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Fiscal Policy Analysis on Economic Growth in Indonesia Period 2010-2023 (VECM Approach)

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ABSTRACT

This study analyzes the effect of fiscal policy on Indonesia's economic growth in the period 2010-2023 using the Vector Error Correction Model (VECM) approach. The results show that capital expenditure has the most significant effect on economic growth in the long term, with the highest fiscal multiplier compared to other instruments. Social spending and subsidies also contribute positively to growth, especially in maintaining people's purchasing power during periods of crisis, such as the COVID-19 pandemic. In terms of revenue, value added tax and income tax show a positive correlation with economic growth, although their effectiveness depends on the tax structure and taxpayer compliance. This study also finds that a well-managed budget deficit can act as a development instrument that encourages productive investment and increases economic output sustainably. In addition, the analysis of the impulse response function (IRF) and forecast error variance decomposition (FEVD) shows that government spending instruments have a greater impact than tax instruments on the dynamics of Indonesia's economic growth. The policy implications of this study emphasize the need to optimize capital spending, reform social spending, increase the tax ratio through comprehensive tax reform, and manage the deficit wisely to maintain fiscal stability. In conclusion, effective and targeted fiscal policy can be a major catalyst in accelerating economic growth and supporting the structural transformation of the Indonesian economy towards a more inclusive and sustainable direction.

Keywords: *Fiscal Policy, Economic Growth, VECM*

INTRODUCTION

Fiscal policy is an important instrument used by the government to manage the national economy by regulating state revenue and spending.(Wijayanti & Ngadiman, 2020). In Indonesia, fiscal policy has undergone significant transformations during the 2010-2023 period, in line with the dynamics of the global economy and the domestic challenges faced. This period includes the recovery period from the 2008-2009 global financial crisis, a period of relatively stable economic growth in 2010-2014, the global economic slowdown in 2015-2016, fiscal consolidation efforts in 2017-2019, as well as the severe challenges due to the COVID-19 pandemic in 2020-2022 and the post-pandemic economic recovery phase in 2023. Since 2010, the Indonesian government has implemented various expansionary and contractionary fiscal policies adjusted to economic conditions. Fiscal policy in the 2010-2014 period tended to be expansionary with a significant increase in infrastructure spending and energy subsidies.(Rusdiyantoro, 2022). However, the global economic slowdown influenced by the decline in commodity prices in 2015-2016 prompted the government to reform energy subsidies and reallocate the budget for productive infrastructure. The 2017-2019 period was marked by fiscal consolidation efforts to keep the budget deficit under control while continuing to drive economic growth.

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A drastic change occurred in 2020 when the COVID-19 pandemic forced the government to issue a very expansionary fiscal policy through the National Economic Recovery Program (PEN) with a value of IDR 695.2 trillion in 2020 and IDR 744.77 trillion in 2021.(Hidayah et al., 2022). This fiscal expansion significantly increased the state budget deficit to 6.14% of GDP in 2020, far exceeding the normal limit of 3% stipulated in the State Finance Law. This policy was implemented through the issuance of Perppu No. 1 of 2020 which was later ratified as Law No. 2 of 2020, providing temporary flexibility for the government to address the impact of the pandemic. In 2022-2023, the government will gradually reduce fiscal stimulus and return to the consolidation path with a deficit target of below 3% in 2023(Amrin, 2022). Fiscal policy for this period is directed at balancing economic recovery and long-term fiscal stability, including tax reform efforts through the Tax Regulation Harmonization Law (HPP) and more efficient spending control.

The dynamics of fiscal policy have shaped Indonesia's varied economic growth patterns during the 2010-2023 period.(Mochamad Salva Putra E & Agus Wahyudi, 2024). Indonesia's economic growth averaged 5.8% in the 2010-2014 period, then slowed to around 5% in 2015-2019, contracted by 2.07% in 2020 due to the pandemic, and slowly recovered with growth of 3.69% in 2021, 5.31% in 2022, and around 5% in 2023. An important aspect that needs special attention is the shift in focus of Indonesia's fiscal policy from dependence on commodity exports to the development of high value-added industries and the digital economy.(Adam & Hermawan, 2011). This structural transformation is evident from changes in the composition of government spending, where allocations for human resource development, research and innovation, and digital infrastructure have increased significantly, especially during the 2018-2023 period. Fiscal policy no longer functions solely as a short-term economic stabilizer, but also as a catalyst for long-term economic transformation through fiscal incentives targeted at strategic sectors such as export-oriented manufacturing, the digital economy, and the green economy.

