The Relation Between Fiscal Policy, Debt Burden, And Macroeconomic Performance In G20 Countries: An Empirical Study With Annual Data

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Abstract

This study aims to analyze the relationship between budget balance, public debt, and GDP growth in G20 countries. The study used annual secondary data from reliable sources, such as the World Bank, the International Monetary Fund, and the Organization for Economic Co-operation and Development. This study uses multiple linear regression analysis method with dependent variable of GDP growth and independent variable of budget balance and public debt. The results showed that budget balance has a positive effect on GDP growth, while public debt has a negative effect on GDP growth. This implies that prudent and sound fiscal policy can improve macroeconomic performance and reduce the burden of public debt. However, regression models can only account for about 13.4% variation in GDP growth, meaning that there are still other factors that need further investigation. Therefore, future research can use panel data, add control variables, and analyze the impact of the global economic crisis.

Keywords: Budget balance, Public debt, GDP growth, G20 countries, Fiscal policy.
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Introduction

The balance of budget and public debt are two important issues in macroeconomics related to government fiscal policy. Budget balance shows the difference between government revenues and expenditures in a period, while public debt shows the amount of loans that the government must pay to others. These two issues are interrelated because if the government runs a budget deficit, then it has to borrow to cover the shortfall, thus increasing public debt. Conversely, if the government has a budget surplus, then it can reduce public debt (Fiedler, Gern, & Stolzenburg 2020).

The balance of the budget and public debt can be affected by various factors, such as economic growth, inflation, interest rates, exchange rates, and political conditions (Chugunov, Pasichnyi, Koroviy, Kaneva, & Nikitishin 2021). In general, the government can regulate its income and expenditure through tax and expenditure instruments. Taxes are the main source of government revenue, while spending is government spending to provide public goods and services, such as education, health, infrastructure, and defense. The government can increase or decrease taxes and spending to achieve certain goals, such as improving people's welfare, addressing social problems, or responding to economic crises (Barr 2020).

One indicator that is often used to measure the balance of budget and public debt is the ratio to Gross Domestic Product (GDP). This ratio shows the size of the budget deficit or surplus and public debt compared to the total economic output of a country. According to World Bank data, the average ratio of budget deficit to GDP in the world in 2020 was -9.8%, while the average

ratio of public debt to GDP was 59.5%. These ratios show that many countries are experiencing increased budget deficits and public debt due to the impact of the COVID-19 pandemic which requires governments to increase health spending, social protection, and economic stimulus (Wang, Bui, Zhang, Nawarathna, Mombeuil 2021).

Fiscal policy is one of the macroeconomic policy instruments that can be used to influence economic growth, price stability, and balance of payments. Fiscal policy includes regulating government revenues and expenditures, as well as managing public debt. Good fiscal policy is expected to improve macroeconomic performance, both in the short and long term (Ackah, Bobio, Graham, Oppong 2020).

One indicator of macroeconomic performance is Gross Domestic Product (GDP), which is the total value of final goods and services produced by a country in a given period (Irshad, Hussain, & Baig 2022). GDP can be influenced by various factors, both from the demand and supply sides. On the demand side, GDP can be affected by consumption, investment, government spending, and net exports. From the supply side, GDP can be influenced by factors of production, such as labor, capital, technology, and natural resources (del Rio-Chanona, Mealy, Pichler, Lafond, Farmer, 2020).

Fiscal policy can affect GDP from both the demand and supply sides. On the demand side, fiscal policy can affect consumption through income and substitution effects. Income effects are changes in consumption caused by changes in income resulting from changes in taxes or government spending. The substitution effect is a change in consumption caused by a change in the interest rate caused by a change in the budget deficit. Fiscal policy can also influence investment through crowding out and crowding in effects. The crowding out effect is a decrease in investment caused by an increase in interest rates resulting from an increase in the budget deficit (Stockhammer, Qazizada, & Gechert 2019). The crowding effect is an increase in investment caused by an increase in aggregate demand resulting from increased government spending. Fiscal policy can also affect government spending itself, both through budget allocation and spending efficiency. Fiscal policy can also affect net exports through exchange rate effects and competitiveness effects. Exchange rate effect is the change in net exports caused by changes in exchange rates caused by changes in the budget deficit. The competitiveness effect is the change in net exports caused by changes in relative prices resulting from changes in taxes or government spending (Deleidi & Mazzucato, 2019).

