# Debt Sustainability Measurement Model in Indonesia using Fiscal Diagnostics

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**Abstract.** The purpose of this study is to measure sustainable debt in Indonesia using fiscal diagnostics. We used secondary data, including data on GDP, government revenue, government debt, primary balance, government debt and private debt from 2010-2020. The source of the data is from Indonesian Statistics, Ministry of Finance and Bank Indonesia. This research method uses fiscal diagnostics which analyzes the development of data on the ability of the government and the private sector to pay debts and interest on their debts. The ability to pay the debt is identified from performance of fiscal indicators to GDP Indonesia, (ii) Debt sustainability indicators Indonesia with three measurements; a) public debt service to revenue ratio, (b) public debt interest to revenue ratio, (c) public debt to revenue ratio. The results show that the budget deficit is within safety limit, which is below 3%, but the effects of the Covid-19 pandemic have made the deficit widen to 6% in 2020. The three indicator of sustainable debt show that the debt burden is increasing and the fiscal capacity of the country is expected to struggle to pay off the debt.

**Keywords:** Public Debt, Debt Sustainability, Fiscal Diagnostics, Private Sector, Indonesia

## 1 Introduction

All countries around the world cannot avoid incurring debt, despite varying fiscal capacities. Lewis and Woodward [1] argue that government debt is a common method used by the central government and local governments to improve public services and stimulate the economic development. The Indonesian government experienced a deficit in the government budget because tax revenues were unable to finance all government spending, including investment in sectors important to the economy and then to seek funding from foreign debt to close the shortage gap. Chatterjee et al. [2] and Ncanywa and Masoga [3] conclude that the foreign debt incurred by the government is related to high spending and low tax revenue.

Table 1 shows the data about Indonesia's debt both by the Government and the private sector for the period 2016-2020.

**Table 1.** Total Government and Private External Debt 2016-2020 (in million USD)

| Type of Debt | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|
| Government & Central Bank | 158.283 | 180.662 | 186.275 | 202.872 | 209.246 |
| Private | 161.722 | 171.847 | 189.155 | 206.690 | 208.235 |

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| Type of Debt | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|
| Total | 320.005 | 352.509 | 375.430 | 409.562 | 417.481 |

(Indonesia's Foreign Debt Statistics, Indonesia Central Bank, (2021))

Based on table 1, Indonesia's total foreign debt increases every year. In 2016, foreign debt amounted to USD 320 billion and then increased dramatically over 5 years to USD 417 billion in 2020. The proportion between public debt and private external debt was not significantly different, between 52% and 48% per year. The foreign debt made must be sustainable, i.e. whether the Government is able to comply with all current and future payment obligations without extraordinary financial assistance or default [4].

Finger and Mecagni [5] state that sustainable debt is a condition in which the borrower or the country is expected to proceed to make debt payments without having a major impact or correction on the balance of income and expenditure of the country. Consequently, a debtor must be able to generate sufficient revenues over future periods to cover its debt payment obligations.

Debt sustainability is related to the fiscal sustainability of a country. Fiscal sustainability indicates that the government is able to fund its budget without excessive accumulation of long-term public debt [6]. Therefore, maintaining fiscal sustainability is a challenging task for the government, when the government loses the ability to pay, it has an impact on inflation or failure to pay debts [7].

Several previous studies that discussed debt and fiscal sustainability, namely Adams et al [8] examined the issue of fiscal sustainability in developing Asian countries in 1990-2008. By using fiscal diagnostics, the results show that (i) there is a deficit below the average of 5%, (ii) the average level of government expenditure and income is relatively low in the range of 20-25% of GDP. (iii) the debt-to-GDP ratio in ASEAN countries is quite high with a range of 50-60%. Ferrarini and Ramayandi [9] analyzed government debt and fiscal performance in developing countries in 1994-2010. The results show that South Asia has the highest debt ratio in Asia, almost 67% on average. The debt ratio in Central Asia, Pacific and Southeast Asia is 40-50% of GDP.

Unalmis [10] analyzes the sustainability of domestic and foreign debt in the long term, and identifies the government's fiscal policy response in the short term in eastern European countries. The results of the study show that the sizable increase in the government spending of these countries is the main reason behind the rapid increase in their debt stock. Bui [6] which examines fiscal sustainability in 22 Asian developing countries from 1999-2017. The results show that fiscal policies in most developing Asian countries are not sustainable after the global financial crisis. This condition raises concerns about the sustainability of debt in the future. Campos and Cysne [11] examined the long-term relationship between income, income, and debt from December 1997 to June 2018. The results show that there is no debt sustainability in Brazil as indicated by the ratio of debt to GDP.