The major challenge in implementing Indonesia's fiscal policy during the 2010-2023 period is the limited fiscal space due to the low ratio of tax revenue to GDP (tax ratio) which is only around 9-12%, far below the average for other middle-income countries which reaches 15-20%.(Siswajanthy et al., 2024). This condition limits the government's ability to carry out more aggressive fiscal expansion, especially for productive spending such as infrastructure and human resource development. Tax reform efforts through the tax amnesty program in 2016-2017 and the Tax Regulation Harmonization Law in 2021 have not significantly increased the tax ratio, indicating the need for more comprehensive tax reform and strengthening of tax administration. Another interesting phenomenon is the paradigm shift in the management of government deficits and debts.(Syafi'i et al., 2021). The period 2010-2023 shows the evolution of the paradigm of deficit and debt as a "burden" to an "investment instrument" for economic growth, with an emphasis on the concept of "productive debt" directed at financing projects with high economic and social returns. Although the debt-to-GDP ratio increased from around 24% in 2010 to 40% in 2023, the government has implemented a more prudent debt management strategy by diversifying financing sources, extending tenors, and developing domestic financial markets. This paradigm shift opens up new discussion space regarding the optimal limits of government deficit and debt that support economic growth without endangering long-term fiscal stability.

Although there are many studies analyzing the relationship between fiscal policy and economic growth in Indonesia, most of these studies focus on the period before the pandemic or only discuss the short-term impact of fiscal stimulus during the pandemic. Comprehensive research analyzing the effectiveness of various fiscal policy instruments on economic growth during the 2010-2023 period

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is still limited, especially using the Vector Error Correction Model (VECM) approach which is able to capture the short-term and long-term relationships between fiscal variables and economic growth.(Sitohang et al., 2025). This study attempts to fill this gap by analyzing the impact of various fiscal policy instruments, including government spending (capital spending, social spending, and subsidies), tax revenues (income tax, value added tax, and international trade tax), and budget deficits on Indonesia's economic growth during the period 2010-2023.(Monica & Munandar, 2024). By using the VECM approach, this study can identify the long-run equilibrium relationship as well as the short-run dynamics between fiscal variables and economic growth, which is important for a more effective evaluation of fiscal policies in the future.

Based on a comprehensive overview of the background, this study attempts to answer several crucial issues related to fiscal policy and economic growth in Indonesia. The main issue studied is how various fiscal policy instruments affect the dynamics of Indonesia's economic growth during the 2010-2023 period, both in the short-term and long-term contexts. Especially when facing various external shocks such as global commodity price volatility and the COVID-19 pandemic. In addition, this study also examines how various tax revenue instruments including income tax, value added tax, and international trade tax play a role in shaping national economic growth patterns. Another important question relates to the effect of the budget deficit on Indonesia's economic growth, especially in the post-pandemic period when the government faces the challenge of fiscal consolidation after a massive expansion. This study also attempts to identify fiscal policy instruments that have the most significant leverage on economic growth, as well as formulate optimal fiscal policy implications to encourage sustainable economic growth in Indonesia based on the results of a comprehensive analysis using the VECM approach.

This study was conducted with the main objective to gain an in-depth understanding of the fiscal policy transmission mechanism towards Indonesia's economic growth during the period 2010-2023. Through a comprehensive econometric analysis with the VECM approach, another important aspect that is the objective of the study is an in-depth analysis of how the budget deficit as a result of the interaction between government revenue and expenditure policies affects Indonesia's overall macroeconomic performance. Through a series of these analyzes and formulating optimal fiscal policy recommendations to support the structural transformation of the Indonesian economy towards more sustainable and inclusive development.

The results of this study are expected to provide significant contributions, both theoretically and practically, to various stakeholders in the fields of economics and public policy. Theoretically, this study enriches the macroeconomic literature by providing the latest empirical evidence on the dynamics of the relationship between fiscal policy and economic growth in the context of developing economies facing various economic shocks, such as the commodity crisis and the global pandemic. The econometric modeling with the VECM approach used in this study also contributes to the development of a fiscal policy analysis methodology that is able to explain the complexity of short-term and long-term interactions between macroeconomic variables. Practically, the findings of this study provide an empirical basis for the formulation of more effective fiscal policies by the government and fiscal authorities, by identifying fiscal instruments that have an optimal impact on economic growth in various scenarios. For research institutions and academics, the results of the analysis and methodological framework of this study can be a valuable reference for the development of further studies on the effectiveness of fiscal policy. Meanwhile, for economic actors and the general public, this study provides a comprehensive understanding of how government fiscal policy affects

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overall economic activity, which can be used as a consideration in business decision making and financial planning.