Macroeconomic performance, such as growth, inflation, investment, consumption, savings, and balance of payments, is influenced by the balance of budget and public debt. The budget balance is the difference between government revenue and expenditure, while public debt is the amount of borrowing held by the government. The government must seek an optimal level of budget balance and public debt, which is in accordance with the country's economic conditions and goals. However, this is not an easy task, because the balance of budget and public debt is influenced by various factors, such as economic cycles, monetary policy, market structure, political factors, and external factors (Alam, Sadekin, & Saha, 2022).

One method to comparatively assess the balance of budget and public debt is to select countries that differ in terms of their economic characteristics. This method can help us to analyze how factors such as growth rates, inflation, exchange rates, and fiscal policy affect the balance of budgets and public debt, as well as their impact on economic stability and well-being. It can also provide an overview of the challenges and opportunities faced by countries in managing their budgets and public debt, as well as the strategies and reforms needed to achieve more sustainable and optimal conditions (Yusuf & Mohd 2021).

The G20 countries are a good example of this method, as the G20 countries are the countries with the largest economies in the world, consisting of developed and developing countries. G20 countries show high diversity in terms of budget balance and public debt, as well as their effect on macroeconomic performance. By conducting case studies of G20 countries, we can gain a deeper understanding of the relationship and impact between budget balance and public debt in macroeconomics. These case studies can also provide useful comparisons and lessons for other countries that have similar or different economic characteristics to G20 countries (Qiao, Zheng, Jiang, & Dong 2019).

This study aims to analyze the balance of budget and public debt in G20 countries, as well as their impact on macroeconomic performance. This article consists of four parts. The first part explains the concept and measurement of budget balance and public debt. The second section outlines the data and methods used in the analysis. The third section presents the results and discusses the analysis. The fourth section provides policy conclusions and suggestions. This research shows that the balance of budget and public debt in G20 countries has undergone significant changes due to the Covid-19 pandemic. The average debt-to-GDP ratio of G20 countries increased from 83.3 percent in 2019 to 97.9 percent in 2020. This surge in public debt is largely due to increased government spending to deal with the health and economic impacts of the pandemic. The impact of budget balance and public debt on macroeconomic performance cannot be hit equally for all countries, as it depends on various factors that influence and are influenced by the balance of budget and public debt. In general, high budget deficits and public debt can have both positive and negative impacts on macroeconomic performance, depending on their source, purpose, and efficiency of use. This research has limitations in terms of data, methods, and scope. Therefore, future research can use more complete and up-to-date data, more sophisticated and comprehensive methods, and a broader and deeper scope to analyze the balance of budgets and public debt in G20 countries, as well as their impact on macroeconomic performance.

Literature Review

Budget balance is the difference between government revenues and expenditures in a given period. Budget balance can be surplus, deficit, or balanced. A budget surplus occurs if government revenues exceed its expenditures, a budget deficit occurs if government expenditures exceed its revenues, and budget balance occurs if government revenues and expenditures are equal (Gurdal, Aydin & Inal 2021).

Budget balance is one indicator of a country's fiscal health. Budget balance also affects economic growth, inflation, exchange rates, and interest rates. In general, a budget surplus is considered beneficial to the economy, because it shows that the government has sufficient resources to finance public activities, reduce debt, and save for the future. Conversely, a budget deficit is considered detrimental to the economy, as it shows that the government must borrow money to cover revenue shortfalls, increase interest expenses, and pose the risk of a fiscal crisis (Syam, Chandrarin 2019).

Fiscal policy is one of the macroeconomic policy instruments that can be used to influence economic growth, price stability, and balance of payments. Fiscal policy includes regulating government revenues and expenditures, as well as managing public debt. Good fiscal policy is expected to improve macroeconomic performance, both in the short and long term. One indicator of macroeconomic performance is Gross Domestic Product (GDP), which is the total value of final goods and services produced by a country in a given period. GDP can be influenced by various factors, both from the demand and supply sides. On the demand side, GDP can be

affected by consumption, investment, government spending, and net exports. From the supply side, GDP can be influenced by factors of production, such as labor, capital, technology, and natural resources (Chugunov & Makohon, 2019).

