

Fiscal Policy Effectiveness in Stabilizing Economic Cycles: A Time Series Analysis of Government Expenditure in Indonesia

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Abstract

Fiscal policy plays a central role in maintaining macroeconomic stability, particularly in emerging economies exposed to external shocks and domestic structural challenges. Focusing on Indonesia, this research analyzes the effectiveness of government expenditure in stabilizing economic cycles using quarterly time series data from 2000Q1 to 2023Q4. The empirical framework combines the Hodrick-Prescott filter to decompose real GDP into trend and cyclical components with the Vector Error Correction Model to examine short-run dynamics and long-run equilibrium relationships among government expenditure, tax revenue, GDP, and inflation. The Johansen cointegration test confirms the presence of long-run relationships among the variables, validating the use of the VECM approach. The estimation results show that government expenditure has a positive and statistically significant effect on GDP in both the short and long run. The estimated fiscal multiplier ranges from 0.82 to 1.62, with capital expenditure producing the strongest impact, reaching 1.35 in the short run and 1.62 in the medium run. Impulse Response Function analysis indicates that a positive government expenditure shock generates a persistent GDP response for approximately 8–12 quarters. Forecast Error Variance Decomposition further shows that government expenditure explains up to 30% of GDP fluctuations over the long horizon. Granger causality results reveal bidirectional causality between government expenditure and GDP, while the CUSUM test confirms model stability. These findings support the role of active fiscal policy as an effective instrument for economic stabilization in Indonesia.

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1. INTRODUCTION

Fiscal policy remains a central instrument for stabilizing macroeconomic fluctuations, particularly in emerging economies where exposure to external shocks, commodity price volatility, and domestic structural constraints often weakens the effectiveness of automatic stabilizers. The Keynesian tradition emphasizes that government expenditure and taxation can influence aggregate

demand, output, and employment, especially when the economy operates below its potential level ([Keynes, 1936](#)). In contrast, the Ricardian Equivalence perspective argues that deficit-financed government spending may have limited effects if households anticipate future tax liabilities and adjust their saving behavior accordingly ([Barro, 1974](#)), ([Ricciuti, 2003](#)). Contemporary fiscal policy literature increasingly recognizes that the effectiveness of fiscal intervention is not uniform, but depends on economic conditions, the composition of fiscal instruments, institutional credibility, monetary policy stance, and the degree of economic openness ([Auerbach & Gorodnichenko, 2012](#)), ([Christiano et al., 2011](#)), ([Ilzetzki et al., 2013](#)), ([Ramey, 2019](#)).

Indonesia provides a relevant empirical setting for examining the effectiveness of fiscal policy in stabilizing economic cycles. As the largest economy in Southeast Asia, Indonesia has experienced several major macroeconomic disturbances over the last two decades, including the recovery period following the Asian Financial Crisis, the 2008-2009 Global Financial Crisis, commodity price fluctuations, and the severe economic disruption caused by the COVID-19 pandemic. During these episodes, fiscal policy was used not only to support aggregate demand but also to preserve social stability, maintain public investment, and strengthen economic recovery. The Indonesian government's fiscal response during crisis periods demonstrates the importance of discretionary fiscal intervention in an emerging market context, particularly when private sector activity weakens and uncertainty increases ([Basri & Rahardja, 2010](#)), ([Bank, 2021](#)).

Although fiscal policy in emerging economies has often been associated with procyclical behavior, recent evidence suggests that several developing countries have gradually improved their capacity to conduct countercyclical fiscal policy. ([Kaminsky et al., 2005](#)) show that fiscal policy in developing countries historically tends to amplify economic fluctuations, while ([Frankel et al., 2013](#)) argue that some emerging economies have “graduated” from fiscal procyclicality as fiscal institutions improve. In the case of Indonesia, the implementation of fiscal rules, including the deficit ceiling and debt sustainability framework, has shaped the government's ability to respond to shocks while maintaining long-run fiscal discipline. However, the effectiveness of these fiscal responses remains an empirical question, especially when evaluated through the dynamic interaction between government expenditure, tax revenue, output, and inflation.

A substantial body of empirical literature has examined fiscal multipliers using structural vector autoregression, local projections, dynamic stochastic general equilibrium models, and error correction frameworks ([Blanchard & Perotti, 2002](#)), ([Mountford & Uhlig, 2009](#)), ([Mountford & Uhlig, 2009](#)), ([Varela & Ribeiro, 2026](#)). Nevertheless, several limitations remain in the Indonesian context. First, many previous studies rely on annual data, which may not adequately capture short-run fiscal transmission and within-year business cycle dynamics. Second, studies that explicitly combine business cycle decomposition with long-run fiscal-output modeling remain limited. Third, the post-pandemic fiscal environment, characterized by higher fiscal pressure, changing expenditure composition, and the return to fiscal rule discipline, requires updated empirical evidence on the size and persistence of fiscal multipliers.

This study addresses these gaps by analyzing the effectiveness of fiscal policy in stabilizing economic cycles in Indonesia using quarterly data from 2000Q1 to 2023Q4. The study combines the Hodrick-Prescott filter to decompose GDP into trend and cyclical components with the Vector Error Correction Model to examine both short-run dynamics and long-run equilibrium relationships among government expenditure, tax revenue, GDP, and inflation. The use of Johansen cointegration testing provides a formal basis for identifying long-run relationships among fiscal and macroeconomic variables, while impulse response functions and forecast error variance decomposition allow for a deeper interpretation of fiscal shock transmission. By

estimating fiscal multipliers across expenditure categories and time horizons, this study contributes to the empirical literature on fiscal stabilization in emerging economies and provides policy-relevant evidence for strengthening Indonesia's countercyclical fiscal framework.

2. LITERATURE REVIEW

2.1 Theoretical Foundations of Fiscal Policy Effectiveness

The theoretical foundation of fiscal policy effectiveness is rooted in the debate between Keynesian, Ricardian, and New Keynesian perspectives. The Keynesian view argues that government expenditure can stimulate aggregate demand and increase output through the multiplier mechanism, particularly when idle resources, unemployment, and price rigidities exist in the economy ([Keynes, 1936](#)). Within this framework, fiscal expansion increases public demand directly and stimulates private income, consumption, and investment indirectly. The size of the multiplier depends on the marginal propensity to consume, import leakage, the response of monetary policy, and the structure of the economy.

The Ricardian Equivalence Hypothesis offers a contrasting perspective. ([Barro, 1974](#)) argues that rational households may perceive government borrowing as future taxation; therefore, they increase savings instead of consumption when fiscal expansion is financed through debt. Under strict Ricardian assumptions, discretionary fiscal policy has limited effects on aggregate demand. However, empirical studies generally find only partial support for Ricardian equivalence because liquidity constraints, imperfect capital markets, finite planning horizons, and income uncertainty prevent households from fully offsetting government fiscal actions ([Ricciuti, 2003](#)), ([Ramey, 2019](#)).

The New Keynesian approach provides a more flexible explanation by integrating fiscal policy into a framework with nominal rigidities, imperfect competition, and monetary-fiscal interaction. ([Christiano et al., 2011](#)) demonstrate that government spending multipliers can become larger when monetary policy is constrained, such as during periods of very low interest rates. ([Auerbach & Gorodnichenko, 2012](#)) further show that fiscal multipliers are state-dependent, with larger effects during recessions than expansions. This perspective is particularly relevant for Indonesia because fiscal intervention during economic downturns may have stronger stabilization effects than during normal periods.

2.2 Empirical Evidence on Fiscal Multipliers

Empirical studies on fiscal multipliers show that the size and persistence of fiscal policy effects differ across countries, time periods, and estimation methods. Blanchard and ([Blanchard & Perotti, 2002](#)) provide a foundational empirical approach by using structural VAR to identify the dynamic effects of government spending and taxation on output. Their framework has influenced later studies that estimate fiscal shocks through VAR-based models, local projections, and impulse response analysis. ([Mountford & Uhlig, 2009](#)) also show that the effects of fiscal shocks depend on how government spending, tax changes, and deficit-financed policies are identified within the model.