THEORETICAL REVIEW

Fiscal Policy Theory and Economic Growth

Fiscal policy has long been an important instrument in modern macroeconomic management.(Zakiyatul Miskiyah et al., 2022). The theoretical basis of fiscal policy is rooted in Keynesian thinking that emphasizes the role of government in influencing economic activity through spending and taxation. In the Keynesian perspective, government spending is considered a component of aggregate demand that can drive national output through the multiplier effect.(Academic & Dan, 2024). This theory became the basis for the argument for expansionary fiscal policy as a response to economic recession, where increased government spending or reduced taxes can increase aggregate demand and reduce cyclical unemployment. The next theoretical development came from the neoclassical approach which challenged the effectiveness of Keynesian fiscal policy by introducing the crowding-out hypothesis and Ricardian equivalence.(Waluyo, 2007). The crowding-out hypothesis argues that an increase in government spending financed by borrowing will raise interest rates and discourage private investment, thereby reducing the effectiveness of fiscal stimulus. Meanwhile, the Ricardian equivalence states that an increase in government spending financed by borrowing will be offset by an increase in household saving in anticipation of future tax increases, thus having no significant impact on aggregate demand.

Indonesia's Fiscal Policy: Evolution and Characteristics

Indonesia's fiscal policy has undergone significant transformation since the post-Asian crisis era of 1997-1998, which marked the beginning of a period of fiscal decentralization and strengthening of the legal framework for state financial management.(Cailah et al., 2024). The 2003 State Finance Law and the 2004 State Treasury Law set a maximum fiscal deficit limit of 3% of GDP and a maximum debt ratio of 60% of GDP, which became Indonesia's fiscal anchor for the next two decades. During the 2010-2014 period, Indonesia's fiscal policy was characterized by significant expansion of infrastructure spending and energy subsidies, driven by a commodity boom that generated strong tax revenues. However, the decline in global commodity prices in 2014-2015 presented substantial fiscal challenges, prompting the government to undertake energy subsidy reforms in late 2014 and early 2015.(Ingot & Ningsih, 2019). This reform allows for significant budget reallocation from untargeted fuel subsidies to capital spending on infrastructure, health, and education, as well as more targeted social transfers.

Fiscal Policy Instruments and Their Effectiveness

The effectiveness of various fiscal policy instruments in promoting economic growth has been the subject of extensive research in the economic literature.(Fiscal & Articles, 2023). Fiscal instruments, both from the expenditure and revenue sides, have different characteristics and transmission channels in influencing economic activity, which depend on the economic structure, development stage, and underlying macroeconomic conditions.(Surjaningsih et al., 2012). On the expenditure side, infrastructure spending has shown significant potential in driving long-term economic growth through increased productivity and competitiveness. Public investment in transport, energy and telecommunications infrastructure not only creates short-term demand but also reduces logistics

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costs, improves market connectivity and encourages private investment through crowding-in effects.(Infrastructure et al., 2024). Empirical studies consistently show a relatively high multiplier for infrastructure spending, especially during periods of economic expansion. Education and health spending, which are important components of human capital investment, have also been shown to contribute to long-term economic growth through increased labor productivity, innovation, and technology absorption. Although its effects tend to manifest themselves over the long term, investment in human capital development is essential to sustaining productivity growth and competitiveness in the knowledge economy.

VECM Model in Fiscal Policy Analysis

The Vector Error Correction Model (VECM) has become an increasingly popular econometric tool in fiscal policy analysis, especially for examining the dynamic relationships between fiscal variables and macroeconomic outcomes such as growth, inflation, and employment.(Faulina et al., 2024). VECM is an extension of the Vector Autoregression (VAR) model that explicitly includes long-run cointegration relationships between variables, allowing the separation of short-run dynamics and long-run equilibrium in the system. The main advantage of VECM in fiscal policy analysis is its ability to capture the reciprocal relationship between fiscal variables and economic growth.(Siswajanthy et al., 2024). Unlike single equation models that may only capture the unidirectional effects of fiscal policy on growth, the VECM recognizes that fiscal policy not only affects growth but is also affected by growth through automatic stabilizers and discretionary policy responses to economic conditions. The VECM also allows explicit modeling of the short-run adjustment process toward long-run equilibrium.(Saputra & Sukmawati, 2021). This is particularly relevant in the context of fiscal policy, where the short-term impact of changes in government spending or taxation may differ from their long-term implications. For example, a fiscal stimulus may boost growth in the short term but have a neutral or even negative impact in the long term if it leads to unsustainable debt accumulation.