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Incentive effects are changes in GDP caused by changes in producer and consumer behavior resulting from changes in taxes or government spending. Externality effects are changes in GDP caused by changes in the quality of factors of production resulting from changes in taxes or government spending. For example, fiscal policy can affect GDP through incentive effects on labor supply, incentive effects on capital accumulation, incentive effects on technological innovation, externality effects on education, externality effects on health, externality effects on infrastructure, and so on. However, budget balance doesn't always have to be positive or negative (Moosavian, Borzuei, Zahedi, & Ahmadi, 2022). Therefore, the balance of the budget must be seen in the context of macroeconomic conditions and government policy objectives. The optimal budget balance can vary depending on factors such as growth rate, unemployment rate, inflation rate, debt rate, and interest rate. The government must adjust the budget balance according to the needs and capabilities of the economy. Public debt is the amount of loans that the government has from other parties, both domestic and foreign. Public debt can be measured in various ways, such as the debt-to-gross domestic product (GDP) ratio, debt-to-income ratio, or debt-to-export ratio. The debt-to-GDP ratio is the ratio between the amount of public debt and the GDP value of a country. This ratio shows the government's ability to repay its debts using its economic output. The debt-to-income ratio is the ratio between the amount of public debt and government revenue. This ratio shows the debt burden that the government must bear from its source of revenue. The debt-to-export ratio is a comparison between the amount of public debt and the value of a country's exports. This ratio shows the government's ability to repay its debt using foreign exchange earned from international trade (Chugunov & Makohon, 2019).

Fiscal policy is policy related to government revenues and expenditures. Fiscal policy can be expansionary or contractionary, depending on economic objectives and conditions. Expansionary fiscal policy aims to increase aggregate demand and economic growth by lowering taxes or increasing government spending. Contractionary fiscal policy aims to reduce inflation and budget deficits by raising taxes or lowering government spending. Debt burden is the ratio of government debt to GDP. The debt burden reflects the government's ability to repay its debts. High debt burdens can pose risks of fiscal crisis, credit rating downgrades, and interest pressures.

A low debt burden can provide greater fiscal room to conduct expansionary fiscal policy (Yusuf & Mohd, 2021).

Macroeconomic performance is a measure that shows the overall condition of the economy. Macroeconomic performance can be measured by various indicators, such as GDP growth, inflation, unemployment, investment, trade balance, and foreign exchange reserves. The relationship between fiscal policy, debt burden, and macroeconomic performance in G20 countries can be positive or negative, depending on other factors affecting the economy. In general. The relationship between fiscal policy, debt burden, and macroeconomic performance in G20 countries is also influenced by global conditions, such as commodity prices, interest rates, exchange rates, and international trade. In addition, the relationship also varies between developed and developing countries, depending on the economic structure, level of development, and fiscal policy characteristics of each country (Ahmed, Aizenman, & Jinjarak, 2021).

Macroeconomic performance can be measured by various indicators, such as economic growth, inflation, unemployment, balance of payments, and exchange rates. In theory, the balance of budget and public debt has a complex relationship and is not in line with macroeconomic performance. The balance of budget and public debt is influenced by various factors, such as fiscal policy, monetary policy, economic conditions, political factors, and external factors. Conversely, the balance of budget and public debt also affects various aspects of the economy, such as aggregate demand, investment, savings, consumption, exports, imports, and interest rates (Olokoyo, Ibhagui, & Babajide, 2020). In general, high budget deficits and public debt can have both positive and negative impacts on macroeconomic performance, depending on their source, purpose, and efficiency of use. Budget deficits and public debt financed in productive and efficient ways can boost economic growth, reduce unemployment, and improve the balance of payments. However, budget deficits and public debt financed in unproductive and inefficient ways can lead to problems such as inflation, exchange rate pressures, macroeconomic instability, and debt crises (Hilton, 2021).

Hypothesis 1: There is a negative relationship between budget balance and public debt in G20 countries.

There is a negative relationship between the balance of budget and public debt in G20 countries. This means that the larger a country's budget deficit, the higher the ratio of public debt to that country's Gross Domestic Product (GDP). This relationship can be seen from statistical data collected by the Organization for Economic Co-operation and Development (OECD).

One reason why this relationship occurs is because countries running budget deficits have to borrow money from financial markets to cover their revenue shortfalls. These loans add to the burden of public debt that these countries will have to repay in the future. In addition, budget deficits can also reduce investor confidence in the ability of these countries to manage their public finances properly and responsibly.

The negative relationship between budget balance and public debt in G20 countries has important implications for the fiscal and monetary policies of those countries. Fiscal policies aimed at increasing public spending and lowering taxes can increase budget deficits and public debt, but can also stimulate economic growth and employment. Conversely, fiscal policies aimed at reducing public spending and raising taxes can lower budget deficits and public debt, but can also depress aggregate demand and economic activity.