([Ramey, 2019](#)) reviews the fiscal multiplier literature and concludes that government spending multipliers in advanced economies generally vary within a moderate range, depending on the economic state, the type of expenditure, and the identification strategy. In open and developing economies, however, fiscal multipliers are often smaller because of import leakage, limited fiscal space, weaker institutions, and financial market constraints ([Ilzetzki et al., 2013](#)). ([Colombo et al.,](#)

[2022](#)) also confirm that fiscal multipliers are heterogeneous across countries, with lower estimates often found in economies with higher openness and weaker policy credibility.

Recent studies have extended the fiscal multiplier literature by examining state dependence, institutional conditions, and cross-country variation. [\(Hur et al., 2021\)](#) find that fiscal policy in developing Asia can be effective, particularly during recessionary periods when government spending supports aggregate demand. [\(Nkalu & Agu, 2023\)](#) combine a Panel VECM framework with Hodrick-Prescott filter decomposition and show that fiscal instruments can contribute to output stabilization in Sub-Saharan African economies. [\(Varela & Ribeiro, 2026\)](#), through a bibliometric review of fiscal multiplier studies, conclude that the effectiveness of fiscal policy depends strongly on monetary policy conditions, the state of the economy, and the methodological framework used to estimate fiscal shocks.

2.3 Fiscal Policy, Business Cycle Stabilization, and Emerging Economies

The relationship between fiscal policy and business cycle stabilization is especially important in emerging economies. [\(Kaminsky et al., 2005\)](#) argue that many developing countries historically conduct procyclical fiscal policy, increasing expenditure during booms and reducing expenditure during downturns. This behavior can intensify economic fluctuations rather than stabilize them. The causes of fiscal procyclicality include limited access to credit during crises, weak fiscal institutions, political economy pressures, and reliance on volatile revenue sources.

However, more recent evidence suggests that several emerging economies have improved their fiscal management and moved toward more countercyclical policy behavior. [\(Frankel et al., 2013\)](#) explain that stronger institutions, improved fiscal rules, and better macroeconomic management have enabled some developing countries to reduce procyclicality. [\(Ardanaz et al., 2021\)](#) emphasize that fiscal rules can protect public investment from excessive adjustment during consolidation periods, making fiscal policy more supportive of long-run growth and stabilization.

In Indonesia, fiscal cyclicality has evolved alongside institutional reforms and crisis experiences. [\(Basri & Rahardja, 2010\)](#) show that Indonesia's fiscal response during the 2008-2009 Global Financial Crisis helped support economic resilience. During the COVID-19 pandemic, the government temporarily relaxed the deficit ceiling through extraordinary fiscal measures to finance health spending, social protection, and economic recovery programs [\(Bank, 2022\)](#). These experiences indicate that Indonesia's fiscal policy has become increasingly important as a countercyclical instrument, although its effectiveness must be evaluated empirically through the transmission of expenditure shocks to output and inflation.

2.4 Fiscal Policy and Economic Growth in Indonesia

Studies on fiscal policy and economic growth in Indonesia generally find that government expenditure plays an important role in supporting output, although the magnitude and direction of the effect depend on model specification, data frequency, and expenditure composition. [\(Shafrullah et al., 2024\)](#) provides early evidence that fiscal policy and economic growth are related in the Indonesian context [\(Indrajaya, 2021\)](#). using cointegration and VECM, finds a long-run relationship among foreign direct investment, labor force, government expenditure, and GDP in Indonesia. This supports the argument that fiscal variables should be examined within a dynamic long-run framework rather than through static regression alone.

Recent Indonesian studies also emphasize the relevance of macroeconomic variables in explaining economic growth. [\(Mustofa & Faizin, 2025\)](#) examine the effect of macroeconomic factors on Indonesia's economic growth and provide evidence that macroeconomic stability is essential for sustaining output performance. [\(Raseuky et al., 2023\)](#), using a VAR/VECM approach,

show that economic development indicators in Indonesia display dynamic interactions over time. ([Maulid et al., 2021](#)) also examine the effect of government expenditure on economic growth in Indonesia, supporting the relevance of fiscal expenditure as a policy variable. Although these studies contribute to the Indonesian literature, most do not explicitly integrate business cycle decomposition, fiscal multiplier estimation, and VECM-based long-run equilibrium analysis in a single empirical framework.

2.5 Methodological Basis: VECM, Cointegration, and HP Filter

The methodological foundation of this study is based on the integration of cointegration analysis, Vector Error Correction Modeling, and business cycle decomposition. ([Johansen, 1988](#)) provides the formal cointegration testing framework used to determine whether non-stationary variables share long-run equilibrium relationships. When cointegration exists, the VECM framework becomes appropriate because it captures both short-run adjustments and long-run relationships among variables.

The HP Filter, introduced by ([Nkalu & Agu, 2023](#)), is widely used to separate the trend and cyclical components of output. In fiscal policy research, this decomposition is important because the effect of fiscal policy may differ between trend growth and cyclical stabilization. By applying the HP Filter to GDP, the study can identify expansionary and contractionary phases of the business cycle and evaluate whether fiscal policy contributes to reducing output fluctuations.

The use of VECM is also appropriate because government expenditure, tax revenue, GDP, and inflation are likely to interact dynamically over time. Fiscal expenditure may influence output through aggregate demand, while output growth can increase tax revenue and expand fiscal capacity. Inflation may also affect real output and fiscal conditions through purchasing power, interest rate responses, and expenditure pressures. Therefore, a multivariate time series framework is necessary to capture feedback mechanisms among these variables.

2.6 Research Gap and State of the Art

Despite the extensive literature on fiscal policy and economic stabilization, several gaps remain. First, many empirical studies on Indonesia use annual data, which may obscure short-run fiscal transmission and the timing of policy effects. Quarterly data provide a more appropriate basis for examining fiscal dynamics because government expenditure, tax revenue, output, and inflation can adjust within a shorter horizon.

Second, previous studies often examine fiscal policy and economic growth without explicitly separating the cyclical component of output from its long-run trend. This distinction is important because fiscal policy may be effective as a stabilization tool even when its long-run growth effect is moderate. By combining HP Filter decomposition with VECM estimation, this study evaluates fiscal policy not only as a growth-supporting instrument but also as a mechanism for stabilizing business cycle fluctuations.

Third, existing Indonesian studies rarely estimate fiscal multipliers by expenditure category and time horizon within a unified VECM framework. This study addresses that gap by estimating the effects of government expenditure, tax revenue, GDP, and inflation using quarterly data from 2000Q1 to 2023Q4. The analysis further incorporates impulse response functions, forecast error variance decomposition, Granger causality, and stability testing, thereby providing a more comprehensive empirical assessment of fiscal policy effectiveness in Indonesia.

Table 1. Selected Empirical Studies on Fiscal Policy Effectiveness

Author(s)	Year	Method	Key Finding	Relevance to This Study
Blanchard & Perotti	2002	Structural VAR	Government spending and tax shocks have dynamic effects on output. Fiscal multipliers differ across countries depending on openness, exchange rate regime, and development level.	Provides the empirical foundation for identifying fiscal policy shocks and multiplier effects.
Ilzetzki et al.	2013	SVAR	Fiscal multiplier estimates vary according to method, period, and fiscal instrument.	Relevant for interpreting Indonesia as an open emerging economy.
Ramey	2019	Survey of fiscal multiplier studies	Fiscal policy tends to be more effective during recessionary periods.	Provides a benchmark for interpreting the estimated multiplier range.
Hur et al.	2021	Panel-based fiscal analysis	Fiscal multipliers are generally lower in open and developing economies.	Supports the argument that fiscal intervention may stabilize output during downturns.
Colombo et al.	2022	Local projections and NK-DSGE	Fiscal instruments contribute to output stabilization across business cycles.	Provides comparative evidence for emerging market fiscal multiplier estimates.
Nkalu & Agu	2023	Panel VECM and HP Filter	Government expenditure has a long-run relationship with GDP.	Methodologically relevant because it combines VECM and HP Filter.
Indrajaya	2021	Cointegration and VECM		Directly relevant to fiscal-output dynamics in the Indonesian context.

