</b>	-0,151
<b>Exchange Rate</b>	-0,491
<b>GDP</b>	0,762

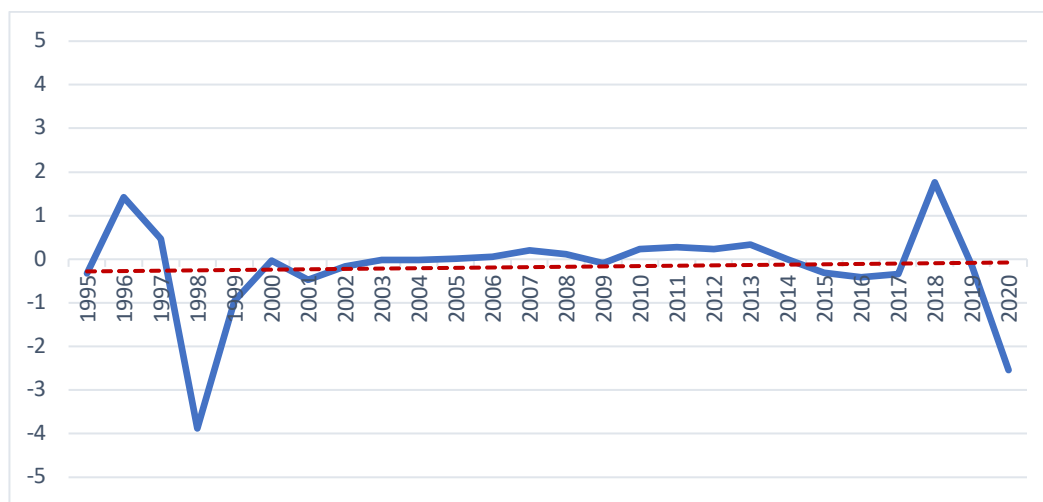
Table 3. is the main component score in building the FRI . The variables of tax revenue, non-tax revenue, routine expenditure, development expenditure, transfer to the local government, and economic growth positively correlate to the FRI score. Meanwhile, the debt and exchange rate variables have scored with negative values, indicating that when the components of the two variables increase, the FRI score will decrease or vice versa.

Based on the principal component scores shown in table 3, the Fiscal Resilience Index can be formed through the following equation:

$$IKF_t = 0,03 X_1 + 0,013 X_2 + 0,056 X_3 + 0,054 X_4 + 0,071 X_5 - 0,151 X_6 - 0,491 X_7 + 0,762 X_8$$

Using the above equation, the Indonesian Fiscal Resilience Index for the period 1995-2020 is presented as follows:

**Figure 3. Fiscal Resilience Index 1995-2020 Period**



In general, the average score of Indonesia's FRI is -0.177. Based on the trend, the FRI score has increased since 1995 - 2020 even though the trend value is still below 0 or recorded a negative value. This indicates that Indonesia's FRI is in bad condition because it shows a negative number.

The lowest value of the FRI in 1998, with an index score of -3.879. That year's low FRI score was influenced by the pressure of the monetary crisis as indicated by the increase in the amount of government spending (routine, development, and transfers to the local government), which is not followed by the rise in government revenue. In 1998, there was an increase in routine government spending by 273%, development spending increased by 100%, and transfer to the local government rising by 23%. Meanwhile, government revenue only increased by +/- 13%. Pressure on the FRI score also arose due to the significant outstanding value of government debt, which increased 780% from the previous period. Likewise, the rupiah exchange rate against the US dollar weakened 280%, which of course, increased the burden of government debt. Insukindro (2018) finds that the lower exchange rate ultimately affects the reduced value of the primary surplus. The weakening exchange rate directly affects external government debt and the primary balance, affecting fiscal resilience. In addition, the realization of economic growth recorded a growth rate of -13%, which further put pressure on the condition of fiscal resilience in 1998.

The same thing happened to the FRI score in 2020, which recorded a figure of -2.54. With the COVID-19 pandemic, the government implemented an expansionary fiscal policy by providing tax relaxation, which contributed to negative growth in tax revenues of 16.7% from 2019, dominated by negative oil and gas tax growth of 19.7%. In terms of government spending, there was a positive growth of 12.2% from 2019. The increase in spending was dominated by the rise in central government spending allocated for social assistance subsidies with a growth of 82.3%. In terms of debt, it is known that Indonesia's total debt grew by 65.3%, with a proportion of 63.3% originating from the issuance of Government Securities (SBN). By the government's target, domestic SBN ownership is 35.90% and comes from the banking industry. This condition is in line with previous research (Sriyana, 2005; Kuncoro, 2011; Mokiginta & Asfari, 2015; Insukindro; 2018; Shastri et al., 2018; Dzibede, 2020; Stigler, 2021), which states that fiscal resilience will be under pressure if the spending side increases faster than the income side, and also pressure from the exchange rate side. However, when viewed from the side of pressure originating from the outstanding value of debt and the exchange rate factor, in 2020, it tends to be better than what happened in 1998. The outstanding value of debt has decreased from 2019, indicating that the government carries out a mechanism of debt risk management.

However, in 2020 there will be a slowdown in economic growth so that when viewed based on the debt to GDP ratio indicator, it shows an increase.