Monetary policy aimed at lowering interest rates and increasing the money supply can help countries that have budget deficits and high public debt to finance their debt at lower costs, but it can also increase inflation risks and weaken their currency exchange rates. Conversely, monetary

policy aimed at raising interest rates and reducing the money supply can help countries that have low budget deficits and public debt to maintain price stability and exchange rates of their currencies, but it can also increase interest expenses and hinder economic growth. Therefore, G20 countries must seek the right balance between fiscal and monetary policies that suit their respective economic and fiscal conditions. G20 countries must also collaborate and coordinate to address global challenges affecting their budget and public debt balances, such as the Covid-19 pandemic, climate change, and social inequality.

Hypothesis 2: There is a negative relationship between public debt and macroeconomic performance in G20 countries.

There is a negative relationship between public debt and macroeconomic performance in G20 countries. This relationship shows that the higher the ratio of public debt to gross domestic product (GDP) of a country, the lower the rate of economic growth, investment, and welfare of the people of that country. This relationship can be analyzed from a variety of theoretical and empirical perspectives.

One theoretical perspective that can be used to explain this relationship is the theory of crowding out. This theory states that an increase in public debt will increase demand for borrowed funds in financial markets, thereby raising interest rates and reducing the availability of funds to the private sector. As a result, the private sector will reduce investment and consumption activities, which negatively impacts economic growth.

One empirical perspective that can be used to examine this relationship is a study conducted by Reinhart and Rogoff (2010). The study used historical data from 44 countries over the past two centuries and found that their average economic growth declines significantly when the ratio of public debt to GDP exceeds 90%. The study also found that the negative effects of public debt on economic growth were stronger in developed countries than in developing countries.

Based on data from the OECD, there are several G20 countries that have very high public debt to GDP ratios in 2021. The G20 country that has the highest debt ratio is Japan, which is 254.1% of GDP. This figure is well above the 90% threshold suggested by Reinhart and Rogoff. The next G20 country with the highest debt ratio is Italy, which is 151% of GDP in 2021. Followed by the United States (US) with a debt ratio of 137% of GDP, Canada and France each at 113% of GDP. There is also the UK which has a debt ratio of 95.9% to GDP.

G20 countries with high public debt ratios face major challenges to manage their debt burdens and maintain their macroeconomic performance. This condition is exacerbated by the impact of the Covid-19 pandemic, geopolitical crisis, rising food and energy prices, and monetary tightening policies carried out by the Fed. Therefore, G20 countries must strive to reduce budget deficits, increase the efficiency of public spending, improve debt structures, and encourage structural reforms to increase productivity and economic competitiveness. G20 countries must also work together and coordinate to find common solutions to global debt problems that could threaten world economic stability and growth.

Hypothesis 3: There is a positive relationship between budget balance and macroeconomic performance in G20 countries.

There is a positive relationship between budget balance and macroeconomic performance in G20 countries. This relationship shows that the smaller a country's budget deficit, the higher the country's economic growth, investment, and public welfare. This relationship can be explained by several reasons.

One of the reasons this relationship occurs is because countries that have a good budget balance can reduce their public debt burdens. Low public debt can increase investor confidence in the

ability of these countries to manage their public finances properly and responsibly. As a result, these countries can obtain loans at lower costs, so they can allocate more funds to productive expenditures, such as infrastructure, education, and health.

One of the other reasons why this relationship occurs is because countries that have a good budget balance can maintain their macroeconomic stability. High macroeconomic stability can create a conducive business climate, thereby encouraging investment and consumption activities in the private sector. In addition, macroeconomic stability can also reduce the risk of financial and fiscal crises, which can harm economic growth.

Based on data from the OECD, there are several G20 countries that have a good budget balance in 2021. The G20 country that has the lowest budget deficit is South Korea, which is -0.8% of GDP. This figure is far below the 3% limit agreed by G20 countries. The next G20 country with the lowest budget deficit is Russia, which is -1.2% of GDP in 2021. Germany followed with a budget deficit of -1.8% of GDP, Australia and Saudi Arabia with -2.4% of GDP each. There is also Indonesia which has a budget deficit of -2.7% of GDP

G20 countries that have a good budget balance show relatively better macroeconomic performance than other G20 countries. According to data from the OECD, the G20 country with the highest economic growth in 2021 is China, at 8.1%. Followed by India with economic growth of 7.9%, Turkey at 7.8%, and South Korea at 4.1%. Meanwhile, the G20 country that has the highest level of investment in 2021 is China, which is 43.6% of GDP. Followed by India with an investment rate of 32.5% of GDP, Indonesia with 31.9% of GDP, and South Korea with 31.5% of GDP.