Research topics that discuss debt sustainability in developing countries which are exacerbated by the negative impacts of the Covid-19 pandemic have not been widely carried out. The purpose of this study is to measure the sustainability of Indonesia's debt using fiscal diagnostics. The paper is organized as follows. Section 2 provides the methodology of research. Section 4 presents and discusses the empirical results. Section 5 concludes the finding in this study.

## 2 Method

This study used secondary data sourced from Indonesian Statistics, Ministry of Finance and Indonesia Central Bank for the period 2010-2020. These data include; GDP, revenue, tax revenue, expenditure, deficit, and primary balance. The data analysis method uses fiscal diagnostics to analyze; (i) Indonesia's Fiscal Indicators to GDP performance, (ii) Indonesia's debt sustainability indicators with three measurement; a) public debt service to revenue ratio, (b) public debt interest to revenue ratio, (c) public debt to revenue ratio.

We calculate three measurement of debt sustainability as follows :

1) Public debt service to revenue ratio

$$Public\ Debt\ Service\ to\ Revenue\ Ratio = \frac{Total\ Debt}{Revenue}\ x\ 100\ \%$$

2) Public debt interest to revenue ratio

$$Public\ debt\ interest\ to\ Revenue\ Ratio = \frac{Total\ Debt}{Revenue}\ x\ 100\ \%$$

3) Public debt to revenue ratio

$$Public\ Debt\ to\ Revenue\ Ratio = \frac{Total\ Debt}{Revenue}\ x\ 100\ \%$$

## 3 Results and Discussions

Adams et al. [8] suggested that fiscal Diagnostics reviews the fiscal balance, government expenditures and revenues, and government debt presented to Gross Domestic Product (GDP) in Indonesia in 2010-2020. The results of this study will be divided into several parts. Table 2 shows Indonesia's macroeconomic conditions (GDP) and fiscal indicators, namely government revenues, tax revenues, deficits, and primary balance.

**Table 2.** GDP dan Fiscal Indicators of Indonesia, 2010-2020 (in trillion rupiah)

| Period | GDP | Revenue | Tax Revenue | Expenditure | Deficit | Primary Balance |
|---|---|---|---|---|---|---|
| 2010 | 6442,9 | 995,27 | 723,3 | 1042,12 | 39,5 | 58,8 |
| 2011 | 7427,1 | 1210,6 | 873,9 | 1295 | 84,4 | 22,2 |
| 2012 | 8241,9 | 1338,11 | 980,52 | 1491,41 | 153,3 | -35,5 |
| 2013 | 9084 | 1438,89 | 1077,3 | 1650,56 | 211,67 | -99,17 |
| 2014 | 10542,7 | 1550,49 | 1146,9 | 1777,18 | 226,69 | -91,19 |
| 2015 | 11540,8 | 1508,02 | 1240,4 | 1806,51 | 298,49 | -142,76 |
| 2016 | 12406,8 | 1555,93 | 1284,97 | 1864,27 | 308,34 | -117,12 |
| 2017 | 13588,8 | 1666,37 | 1343,53 | 2007,35 | 340,98 | -124,41 |
| 2018 | 14837,4 | 1943,67 | 1518,79 | 2213,11 | 269,44 | -31,38 |
| 2019 | 15883,9 | 1960,63 | 1546,14 | 2309,28 | 348,65 | -73,13 |
| 2020 | 15434,2 | 1633,6 | 1070 | 2589,9 | 956,3 | -642,2 |

(Statistics of Indonesia & Ministry of Finance, 2010-2020)

Indonesia is one of the countries with the largest GDP in the world, including one of the largest in Asia. In 2010, nominal GDP reached IDR 6,442.9 trillion and in 2020, it reached IDR 15,434.2 trillion. Household consumption is the largest contributor to GDP with an average contribution of 58%. If there is a short-term shock, household consumption will decline and have an impact on Indonesia's economic growth slowdown. From the fiscal performance, the following results can be explained; over the past 10 years, government spending has exceeded government revenues and every year there is a budget deficit. The budget deficit continued to increase from only Rp. 39,5 trillion in 2010 and significantly increased to almost Rp. 1000 trillion in 2020. The increase in the deficit in terms of expenditure was due to massive infrastructure development, human development through education funds and the provision of social assistance. Meanwhile, in terms of government revenue, it is caused by tax revenues that do not reach the target each year. The Covid-19 pandemic has widened the budget deficit from IDR 348,65 trillion in 2019 to IDR 956,3 trillion in 2020.