The studies summarized in Table 1 indicate that fiscal policy effectiveness is strongly influenced by methodological design, country characteristics, and macroeconomic conditions. Earlier VAR-based studies provide the foundation for identifying fiscal shocks, while more recent works emphasize that fiscal multipliers are heterogeneous and tend to vary between advanced, open, and developing economies. Evidence from developing Asia and other emerging regions also suggests that government expenditure may have stronger effects during downturns, particularly when fiscal intervention is directed toward supporting aggregate demand and economic recovery. In the Indonesian context, previous VECM-based evidence confirms the existence of a long-run relationship between government expenditure and output, but the integration of business cycle decomposition, fiscal multiplier estimation, and dynamic shock analysis remains limited. Therefore, the present study extends the existing literature by combining the HP Filter and VECM framework to evaluate the role of fiscal policy in stabilizing Indonesia's economic cycles using quarterly data from 2000Q1 to 2023Q4.

3. METHODOLOGY

3.1 Research Design and Data Sources

This research employs a quantitative time series approach to examine the effectiveness of fiscal policy in stabilizing economic cycles in Indonesia. The use of a time series design is appropriate because the study focuses on the dynamic relationship among fiscal variables, output, and inflation over time. The empirical analysis is based on quarterly data covering the period from 2000Q1 to

2023Q4, resulting in 96 observations. This period is selected because it captures several important phases of Indonesia's macroeconomic development, including post-crisis recovery, the 2008–2009 Global Financial Crisis, the COVID-19 pandemic, and the subsequent recovery period.

The data used in this study are obtained from official and internationally recognized sources, including Statistics Indonesia, the Ministry of Finance of the Republic of Indonesia, Bank Indonesia, and the World Bank's World Development Indicators. The use of official secondary data is intended to ensure consistency, reliability, and comparability of the macroeconomic series employed in the analysis. The main variables consist of real gross domestic product, government expenditure, tax revenue, and the consumer price index. Gross domestic product is used as the primary indicator of economic output, while government expenditure and tax revenue represent fiscal policy instruments. The consumer price index is included to capture the role of price dynamics in the fiscal-output relationship.

All nominal fiscal variables are converted into real terms using the GDP deflator with 2010 as the base year. This adjustment is necessary to remove the effect of inflation and to ensure that the estimated relationships reflect real economic movements rather than nominal changes. Furthermore, natural logarithmic transformation is applied to all level variables. The logarithmic transformation reduces scale differences among variables, helps mitigate heteroscedasticity, and enables the interpretation of estimated coefficients as elasticities.

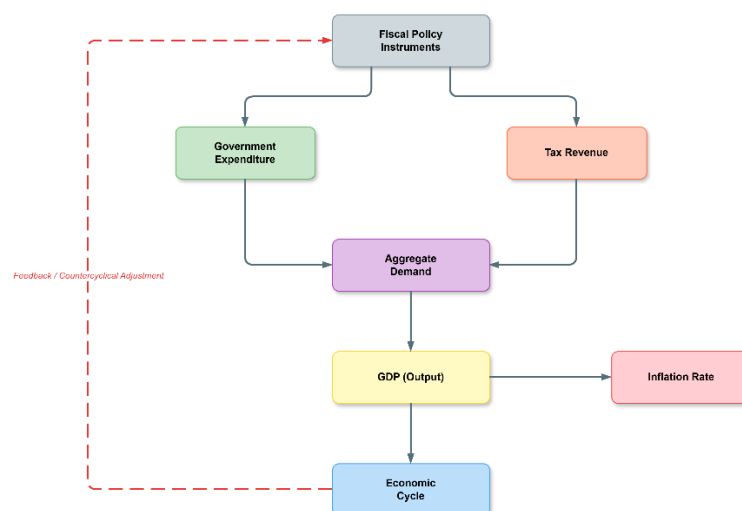


Figure 7. Conceptual Framework: Fiscal Policy Transmission to Economic Stabilization

Figure 7 illustrates the conceptual framework of the study. Fiscal policy is represented by government expenditure and tax revenue, which influence economic output through aggregate demand, public investment, and fiscal capacity channels. GDP is then decomposed into trend and cyclical components using the Hodrick-Prescott filter to identify business cycle movements. The interaction among fiscal variables, GDP, and inflation is further examined using the Vector Error Correction Model to capture both short-run dynamics and long-run equilibrium relationships.

3.2 Econometric Model Specification

The empirical strategy is designed to provide a systematic assessment of fiscal policy effectiveness in Indonesia. The analysis begins with testing the stationarity properties of each variable, followed by the determination of the optimal lag length. After that, the Johansen cointegration test is applied to examine whether the variables share a stable long-run equilibrium

relationship. If cointegration is confirmed, the Vector Error Correction Model is estimated to capture short-run adjustments and long-run interactions among the variables.

The econometric procedure consists of eight main stages: unit root testing, optimal lag selection, Johansen cointegration testing, VECM estimation, Granger causality testing, impulse response function analysis, forecast error variance decomposition, and diagnostic as well as stability testing. This sequence is necessary to ensure that the model is statistically valid and that the interpretation of fiscal policy effects is grounded in a coherent time series framework.

3.2.1 Unit Root Test

The first step in the econometric analysis is to examine whether the variables are stationary. Stationarity is an important requirement in time series analysis because non-stationary variables may produce spurious regression results if they are estimated without proper transformation or cointegration treatment. This study employs the Augmented Dickey-Fuller test to determine the order of integration of each variable.

The ADF test is specified as follows:

$$\Delta y_t = \alpha + \beta t + \gamma y_{t-1} + \sum_{i=1}^p \delta_i \Delta y_{t-i} + \varepsilon_t \quad (1)$$

where y_t denotes the variable being tested, α is the intercept, t represents the deterministic trend, p is the selected lag length, and ε_t is the error term. The null hypothesis states that the series contains a unit root, while the alternative hypothesis indicates that the series is stationary. If the variables are non-stationary at level but stationary after first differencing, they are classified as integrated of order one, or $I(1)$. This condition provides the basis for applying the Johansen cointegration test and the VECM framework.

3.2.2 Johansen Cointegration Test

After identifying the integration order of the variables, the Johansen cointegration test is used to examine the existence of long-run equilibrium relationships among government expenditure, tax revenue, GDP, and inflation. This test is appropriate because the study involves a multivariate system in which more than one cointegrating relationship may exist.

The Johansen approach evaluates the rank of the long-run impact matrix using the trace statistic and maximum eigenvalue statistic. The trace statistic is formulated as follows:

$$\lambda_{trace} = -T \sum_{i=r+1}^n \ln(1 - \hat{\lambda}_i) \quad (2)$$

Meanwhile, the maximum eigenvalue statistic is expressed as:

$$\lambda_{max} = -T \ln(1 - \hat{\lambda}_{r+1}) \quad (3)$$

where T is the sample size, n is the number of endogenous variables, r is the number of cointegrating vectors, and $\hat{\lambda}_i$ represents the estimated eigenvalues. The presence of cointegration indicates that although the variables may fluctuate in the short run, they move together toward a stable equilibrium path in the long run. In this study, the existence of cointegration justifies the use of VECM rather than a standard VAR model in first differences.

3.2.3 Vector Error Correction Model

The Vector Error Correction Model is employed to estimate both the short-run dynamics and long-run equilibrium relationships among the variables. The VECM is particularly suitable when the variables are integrated of order one and cointegrated. Unlike a standard VAR model, the VECM incorporates an error correction term that measures the speed at which short-run deviations adjust back to long-run equilibrium.