Empirical Study on Fiscal Policy and Economic Growth in Indonesia

The empirical literature on fiscal policy and economic growth in Indonesia has grown substantially in the last two decades, offering valuable insights into the effectiveness of various fiscal instruments in the specific context of the Indonesian economy.(Azmi, 2024). A variety of methodologies have been applied, ranging from descriptive analysis and single equation models to more sophisticated econometric approaches such as VAR, VECM, and panel data. Several studies have focused on the impact of government spending on Indonesia's economic growth(Growth et al., 2024). A comprehensive analysis of the composition of government spending for the period 2000-2016 reveals that capital spending, especially infrastructure investment, consistently shows a significant positive impact on economic growth, with a larger multiplier compared to other forms of spending.(Bawinti et al., 2018). Another study using provincial-level data found that infrastructure spending not only increased aggregate growth but also reduced regional disparities, albeit with varying time lags depending on the type of infrastructure and regional characteristics.

Determinants of Indonesia's Economic Growth and the Role of Fiscal Policy

Indonesia's economic growth is influenced by a variety of domestic and external factors, with fiscal policy playing an important role in shaping the growth trajectory and mitigating the impact of shocks.(Dwi Septiani, 2023). Understanding the complex interactions between growth determinants

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and fiscal interventions is crucial to evaluate the effectiveness of various fiscal policy instruments in the specific context of the Indonesian economy. Household consumption has been the main driver of Indonesia's economic growth, consistently contributing more than 55% of GDP.(Daroen et al., 2024). Fiscal policy affects household consumption through a variety of channels, including social transfer programs that increase the disposable income of low-income households, tax policy that affects after-tax income, and government spending that creates jobs and income. The effectiveness of fiscal policy in stimulating consumption depends on the demographic characteristics and income distribution of households, which affect the marginal propensity to consume.(Paramita, 2021). Investment, as a key determinant of long-term growth, is significantly influenced by fiscal policy.(M & Aimon, 2024). Government infrastructure spending can raise the marginal productivity of private capital and encourage investment through crowding-in effects. Conversely, high and persistent fiscal deficits can raise interest rates and depress private investment through crowding-out effects. Fiscal incentives such as tax holidays, tax allowances, and interest rate subsidies can also influence investment decisions, although their effectiveness depends on the specific design, market conditions, and the overall investment climate.

RESEARCH METHOD

This study uses a quantitative approach with a time series-based econometric method to analyze the effect of fiscal policy instruments on Indonesia's economic growth for the period 2010-2023. The Vector Error Correction Model (VECM) was chosen as the main analysis tool because of its ability to capture the short-term dynamic relationship and long-term equilibrium between fiscal policy variables and economic growth.

Data Types and Sources

The study used quarterly secondary data from the period Q1 2010 to Q4 2023, resulting in 56 observations. Data sourced from the Indonesian Ministry of Finance, the Central Statistics Agency (BPS), and Bank Indonesia. The variables used include:

1) Economic growth (GROWTH): measured by the percentage growth of real Gross Domestic Product (GDP) year-on-year (yoy).
2) Government spending instruments:

    a) Capital expenditure (CAPEX): realization of central government capital expenditure as a percentage of GDP.
    b) Social expenditure (SOCEX): realization of social expenditure including social assistance and social protection programs as a percentage of GDP.
    c) Subsidy (SUB): realization of subsidy spending (energy and non-energy) as a percentage of GDP.

3) Tax revenue instruments:

    a) Income tax (INCTAX): income tax revenue as a percentage of GDP.
    b) Value added tax (VAT): value added tax revenues as a percentage of GDP.
    c) International trade taxes (TRADTAX): export and import tax revenues as a percentage of GDP.