The Indonesian government is financing debt to cover a widening deficit. This condition ensures that the primary balance does not arise in 2012-2020. The primary balance is the difference between total government revenue minus government spending, excluding interest payments on debt. The primary balance describes the government's ability to pay principal and interest on debt with government revenues. If the value of the primary balance is negative, the government must issue new debt to pay the principal and interest on the debt, otherwise if the value of the primary balance is positive, the government can use sources of government revenue to pay part or all of the principal and interest on the debt. The target of the Indonesian government is to push for a positive primary balance by reducing the government budget deficit within safe limits with spending that is still directed at strengthening fiscal stimulus in order to maintain the momentum of sustainable and equitable economic growth [12].

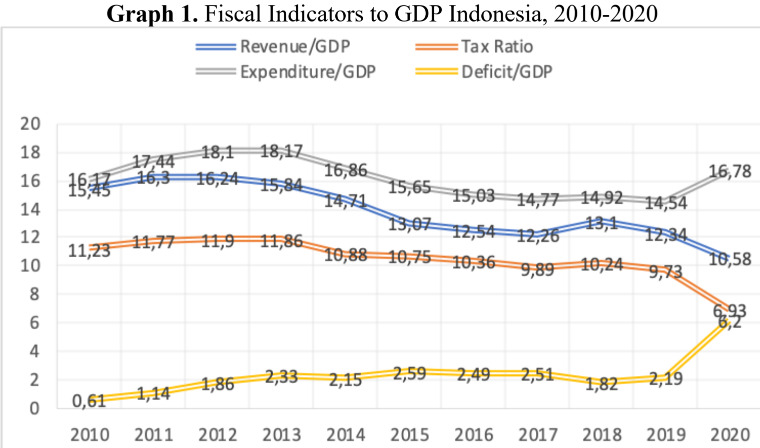
Table 3 and Graph 1 show the fiscal indicators for Indonesia's GDP 2010-2020 including revenue to GDP, tax revenue to GDP or tax ratio, expenditure to GDP and deficit to GDP.

**Table 3.** Fiscal Indicators to GDP of Indonesia, 2010-2020 (percent)

| Period | Revenue/GDP | Tax Ratio | Expenditure/GDP | Deficit/GDP |
|---|---|---|---|---|
| 2010 | 15,45 | 11,23 | 16,17 | 0,61 |
| 2011 | 16,30 | 11,77 | 17,44 | 1,14 |
| 2012 | 16,24 | 11,90 | 18,10 | 1,86 |
| 2013 | 15,84 | 11,86 | 18,17 | 2,33 |
| 2014 | 14,71 | 10,88 | 16,86 | 2,15 |
| 2015 | 13,07 | 10,75 | 15,65 | 2,59 |
| 2016 | 12,54 | 10,36 | 15,03 | 2,49 |
| 2017 | 12,26 | 9,89 | 14,77 | 2,51 |
| 2018 | 13,10 | 10,24 | 14,92 | 1,82 |
| 2019 | 12,34 | 9,73 | 14,54 | 2,19 |
| 2020 | 10,58 | 6,93 | 16,78 | 6,20 |

(Ministry of Finance (2010-2020, author's calculation))

**Graph 1.** Fiscal Indicators to GDP Indonesia, 2010-2020




The Expansive fiscal policy by increasing spending accompanied by flexibilities of tax revenues makes the ratio of expenditure to GDP greater than the ratio of revenue to GDP. For he period 2010-2020, the average ratio of expenditures to GDP is 16,22% per year and the average ratio of revenues to GDP is 13, 86% per year. Over the past 11 years, the ratio of tax revenues to Indonesia's GDP, or the tax ratio, has tended to decline by an average of 10.5% per year. The lowest tax ratio occurred in 2020 as a result the Covid-19 pandemic. Tax payments made by companies and the public decreased drastically due to social restrictions. With relatively massive fiscal policy, Indonesia's deficit to GDP ratio can be maintained at 1-2%. However, the Covid-19 pandemic has increased the deficit and this condition can become a big problem if no efforts are made to restore the economy. If in accordance with Law Number 17 of 2003 concerning Government Finances, the national deficit is limited to 3 percent of GDP [12]. The deficit in 2020 of 6.2% of GDP has exceeded the safety limit. The average budget deficit in Indonesia is below 3%, this result is in accordance with Adams et al [8] which governments that the deficit of ASEAN countries is still below the average of 5% and has a low ratio of expenditure and expenditure to GDP.

Table 4 and Graph 2 show the condition of debt in Indonesia including the ratio of total debt to GDP, the ratio of total government debt to GDP, and the ratio of total private debt to GDP.