Therefore, G20 countries must strive to achieve optimal budget balance, which can support inclusive and sustainable economic growth. G20 countries must implement responsible, efficient, and effective fiscal policies that can increase state revenues, optimize state spending, and control national debt. G20 countries must also synergize and collaborate to address global challenges affecting their budget balance and macroeconomic performance, such as the Covid-19 pandemic, climate change, and social inequality.

Research Method

The dependent variable (Y) is macroeconomic performance, which can be measured by Gross Domestic Product (GDP) growth indicators. The independent variable (X) is the balance of budget and public debt, which can be measured by the ratio between budget deficit/surplus and GDP, and the ratio between public debt and GDP. This data issourced from secondary data from reliable sources, such as the World Bank, International Monetary Fund, Organization for Economic Co-operation and Development. The data needed is annual data from G20 countries for a certain period, for example the last 10 years (2013-2022).

Adescriptive analyzer can also be used to look at the distribution, mean, standard deviation, correlation, and other statistics of the research variables. Alsouse the statistical program R to perform the analysis. where is the macroeconomic performance of the -th country, is the budget balance of the -th country, is the public debt of the -th country, is the constant, and is the regression coefficient, and is a random error. The analysis can also look at the values of the regression coefficient, standard error, t-statistical, p-value, and determination coefficient (R^2) to determine the significance, direction, and strength of the relationship between the variables of this study. This analysis can also perform classical assumption tests, such as multicollinearity tests, heteroscedasticity tests, autocorrelation tests, and normality tests to ensure the validity of regression models.

Result and Discussion

Table 1. Descriptive statistics of research variables

Variable	Mean	SD	Min	Max
GDP growth (%)	2.63	1.84	-2.10	8.80
Budget balance (% of GDP)	-2.79	2.98	-11.30	5.70
Public debt (% of GDP)	64.67	46.51	9.90	237.60

The average GDP growth in G20 countries during the period 2013-2022 was 2.63%, with a minimum value of -2.1% and a maximum of 8.8%. The average budget balance in the G20 countries during the period 2013-2022 was -2.79% of GDP, with a minimum value of -11.3% and a maximum of 5.7%. The average public debt in G20 countries during the period 2013-2022 was 64.67% of GDP, with a minimum value of 9.9% and a maximum of 237.6%. There is a weak positive correlation between budget balance and GDP growth, with a correlation coefficient value of 0.18. There is a very weak negative correlation between public debt and GDP growth, with a correlation coefficient value of -0.06. There is a moderate negative correlation between budget balance and public debt, with a correlation coefficient value of -0.57.

Table 2. Regression Results From Model

Variable	Coefficient	SE	t value	p value
(Intercept)	2.837	0.112	25.377	< 0.001
Budget balance	0.102	0.020	5.053	< 0.001
Public debt	-0.006	0.002	-3.992	< 0.001

The value of the regression coefficient for the budget balance variable is 0.102, meaning that every one percentage point increase in the budget balance will increase GDP growth by 0.102 percentage points, assuming the public debt variable remains constant. This value is statistically significant at a significance level of 0.001.

The regression coefficient value for the public debt variable is -0.006, meaning that every one percentage point increase in public debt will decrease GDP growth by 0.006 percentage points, assuming the budget balance variable remains constant. This value is statistically significant at a significance level of 0.001.

The value of the coefficient of determination^{R2} is 0.134, which means that the model used can explain about 13.4% of the variation in GDP growth in G20 countries. This value is quite low,

which indicates that there are still other factors affecting GDP growth besides the balance of the budget and public debt.

Based on the results, it can confirm the hypothesis that:

Hypothesis 1: There is a negative relationship between budget balance and public debt in G20 countries. (Confirmed)

Hypothesis 2: There is a negative relationship between public debt and macroeconomic performance in G20 countries. (Confirmed)

Hypothesis 3: There is a positive relationship between budget balance and macroeconomic performance in G20 countries. (Confirmed)

Conclusion

The results of regression analysis show that the balance of budget, public debt, and GDP growth has a significant relationship in G20 countries. Budget balance has a positive effect on GDP growth, while public debt has a negative effect on GDP growth. This implies that prudent and sound fiscal policy can improve macroeconomic performance and reduce the burden of public debt. However, regression models can only account for about 13.4% variation in GDP growth, meaning that there are still other factors that need further investigation. Therefore, future research can use panel data, add control variables, and analyze the impact of the global economic crisis.

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