The general VECM specification used in this study is written as follows:

$$\Delta X_t = \mu + \Pi X_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta X_{t-i} + \varepsilon_t \quad (4)$$

where $X_t = [\ln GDP, \ln GOVEXP, \ln TAX, \ln CPI]'$ is the vector of endogenous variables, μ represents deterministic components, $\Pi = \alpha\beta'$ is the long-run impact matrix, α denotes the adjustment coefficient, β represents the cointegrating vector, Γ_i captures short-run dynamics, and ε_t is the vector of residuals.

In this framework, the error correction term indicates how quickly the system returns to equilibrium after a short-run shock. A negative and statistically significant error correction coefficient suggests that deviations from the long-run path are corrected over time. Therefore, the VECM provides a comprehensive framework for evaluating whether fiscal policy variables influence GDP only temporarily or whether they are also linked to output through long-run equilibrium mechanisms.

3.2.4 Hodrick-Prescott Filter for Business Cycle Decomposition

To evaluate fiscal policy effectiveness in relation to economic cycles, this study applies the Hodrick-Prescott filter to decompose real GDP into trend and cyclical components. The trend component represents the long-run path of output, while the cyclical component captures short-run deviations from that trend. This decomposition is essential because fiscal policy may have different implications for long-run growth and short-run stabilization.

The HP Filter minimizes the following objective function:

$$\min_{\tau_t} \sum_{t=1}^T (y_t - \tau_t)^2 + \lambda \sum_{t=2}^{T-1} [(\tau_{t+1} - \tau_t) - (\tau_t - \tau_{t-1})]^2 \quad (5)$$

where y_t denotes actual real GDP, τ_t is the trend component, and λ is the smoothing parameter. Following the standard convention for quarterly data, this study uses $\lambda = 1600$. The cyclical component is obtained as:

$$c_t = y_t - \tau_t \quad (6)$$

Positive values of the cyclical component indicate that actual output is above its long-run trend, while negative values indicate that output is below trend. By using this decomposition, the study can identify expansionary and contractionary phases and assess whether fiscal policy contributes to reducing cyclical fluctuations.

3.3 Fiscal Multiplier Estimation

The fiscal multiplier is estimated to measure the magnitude of GDP response to a fiscal policy shock. In this study, the multiplier is derived from the cumulative impulse response functions generated from the VECM estimation. This approach allows the study to evaluate not only the immediate effect of fiscal policy but also its cumulative impact across different time horizons.

Following the fiscal multiplier literature, the cumulative multiplier at horizon h is calculated as the ratio between the cumulative response of GDP and the cumulative response of government expenditure, adjusted by the average ratio of GDP to government expenditure in the sample. The general form is expressed as:

$$Multiplier_h = \frac{\sum_{j=0}^h Response(GDP)_{t+j}}{\sum_{j=0}^h Response(GOVEXP)_{t+j}} \times \frac{\bar{GDP}}{\bar{GOVEXP}} \quad (7)$$

The multiplier is estimated for different fiscal components, including aggregate government expenditure, capital expenditure, and current expenditure. This disaggregation is important because different types of fiscal spending may generate different output effects. Capital

expenditure is expected to produce a stronger and more persistent multiplier because it is associated with infrastructure, productive capacity, and long-term investment. Current expenditure may support short-run demand, but its long-term effect may be more limited depending on its composition.

3.4 Impulse Response Function and Forecast Error Variance Decomposition

Impulse Response Function analysis is used to examine the dynamic response of GDP to shocks in government expenditure, tax revenue, and inflation. Through IRF, the study evaluates whether fiscal shocks generate positive or negative effects on output and how long these effects persist. This analysis is particularly important because fiscal policy transmission may occur gradually over several quarters.

Forecast Error Variance Decomposition is then applied to measure the contribution of each variable to fluctuations in GDP over different time horizons. While IRF explains the direction and duration of responses, FEVD quantifies the relative importance of fiscal shocks in explaining output variability. In this study, FEVD is used to determine how much of GDP fluctuation can be attributed to government expenditure, tax revenue, and inflation shocks.

Together, IRF and FEVD provide a deeper understanding of fiscal policy transmission. If government expenditure shocks generate a persistent positive response in GDP and explain a substantial share of GDP variance, then fiscal policy can be interpreted as an important stabilization instrument.

3.5 Granger Causality, Diagnostic, and Stability Testing

Granger causality testing is conducted within the VECM framework to examine the direction of predictive relationships among the variables. This test determines whether past values of one variable contain useful information for predicting another variable. In the context of this study, Granger causality is used to evaluate whether government expenditure predicts GDP movements and whether GDP also predicts government expenditure. A bidirectional relationship would indicate the existence of a fiscal-output feedback mechanism.

To ensure the reliability of the estimation results, diagnostic and stability tests are also conducted. The diagnostic tests include the Lagrange Multiplier test for serial correlation, the White test for heteroscedasticity, the Jarque-Bera test for residual normality, and the AR roots stability test. In addition, the CUSUM test is used to evaluate the structural stability of the model parameters over the sample period. These tests are essential to confirm that the estimated model satisfies the statistical assumptions required for valid inference and policy interpretation.

3.6 Variable Description and Data Sources

Table 2 presents the operational definition, measurement unit, and data source of each variable used in the model.

Table 2. Variable Description and Data Sources

Variable	Description	Unit	Source
lnGDP	Natural log of real GDP at constant 2010 prices	Billion IDR	BPS, World Bank WDI
lnGOVEXP	Natural log of real total government expenditure	Billion IDR	Ministry of Finance
lnTAX	Natural log of real tax revenue	Billion IDR	Ministry of Finance, DGT

lnCPI

Natural log of consumer price
 index (2010 = 100)

Index

BPS, Bank Indonesia

4. RESULTS AND DISCUSSION

4.1 Descriptive Statistics and Data Visualization

The descriptive analysis provides an initial overview of the macroeconomic behavior of Indonesia during the observation period from 2000Q1 to 2023Q4. Figure 1 illustrates the movement of government expenditure and GDP growth over the period under study. The pattern indicates that government expenditure experienced a persistent upward trend, reflecting both the expansion of the fiscal role of the state and the increasing complexity of Indonesia's development needs. The acceleration of expenditure after the 2008–2009 Global Financial Crisis and the sharp increase during the COVID-19 pandemic demonstrate the use of fiscal policy as a stabilization instrument during periods of macroeconomic stress.

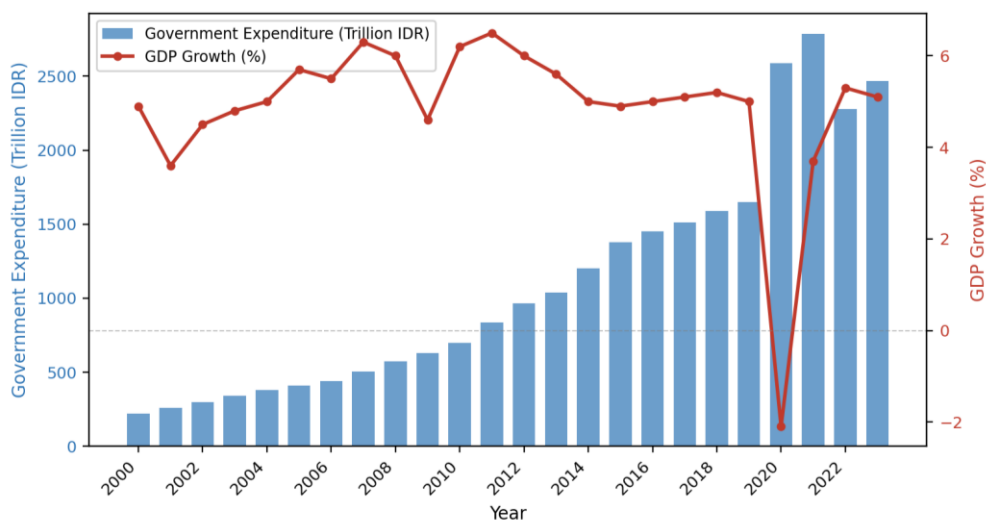


Figure 1. Trend of Government Expenditure and GDP Growth in Indonesia, 2000–2023

Source: BPS and Ministry of Finance, processed by authors.