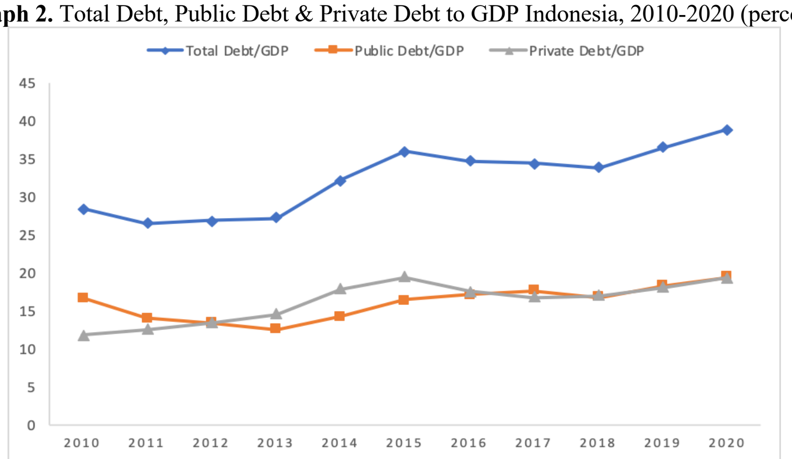
**Table 4.** Total Debt, Public Debt & Private Debt to GDP Indonesia, 2010-2020 (percent)

| Period | Total Debt/GDP | Public Debt/GDP | Private Debt/GDP |
|---|---|---|---|
| 2010 | 28,55 | 16,73 | 11,82 |
| 2011 | 26,64 | 14,02 | 12,62 |
| 2012 | 26,95 | 13,47 | 13,48 |
| 2013 | 27,24 | 12,65 | 14,60 |
| 2014 | 32,27 | 14,27 | 18,00 |
| 2015 | 36,06 | 16,55 | 19,51 |
| 2016 | 34,82 | 17,22 | 17,60 |
| 2017 | 34,50 | 17,68 | 16,82 |
| 2018 | 33,91 | 16,82 | 17,08 |
| 2019 | 36,59 | 18,39 | 18,19 |

| Period | Total Debt/GDP | Public Debt/GDP | Private Debt/GDP |
|---|---|---|---|
| 2020 | 38,97 | 19,52 | 19,45 |

(Indonesia Central Bank (2010-2020, author's calculation))

**Graph 2.** Total Debt, Public Debt & Private Debt to GDP Indonesia, 2010-2020 (percent)




Indonesia's total debt is the accumulated debt made by the government and the private sector. Due to the impact of increasing government and business funding, the debt-to-GDP ratio has tended to increase over the past 11 years. In 2010, the debt-to-GDP ratio reached 28,55% and increased significantly to 38,97% in 2020. Based on Law Number 17 of 2003 concerning Government Finances, Indonesia's debt ratio is still within safe limits because it is less than 60%. of GDP. The development of the ratio of government debt and the ratio of private debt to GDP is almost balanced. However, on average the private debt ratio is 16,29%, while the average government debt ratio is 16,12%. In 2010, the ratio of government debt was still higher than private debt as a result of the global financial crisis in 2008. In 2013-2015, private debt exceeded government debt due to the need for business expansion carried out by many companies including government-owned companies. The expansion of private debt is intended to increase the company's production capacity by building new plants and enhancing production technologies

In measuring debt sustainability to examine fiscal vulnerability, three measurements are used, namely: (a) public debt service to revenue ratio, (b) public debt interest to revenue ratio, (c) public debt to revenue ratio as shown in table 5 and graph 3 to 4.

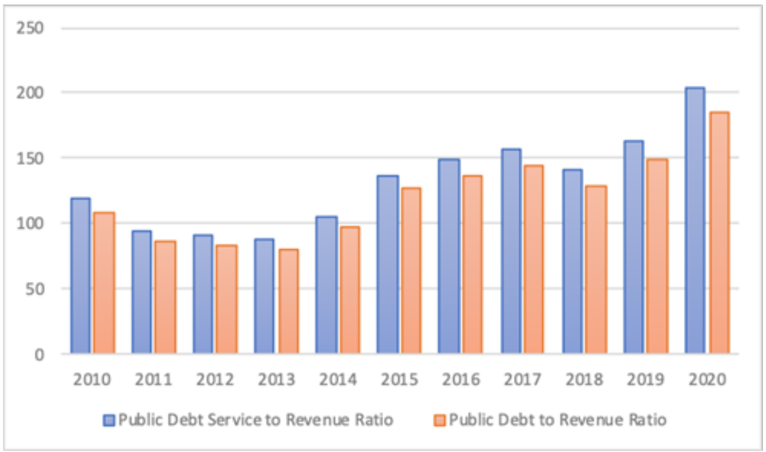
**Table 5.** Indicators of Debt Sustainability Indonesia,2010-2020 (percent)