The highest FRI score occurred in 2018, which recorded a score of 1,764. In contrast to what happened in 1998 and 2020, in 2018, the government's revenue and spending indicators showed an increase, with a higher growth rate on the revenue side. This indicates that although in 2018, the government still implemented a budget deficit policy, the budget deficit decreased from the previous period. The outstanding value of debt has fallen, and the exchange rate tends to be stable compared to the last period. This is thought to be supportive in producing a positive fiscal resilience index score.

Based on the results obtained above, the FRI gives a comprehensive point of view about Indonesia's fiscal resilience compared to other indicators, namely the debt to GDP ratio and deficit to GDP ratio. This study is in line with the findings of Sriyana (2005), Kuncoro (2011), and Mokoginta & Asfari (2015), which state that the deficit fiscal policy adopted by the Indonesian government is a source of pressure on its fiscal resilience. In addition, foreign government debt will also put additional pressure on Indonesia's fiscal resilience; this is in line with the findings of Insukindro (2018). Therefore, the Indonesian government needs to review the deficit fiscal policy by maximizing tax revenues and allocating productive government spending.

## **CONCLUSION AND FURTHER RESEARCH**

The Fiscal Resilience Index provides a more comprehensive indicator of a country's fiscal resilience condition rather than using indicators from the revenue and spending side only (with a proxying the ratio of the budget deficit to GDP) or using indicators in terms of debt management only (by proxying the ratio of debt to GDP). The Fiscal Resilience Index considers the main factors in fiscal resilience, namely the government revenue, spending, debt, and macroeconomic factors.

Based on the data processing results through the Principal Component Analysis (PCA) method, it was found that in the period 1995-2020, Indonesia's fiscal resilience was in bad condition because it recorded a negative average score. Pressure on Indonesia's Fiscal Resilience Index comes from the higher growth rate on the spending side than on the revenue side. This is reflected in the budget deficit strategy adopted by the Indonesian government.

This study contributes to the development of fiscal resilience literature, especially giving the new perspective of comprehensive fiscal resilience indicators. We hope the government can consider this study in formulating revenue, expenditure, and debt policy. In addition, it is essential to maintain macroeconomic stability because it will put pressure on budget realization.

This study has limitations because it only uses an Indonesian case study where only Indonesian macroeconomic variables and the value of Indonesian government revenue and spending are used. Further research is needed with the broader country sample to ensure the reliability of the formation of the Fiscal Resilience Index.

## **REFERENCE**

- Adiningsih, S. (2012). Koordinasi dan interaksi kebijakan fiskal-moneter: tantangan ke depan. *Yogyakarta: Kanisius*.
- Alijoyo, A. (2021, August 2). The Necessity of a Holistic Model of Fiscal Risk Resilience. Retrieved from CRMS <https://crmsindonesia.org/publications/the-necessity-of-a-holistic-model-of-fiscal-risk-resilience/>
- Blanchard, O. J., & Das, M. (2017). A new index of debt sustainability. *National Bureau of Economic Research (working paper)*.



- CEIC Data. (2021, 08 07). *Utang Pemerintah:% dari PDB*. Retrieved from CEIC Data: <https://www.ceicdata.com/id/indicator/government-debt--of-nominal-gdp>
- Dzighbede, K. D & Pathak Rahul (2020). COVID-19 economic shocks and fiscal policy options for Ghana. *Journal of Public & Financial Management*, 903-917
- Insukindro (2018). The effect of twin shock on fiscal sustainability in Indonesia. *Recent Issues In Economic Development*, 11(1), 75-84
- Kemenkeu. (2016, November 25). *Tantangan Ketahanan Fiskal yang Berkelanjutan*. Retrieved from Kemenkeu:<https://www.kemenkeu.go.id/publikasi/artikel-dan-opini/tantangan-ketahanan-fiskal-yang-berkelanjutan/>
- Kemenkeu. (2019, June 21). *Kementerian Keuangan*. Retrieved from Ringkasan APBN :<http://www.data-apbn.kemenkeu.go.id/Dataset/Details/1011>
- Klimanov, V. V., Kazakova, S. M., & Mikhaylova, A. A. (2020). Economic and fiscal resilience of Russia's regions. *Regional Science Policy & Practice*, 12(4), 627-640.
- Kuncoro, H. (2011). The Indonesia's state budget sustainability and its implication for financial system stability. *Romanian Journal of Fiscal Policy*, 2(1), 36-53.
- Mankiw, N. G (1987). The optimal collection of seigniorage Theory and Evidence, *Journal of Monetary Economics*, 327-341
- Mokoginta, I. S., & Asfari, D. D. (2015). Fiscal stress index sebagai sistem peringatan dini krisis fiskal di Indonesia. *Research Report-Humanities and Social Science*, 2.
- Munawar, Y. (2020). Respon Kebijakan Fiskal Terhadap Siklus Bisnis: Studi Kabupaten/Kota Di Indonesia. *Bina Ekonomi*, 24(1), 1-13.
- Santosa, S. (2002). *Buku Latihan SPSS Statistik Multivariat*. Jakarta: PT. Elex Media Komputindo.
- Shastri, S., Giri, A. K., & Mohapatra, G. (2018). Fiscal sustainability in major South Asian economies: evidences from panel data analysis. *Journal of Economic Cooperation & Development*, 39(2), 69-93.
- Sriyana, J. (2005). Ketahanan Fiskal: Studi Kasus Malaysia dan Indonesia. *Economic Journal of Emerging Markets*, 10(2).
- Stigler, S. H. (2021). Changes in fiscal risk against natural disasters due to Covid-19. *Progress in Disaster Science*.