The visualization also shows that GDP growth remained relatively stable within the range of approximately 4.5% to 6.0% during most of the sample period. However, the contraction in 2020, when GDP growth declined to approximately -2.1%, reflects the severity of the COVID-19 shock. The subsequent recovery in 2021 and the stabilization of growth around 5.0% to 5.3% in 2022–2023 indicate that fiscal expansion contributed to supporting aggregate demand and economic recovery. This pattern is consistent with the theoretical expectation that government expenditure becomes more relevant when private sector activity weakens during crisis periods.

Table 3 presents the descriptive statistics of the transformed variables used in the empirical model. The use of logarithmic transformation helps reduce scale differences among variables and allows the estimated coefficients to be interpreted in elasticity terms. The mean values of lnGDP, lnGOVEXP, lnTAX, and lnCPI indicate that the variables are within a reasonable range for time series modeling. The standard deviation of lnGOVEXP is higher than that of the other variables, suggesting that government expenditure experienced greater variation during the sample period.

This is consistent with the fiscal expansion observed during crisis periods and the structural increase in public spending over time.

Table 3. Descriptive Statistics of Research Variables (2000Q1–2023Q4)

Statistic	lnGDP	lnGOVEXP	lnTAX	lnCPI
Mean	13.847	13.214	12.876	4.632
Median	13.892	13.285	12.943	4.654
Maximum	14.518	14.768	13.942	5.127
Minimum	12.946	11.843	11.627	4.082
Std. Dev.	0.478	0.842	0.685	0.312
Skewness	-0.234	0.118	-0.156	0.042
Kurtosis	1.987	2.143	1.876	1.934
Jarque-Bera	4.523	3.876	5.134	4.267
Observations	96	96	96	96

The skewness values are relatively close to zero, indicating that the distributions of the variables are not severely asymmetric. The kurtosis values are below three, suggesting that the variables tend to have relatively flat distributions compared to the normal distribution. Overall, the descriptive statistics indicate that the data are suitable for further time series testing, although formal stationarity analysis is still required before estimating the VECM model.

4.2 Unit Root Test Results

Before estimating the dynamic relationship among fiscal and macroeconomic variables, it is necessary to examine the stationarity properties of each series. Table 4 reports the Augmented Dickey-Fuller test results at both level and first-difference forms. The results show that all variables fail to reject the null hypothesis of a unit root at the level form. This indicates that lnGDP, lnGOVEXP, lnTAX, and lnCPI are non-stationary in their original form.

After first differencing, all variables become stationary at the 1% significance level. The ADF statistics for the first-differenced variables are substantially lower than the critical value, and the associated p-values are 0.0000. These results confirm that all variables are integrated of order one, or I(1). This finding is important because the Johansen cointegration approach and VECM framework require variables to be non-stationary at level but stationary after first differencing.

Table 4. ADF Unit Root Test Results

Variable	ADF (Level)	p-value	ADF (1st Diff)	p-value	Conclusion
lnGDP	-1.843	0.3584	-6.724***	0.0000	I(1)
lnGOVEXP	-2.156	0.2234	-7.312***	0.0000	I(1)
lnTAX	-1.967	0.3012	-6.458***	0.0000	I(1)
lnCPI	-1.534	0.5123	-8.145***	0.0000	I(1)

4.3 Optimal Lag Selection and Cointegration Results

The selection of the optimal lag length is a critical step in time series modeling because it influences the validity of the cointegration test and the stability of the VECM estimation. Based on the information criteria, including the Akaike Information Criterion, Schwarz Bayesian Criterion, and Hannan-Quinn Criterion, the optimal lag length is determined to be four quarters. This lag structure is economically reasonable because fiscal policy effects generally do not materialize instantly, but are transmitted gradually through aggregate demand, public investment execution, revenue collection, and private sector response.

Table 5 presents the Johansen cointegration test results. The trace statistic rejects the null hypothesis of no cointegration and also rejects the null hypothesis of at most one cointegrating equation at the 5% significance level. However, the null hypothesis of at most two cointegrating equations cannot be rejected. Therefore, the trace test indicates the presence of two cointegrating relationships among the variables.

Table 5. Johansen Cointegration Test Results

Hypothesized No. of CE(s)	Eigenvalue	Trace Stat.	5% Critical Value	Prob.
None **	0.3842	78.435	47.856	0.0000
At most 1 **	0.2567	42.178	29.797	0.0012
At most 2	0.1123	14.234	15.495	0.0768
At most 3	0.0234	2.178	3.841	0.1398

The existence of two cointegrating equations confirms that government expenditure, tax revenue, GDP, and inflation share stable long-run relationships. This result justifies the use of the VECM framework because the model is able to capture both long-run equilibrium and short-run adjustment dynamics. Substantively, the cointegration result indicates that fiscal variables are not isolated from macroeconomic performance. Instead, government expenditure and tax revenue move together with output and inflation over time, forming a long-run fiscal-macroeconomic system.

4.4 VECM Estimation Results

Table 6 reports the estimated long-run and short-run coefficients from the VECM. The long-run coefficients show that government expenditure has a positive and statistically significant relationship with real GDP. The coefficient of $\ln\text{GOVEXP}(-1)$ is 0.586 and significant at the 1% level, indicating that a 1% increase in government expenditure is associated with a 0.586% increase in real GDP in the long run, holding other variables constant. This finding supports the Keynesian argument that government expenditure can stimulate output through aggregate demand and productive public spending channels.

Table 6. VECM Estimation Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Long-Run Coefficients (Cointegrating Equation)				
$\ln\text{GOVEXP}(-1)$	0.586	0.134	4.373***	0.0000
$\ln\text{TAX}(-1)$	0.342	0.098	3.490***	0.0008
$\ln\text{CPI}(-1)$	-0.218	0.087	-2.506**	0.0142

Constant	2.347	0.456	5.148***	0.0000
Short-Run Coefficients (Dependent Variable: $\Delta \ln \text{GDP}$)				
ECT(-1)	-0.183	0.048	-3.847***	0.0002
$\Delta \ln \text{GOVEXP}(-1)$	0.142	0.056	2.536**	0.0132
$\Delta \ln \text{GOVEXP}(-2)$	0.098	0.052	1.885*	0.0632
$\Delta \ln \text{TAX}(-1)$	0.076	0.043	1.767*	0.0812
$\Delta \ln \text{GDP}(-1)$	0.324	0.087	3.724***	0.0004
$\Delta \ln \text{CPI}(-1)$	-0.067	0.038	-1.763*	0.0823

The positive coefficient of tax revenue in the long-run equation suggests that tax revenue moves together with output. This relationship should not be interpreted simply as a contractionary tax effect, but rather as an indication that higher economic activity broadens the tax base and improves revenue collection. In contrast, inflation has a negative long-run coefficient, indicating that persistent price pressure may weaken real output through declining purchasing power, higher production costs, and reduced investment certainty.

The error correction term is negative and statistically significant, with a coefficient of -0.183. This result confirms the existence of a valid adjustment mechanism toward long-run equilibrium. Approximately 18.3% of short-run disequilibrium is corrected within one quarter, implying that the system gradually returns to its long-run path after a shock. The short-run coefficients also show that changes in government expenditure have a positive effect on GDP, particularly at the first lag. This result indicates that fiscal expenditure affects output not only in the long run but also through short-run demand-side transmission.

Overall, the VECM results provide empirical support for the view that fiscal policy contributes to macroeconomic stabilization in Indonesia. The positive role of government expenditure is consistent with the country's reliance on fiscal intervention during periods of crisis and recovery.