| Period | Public Debt Service to Revenue Ratio | Public debt Interest to Revenue ratio | Public Debt to Revenue Ratio |
|---|---|---|---|
| 2010 | 118,92 | 10,62 | 108,31 |
| 2011 | 94,84 | 8,81 | 86,04 |
| 2012 | 91,74 | 8,80 | 82,94 |
| 2013 | 87,67 | 7,82 | 79,85 |
| 2014 | 105,80 | 8,74 | 97,06 |
| 2015 | 136,97 | 10,33 | 126,64 |
| 2016 | 149,62 | 12,29 | 137,33 |

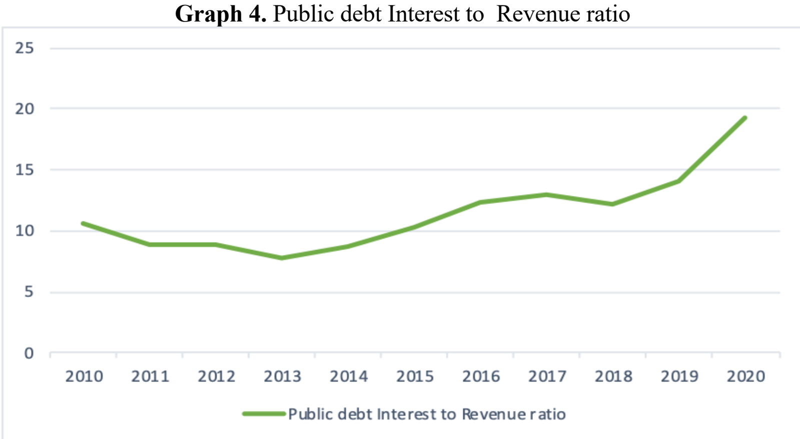
| Period | Public Debt Service to Revenue Ratio | Public debt Interest to Revenue ratio | Public Debt to Revenue Ratio |
|---|---|---|---|
| 2017 | 157,16 | 13,00 | 144,16 |
| 2018 | 140,67 | 12,25 | 128,42 |
| 2019 | 163,05 | 14,05 | 149,00 |
| 2020 | 203,68 | 19,23 | 184,45 |

(Ministry of Finance & Indonesia Central Bank (2010-2020, author's calculation))

**Graph 3.** Public Debt Service to Revenue Ratio & Public Debt to Revenue Ratio Indonesia, 2010-2020




**Graph 4.** Public debt Interest to Revenue ratio




Public debt service to revenue ratio for 11 years has a tendency to increase. In 2010, it stood at 118,92%, then fall to 87,67% in 2013. Then it increased significantly to 203,68% in 2020. The larger the public debt service to revenue ratio indicates that the fiscal capacity is getting smaller, which means the level of fiscal vulnerability is getting lower increased. The public debt interest to revenue ratio also has a tendency to increase in the last 11 years. The lowest graph in 2013 was 7,82% and the highest graph in 2020 was 19,23%. The larger the public debt interest to revenue ratio indicates that the debt interest expense is increasing and the income capacity to encourage productive needs is getting smaller. The public debt to revenue ratio tends to increase from 2010-2020. In 2010, the debt ratio was 108.31% and increased significantly to 184,45% in 2020. The larger the debt to revenue ratio indicates that the debt burden is getting bigger, this means that the level of vulnerability is increasing. Based on three measures of sustainable debt, namely public debt service to revenue ratio, public debt interest to revenue ratio, public debt to revenue ratio, Indonesia will face the risk of fiscal vulnerability because fiscal capacity is predicted to be unable to bear the increasing burden of government debt. The results from this study are consistence with Adams et al. [8]; Ferrarini et al. [9]; Unalmis [10]; Bui [6]; Campos and Cysne [11] that higher public spending drives up public debt in developing countries and predicts that debt sustainability cannot be achieved.

## 4 Conclusion

The purpose of this study is to identify debt sustainability in Indonesia in 2010-2020 using fiscal diagnostics. Based on the results of the study, it can be concluded that the deficit is still below 3%, but the effects of the Covid-19 pandemic will widen the deficit to 6% in 2020. All indicators of debt sustainability indicators indicate that the debt burden is getting bigger and it is predicted that the country's fiscal capacity will have difficulty to repaying the debts.

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