4.5 Business Cycle Decomposition

Figure 2 presents the cyclical component of GDP obtained through the Hodrick-Prescott filter. The decomposition separates the long-run trend of GDP from short-run cyclical fluctuations, allowing the analysis to identify expansionary and contractionary phases more clearly.

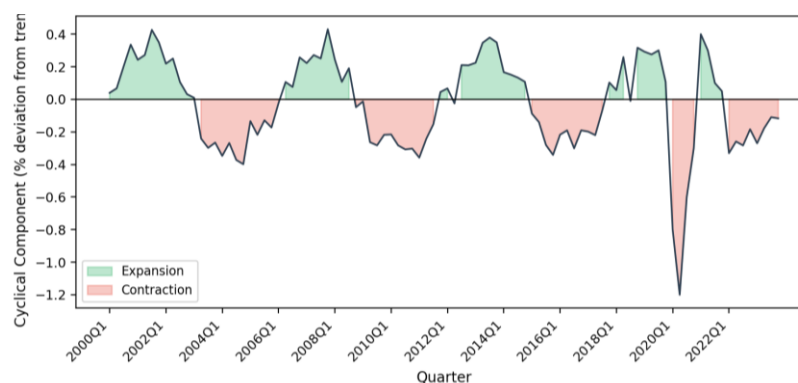


Figure 2. Cyclical Component of GDP Based on the Hodrick-Prescott Filter
Source: Authors' computation from BPS quarterly GDP data.

The cyclical component shows several important contractionary episodes, including the early 2000s adjustment period, the 2008–2009 Global Financial Crisis, and the COVID-19 shock in 2020. Among these episodes, the pandemic period represents the deepest cyclical downturn, with the GDP cycle declining to approximately -1.2% below trend in 2020Q2. This sharp decline reflects the simultaneous effects of mobility restrictions, weakened household consumption, disrupted investment, and declining external demand.

The subsequent recovery of the cyclical component suggests that fiscal intervention played an important role in supporting economic rebound. The recovery pattern is consistent with the increased government expenditure observed during the pandemic period. From a stabilization perspective, the HP Filter results indicate that Indonesia's fiscal policy became particularly relevant when output deviated sharply from its long-run trend. Therefore, the business cycle decomposition strengthens the argument that fiscal policy should be evaluated not only by its long-run effect on growth, but also by its ability to reduce cyclical volatility.

4.6 Impulse Response Function Analysis

Figure 3 presents the generalized impulse response functions with 95% confidence bands. The IRF analysis provides insight into how GDP responds dynamically to shocks in government expenditure, tax revenue, and inflation. This analysis is important because fiscal policy effects often unfold gradually rather than immediately.

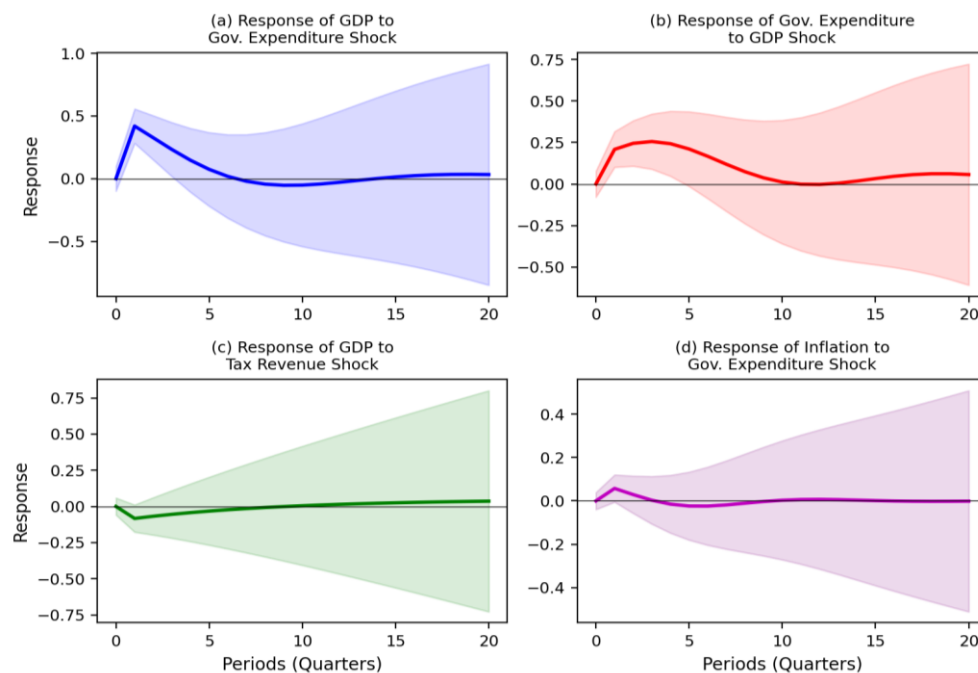


Figure 3. Impulse Response Function of Fiscal and Macroeconomic Shocks

Source: Authors' VECM estimation using EViews 13.

Panel (a) shows that a positive shock to government expenditure generates a positive response in GDP. The response reaches its peak at approximately 0.4 percentage points in the second quarter and remains positive for about 8-12 quarters before gradually declining toward equilibrium. This pattern confirms that government expenditure has a persistent, although not permanent, effect on output. The duration of the response indicates that fiscal shocks require time to be transmitted through public procurement, infrastructure spending, household income, and private sector demand.

Panel (b) indicates that government expenditure also responds positively to GDP shocks. This finding suggests the presence of a feedback mechanism between output and fiscal capacity. When GDP increases, tax revenues and fiscal space tend to improve, enabling the government to maintain or expand expenditure. This supports the interpretation that fiscal policy and economic activity interact dynamically rather than moving in a one-way relationship.

Panel (c) shows that GDP responds negatively to a tax revenue shock in the initial period. This is theoretically plausible because higher tax collection may reduce disposable income or business cash flow in the short run. However, the effect becomes statistically weaker after several quarters, indicating that the contractionary effect of taxation is not persistent. Panel (d) shows that the inflationary response to government expenditure shocks is relatively modest and temporary, dissipating within approximately four to six quarters. This suggests that fiscal expansion during the observed period did not generate prolonged inflationary pressure.

Overall, the IRF results support the argument that fiscal policy in Indonesia has a meaningful stabilization effect. Government expenditure stimulates GDP over the short to medium run, while its inflationary consequences remain limited and transitory.

4.7 Forecast Error Variance Decomposition

Figure 4 presents the forecast error variance decomposition over a 20-quarter horizon. FEVD complements the IRF analysis by quantifying the relative contribution of each shock to fluctuations in the model variables.

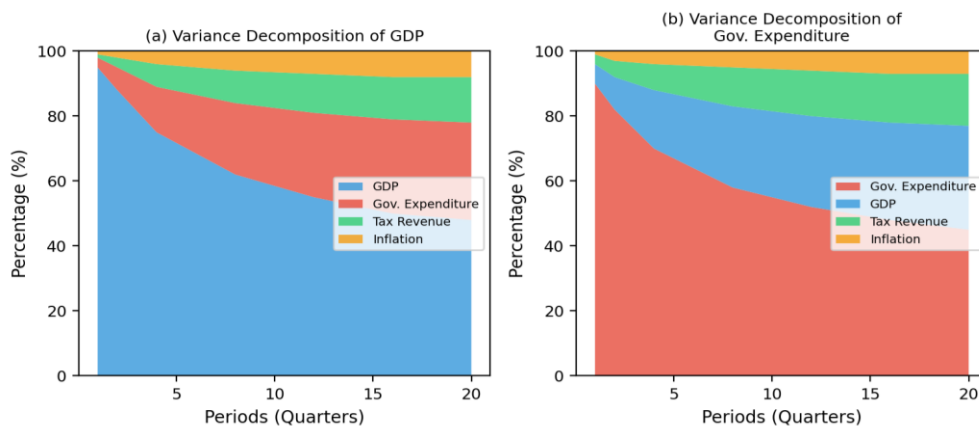


Figure 4. Forecast Error Variance Decomposition of GDP and Government Expenditure

Source: Authors' VECM estimation.

The results show that GDP's own innovations dominate GDP fluctuations in the short run, accounting for approximately 95% of forecast error variance at the one-quarter horizon. However, the contribution of government expenditure increases progressively as the forecast horizon becomes longer. Government expenditure explains approximately 14% of GDP variance at the 4-quarter horizon, 26% at the 12-quarter horizon, and 30% at the 20-quarter horizon.

This increasing contribution indicates that fiscal policy becomes more influential over the medium and long horizon. The finding is consistent with the nature of government expenditure, particularly capital spending, which often requires implementation time before affecting output. Tax revenue contributes approximately 14% of GDP variance at the 20-quarter horizon, while inflation contributes approximately 8%. These results imply that fiscal variables collectively account for a meaningful share of GDP fluctuations.

The FEVD results also show that GDP shocks explain an increasing share of government expenditure variance, reaching approximately 32% at the 20-quarter horizon. This confirms the bidirectional relationship between fiscal policy and output. Fiscal policy affects economic activity, while economic performance also determines fiscal capacity. Therefore, fiscal policy effectiveness should be understood as part of a dynamic macroeconomic feedback system.

4.8 Granger Causality Test Results

Table 7 reports the Wald-Granger causality test results within the VECM framework. The test is used to examine whether past values of one variable contain useful information for predicting another variable. The results show bidirectional causality between government expenditure and GDP at the 5% significance level.

Table 7. Wald-Granger Causality Test Results

Null Hypothesis	Chi-sq	Prob.	Decision
GOVEXP does not Granger-cause GDP	12.456	0.0142**	Reject H0
GDP does not Granger-cause GOVEXP	9.876	0.0425**	Reject H0
TAX does not Granger-cause GDP	7.234	0.0654*	Reject H0
GDP does not Granger-cause TAX	15.678	0.0034***	Reject H0
CPI does not Granger-cause GDP	3.456	0.3267	Fail to Reject
GDP does not Granger-cause CPI	6.789	0.0789*	Reject H0

The bidirectional causality between government expenditure and GDP indicates that fiscal expenditure helps predict output movements, while output also helps predict future government expenditure. This finding is important because it confirms the existence of a fiscal-output feedback mechanism. In practical terms, government spending supports economic activity, while higher economic activity strengthens the fiscal base and enables further public spending.

The causality between tax revenue and GDP is also bidirectional, although the effect from tax revenue to GDP is significant at the 10% level. This reflects the close relationship between tax performance and economic activity. Higher GDP increases the tax base, while changes in tax revenue can influence consumption, investment, and aggregate demand. The result also shows that inflation does not Granger-cause GDP, but GDP Granger-causes inflation at the 10% level. This finding suggests that inflationary pressure in the model is more likely to arise from output dynamics than from inflation independently driving real economic activity.

4.9 Fiscal Multiplier Estimates

Figure 6 presents the estimated fiscal multipliers disaggregated by expenditure category and time horizon. The results show that capital expenditure consistently produces the highest multiplier effect compared to current expenditure and tax-related measures.

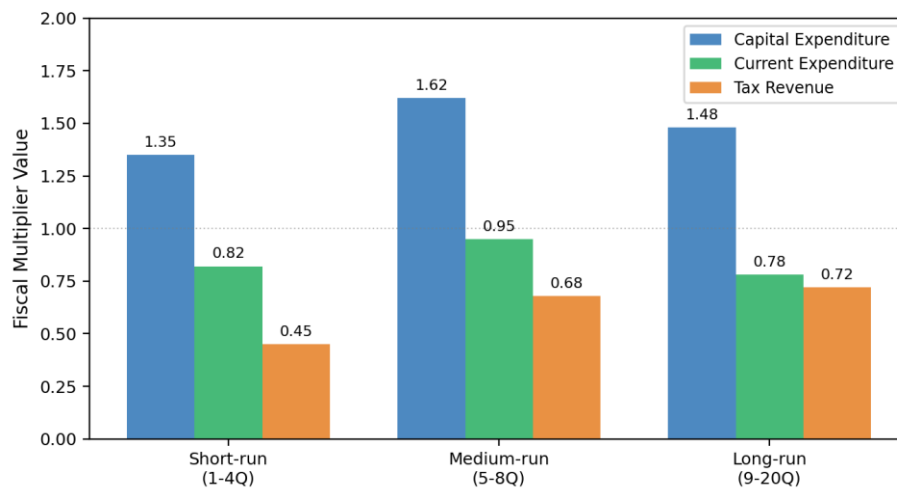


Figure 6. Fiscal Multiplier Estimates by Expenditure Category and Time Horizon

Capital expenditure has a short-run multiplier of 1.35, which increases to 1.62 in the medium run before moderating to 1.48 in the long run. This pattern indicates that public investment has a strong and persistent effect on output. The higher multiplier associated with capital expenditure is theoretically reasonable because infrastructure investment, public facilities, and productive government spending can increase demand in the short run while improving productive capacity in the medium and long run.

Current expenditure produces a lower multiplier, with values of 0.82 in the short run, 0.95 in the medium run, and 0.78 in the long run. This suggests that consumption-oriented spending still supports output but has a more limited and less persistent effect compared to capital expenditure. The smaller multiplier may reflect the fact that current expenditure is often directed toward routine spending, wages, administration, and transfers, which may have weaker productivity-enhancing effects.

Tax-related multipliers are the smallest, ranging from 0.45 to 0.72. This result is consistent with the argument that tax-based stimulus may have weaker immediate effects because part of the additional disposable income may be saved rather than spent. In contrast, direct government expenditure has a more immediate impact on aggregate demand. The multiplier results therefore support the policy implication that capital expenditure should be prioritized when fiscal policy is used to stabilize the economy and support recovery.

4.10 Diagnostic and Stability Tests

To ensure the reliability of the VECM estimation, several diagnostic and stability tests are conducted. Table 8 summarizes the results of serial correlation, heteroscedasticity, normality, and model stability tests. These tests are important because valid inference in time series models requires residuals that are not serially correlated, are homoscedastic, and satisfy basic distributional assumptions.

Table 8. Diagnostic Test Results

Test	Statistic	Prob.	Conclusion
LM Serial Correlation (lag 4)	18.234	0.3124	No Autocorrelation
White Heteroscedasticity	245.678	0.1876	Homoscedastic
Jarque-Bera Normality	5.432	0.2456	Normal Distribution

AR Roots (max modulus)	0.943	—	Stable (< 1)
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The LM serial correlation test fails to reject the null hypothesis of no autocorrelation, indicating that the residuals are free from serial dependence. The White heteroscedasticity test also shows that the residuals are homoscedastic. The Jarque-Bera statistic indicates that the residuals are approximately normally distributed. In addition, the maximum modulus of the AR roots is below one, confirming that the estimated VECM satisfies the stability condition.

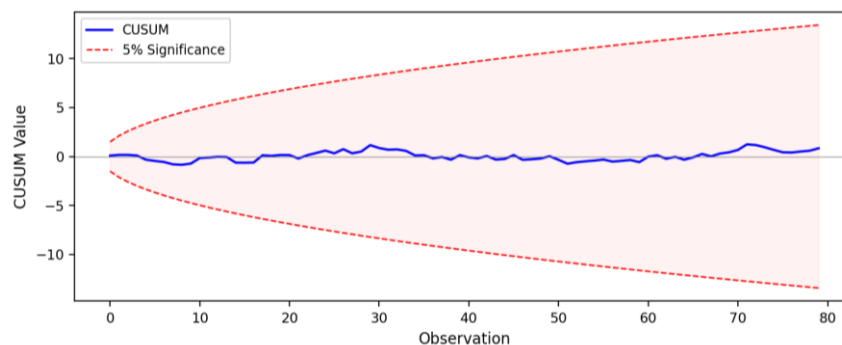


Figure 5. CUSUM Stability Test

Figure 5 presents the CUSUM stability test. The recursive residuals remain within the 5% significance boundaries throughout the sample period, indicating that the model parameters are structurally stable. This result strengthens the reliability of the estimated relationships among government expenditure, tax revenue, GDP, and inflation. The diagnostic and stability tests collectively confirm that the VECM results are statistically valid and suitable for policy interpretation.

5. CONCLUSION

5.1 Conclusions

This study examined the effectiveness of fiscal policy in stabilizing economic cycles in Indonesia using quarterly time series data from 2000Q1 to 2023Q4. By integrating the Hodrick-Prescott filter with the Vector Error Correction Model, the analysis was able to evaluate fiscal policy not only from the perspective of long-run equilibrium, but also through short-run adjustment, cyclical fluctuation, and dynamic shock transmission.

The empirical findings provide several important conclusions. First, the Johansen cointegration test confirms the existence of long-run equilibrium relationships among government expenditure, tax revenue, GDP, and inflation. This result indicates that fiscal and macroeconomic variables in Indonesia move together over time and validates the use of the VECM framework. The presence of cointegration also suggests that fiscal policy should be understood as part of a broader macroeconomic system rather than as an isolated policy instrument.

Second, the VECM estimation shows that government expenditure has a positive and statistically significant relationship with GDP in both the short run and the long run. The long-run coefficient of government expenditure indicates that fiscal spending contributes meaningfully to output performance. The significant and negative error correction term further confirms that deviations from long-run equilibrium are gradually corrected, with approximately 18.3% of disequilibrium adjusted within one quarter. This finding demonstrates that the fiscal-output relationship in Indonesia is stable and has a clear adjustment mechanism.

Third, the fiscal multiplier estimates indicate that the effectiveness of fiscal policy differs across expenditure categories and time horizons. Capital expenditure produces the strongest multiplier effect, reaching 1.35 in the short run and 1.62 in the medium run. This result confirms that productive government spending, particularly expenditure related to infrastructure and capital formation, has a stronger impact on economic output than routine current expenditure. Current expenditure still contributes to output, but its effect is relatively smaller and less persistent.

Fourth, the impulse response function shows that a positive shock to government expenditure generates a positive response in GDP for approximately 8-12 quarters before gradually returning to equilibrium. This finding indicates that fiscal policy effects are not limited to the immediate period, but are transmitted over a medium-term horizon. At the same time, the inflationary response to government expenditure shocks remains modest and temporary, suggesting that fiscal expansion during the observed period did not create prolonged inflationary pressure.

Fifth, the forecast error variance decomposition confirms that government expenditure plays an increasingly important role in explaining GDP fluctuations over longer horizons. Government expenditure accounts for up to 30% of GDP variance at the 20-quarter horizon, while tax revenue and inflation contribute smaller shares. This result strengthens the conclusion that fiscal policy is an important determinant of output dynamics in Indonesia.

Finally, the Granger causality results reveal a bidirectional relationship between government expenditure and GDP. This implies that fiscal expenditure influences economic output, while economic performance also affects fiscal capacity. Therefore, fiscal policy in Indonesia operates through a feedback mechanism in which government spending supports growth, and stronger output performance expands the fiscal space needed for further stabilization.

Overall, the findings confirm that fiscal policy has functioned as an effective macroeconomic stabilization instrument in Indonesia, particularly when expenditure is directed toward productive capital formation and implemented within a stable fiscal framework.

5.2 Policy Implications

The results of this study provide several policy implications for strengthening fiscal policy effectiveness in Indonesia. First, the strong multiplier effect of capital expenditure suggests that the government should continue prioritizing productive public investment. Expenditure on infrastructure, public facilities, and development-oriented capital formation has greater potential to stimulate output because it supports aggregate demand in the short run and strengthens productive capacity in the medium and long run. Therefore, fiscal consolidation should not be carried out by excessively reducing capital expenditure, especially during periods of economic slowdown.

Second, the positive and significant relationship between government expenditure and GDP indicates that fiscal policy remains relevant as a countercyclical instrument. During contractionary phases, timely fiscal intervention can help reduce output losses and accelerate recovery. However, the effectiveness of fiscal policy depends not only on the size of spending but also on its timing, composition, and implementation quality. Fiscal stimulus should therefore be designed in a forward-looking manner, rather than merely reacting after economic contraction has already deepened.

Third, the bidirectional causality between government expenditure and GDP highlights the importance of maintaining a balanced relationship between expenditure expansion and revenue mobilization. Stronger economic growth can improve tax revenue, while adequate revenue capacity allows the government to finance stabilization policies without creating excessive fiscal pressure.

Therefore, fiscal policy should be supported by sustainable revenue strategies, improved tax administration, and better targeting of public expenditure.

Fourth, the moderate speed of adjustment toward long-run equilibrium implies that fiscal policy effects require time to materialize. This finding suggests that government expenditure programs should be planned with realistic implementation horizons. Policies that require procurement, infrastructure development, or institutional coordination may not generate immediate effects, but they can produce stronger output responses over the medium term. For this reason, fiscal planning should integrate short-term stabilization objectives with medium-term development priorities.

Fifth, the relatively limited inflationary response to government expenditure shocks indicates that fiscal expansion can support output without necessarily causing persistent inflation, provided that spending is directed toward productive sectors and supported by macroeconomic coordination. Nevertheless, fiscal policy should remain aligned with monetary policy to preserve price stability, especially when the economy approaches capacity constraints.

In practical terms, the findings suggest that Indonesia's fiscal policy should emphasize three strategic directions: strengthening productive capital expenditure, improving the responsiveness of fiscal intervention during downturns, and maintaining fiscal sustainability through stronger revenue mobilization. These directions are important to ensure that fiscal policy can stabilize economic cycles without undermining long-run macroeconomic stability.

5.3 Limitations and Future Research Directions

Although this study provides comprehensive evidence on fiscal policy effectiveness in Indonesia, several limitations should be acknowledged. First, the analysis uses a linear VECM framework. While this model is appropriate for examining long-run equilibrium and short-run adjustment, it does not fully capture possible asymmetric effects of fiscal policy across different phases of the business cycle. Fiscal multipliers may differ between expansion and contraction periods, especially when economic slack is high. Future research may extend this analysis by applying threshold VAR, nonlinear ARDL, or Markov-switching VAR models to examine whether fiscal policy effects vary across economic regimes.

Second, this study focuses on major aggregate fiscal variables, namely government expenditure and tax revenue. Although the analysis includes multiplier estimation by expenditure category, a more detailed decomposition of fiscal spending could provide richer policy insights. Future studies may examine sectoral expenditure, such as infrastructure, education, health, social protection, and regional transfers, to identify which components generate the strongest stabilization effects.

Third, the study evaluates fiscal policy effectiveness mainly through the demand-side transmission channel. Government expenditure is examined in relation to GDP response, cyclical stabilization, and multiplier effects. However, some fiscal instruments, particularly capital expenditure, may also influence the supply side of the economy through productivity, connectivity, and long-term production capacity. Future research may incorporate productivity indicators, investment efficiency, or sectoral output data to better capture the supply-side contribution of fiscal policy.

Fourth, the analysis uses national-level macroeconomic data. While this approach is suitable for assessing aggregate fiscal policy effectiveness, it does not capture regional differences in fiscal transmission across provinces. Indonesia's regional economic structure is diverse, and the impact of government expenditure may vary depending on local infrastructure, industrial base, institutional capacity, and fiscal dependence. Future research may use panel data at the provincial level to examine regional heterogeneity in fiscal policy effectiveness.

Finally, this study does not explicitly model fiscal-monetary policy interaction. Since the effectiveness of fiscal policy may depend on inflation dynamics, interest rate responses, and monetary policy stance, future research could include policy interest rates, exchange rates, or monetary aggregates to examine how fiscal and monetary policies jointly influence output stabilization.

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