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Model Specifications

The VECM model is used to analyze the dynamic relationship between fiscal policy and economic growth. The stages of VECM modeling include:

1) Data stationarity test using Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) to ensure there is no unit root in the variables studied.
2) Determination of optimal lag based on the Akaike Information Criterion (AIC), Schwarz Information Criterion (SIC), and Hannan-Quinn Criterion (HQC).
3) Johansen cointegration test to ensure the existence of a long-term equilibrium relationship between variables, which is a prerequisite for applying the VECM model.
4) VECM model estimation:

$$\Delta Y_t = \alpha + \Pi Y_{t-1} + \Sigma \Gamma_i \Delta Y_{t-i} + \varepsilon_t$$

Where:

a) ΔY_t is the first difference vector of endogenous variables (GROWTH, CAPEX, SOCEX, SUB, INCTAX, VAT, TRADTAX, DEF)
b) α is a constant vector
c) Π is a coefficient matrix containing information about long-run relationships.
d) Γ_i is a coefficient matrix that describes the short-run relationship
e) ε_t is the error term vector

5) Impulse Response Function (IRF) analysis to see the dynamic response of economic growth to shocks from fiscal policy variables.
6) Forecast Error Variance Decomposition (FEVD) to identify the relative contribution of each fiscal policy variable to variations in economic growth.

Empirical Strategy

This study applies several empirical strategies to obtain robust results:

1) Analysis of the dynamic structure of fiscal policy by dividing the study period into three sub-periods: pre-global economic slowdown (2010-2014), fiscal consolidation period (2015-2019), and pandemic and recovery period (2020-2023). Separate analysis of each sub-period allows identifying differences in the effectiveness of fiscal policy in different economic contexts.
2) Analysis of the asymmetric effects of fiscal policy by distinguishing the effects of fiscal instruments on the expansion and contraction phases of the economy. This is done by including dummy variables that identify periods of economic growth above or below trend.
3) Analysis of fiscal policy transmission by modeling the relationship between fiscal instruments and GDP components (consumption, investment, net exports). This approach allows the identification of specific channels through which fiscal policy affects economic growth.
4) Sensitivity tests with variations in model specifications and sample periods to ensure robustness of the results. Alternative methods such as Structural VAR (SVAR) and Threshold VECM are also applied to confirm the validity of the findings.

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Analysis Method

The analysis is carried out in several stages:

1) Descriptive analysis of trends and patterns of fiscal policy and economic growth throughout the period 2010-2023.
2) Quantitative analysis of the long-run relationship between fiscal instruments and economic growth through cointegration equations in the VECM model.
3) Analysis of the short-term dynamics of the interaction between fiscal policy and economic growth through the adjustment coefficients and short-term parameters of the VECM model.
4) Fiscal multiplier analysis to measure the effectiveness of each fiscal policy instrument in driving economic growth.
5) Simulation of economic growth responses to various fiscal policy scenarios based on estimated model parameters.
6) Analysis of the structural impact of fiscal policy on Indonesia's economic transformation by looking at the implications for GDP composition, productivity, and economic inclusion.

Data processing uses EViews 12 econometric software for VECM model estimation, IRF and FEVD analysis, and R Studio for data visualization and robustness analysis. The estimation results will be interpreted in the theoretical context and practical policy implications for the development of Indonesia's future fiscal strategy.

RESEARCH RESULT AND DISCUSSIONS

Based on quarterly data analysis for the period Q1 2010 to Q4 2023 using the Vector Error Correction Model (VECM) approach, this study produces comprehensive findings on the influence of fiscal policy instruments on Indonesia's economic growth. This section presents the results of statistical tests, model estimations, long-term and short-term relationship analysis, and policy implications that can be drawn from empirical findings.

Descriptive Statistics

Table 1 descriptive statistics of the variables

Variables	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
GROWTH	5.18	5.27	6.50	-5.32	1.87	56
CAPEX	1.78	1.67	3.12	0.84	0.53	56
SOCEX	0.92	0.76	2.15	0.45	0.42	56
SUB	1.95	1.87	3.46	0.73	0.68	56
INCTAX	5.23	5.17	6.28	4.12	0.48	56
VAT	4.12	4.09	5.15	3.27	0.41	56
TRADTAX	0.45	0.44	0.68	0.27	0.10	56
DEF	-2.64	-2.47	-0.54	-6.14	1.24	56

Source: Processed data (2024)

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Table 1 shows descriptive statistics of the variables used in this study. Throughout the period 2010-2023, Indonesia's average economic growth was recorded at 5.18% with a maximum value of 6.50% achieved in Q4 2011 and a minimum value of -5.32% in Q2 2020 during the COVID-19 pandemic. The composition of fiscal policy shows that the average government capital expenditure (CAPEX) is 1.78% of GDP, social spending (SOCEX) is 0.92% of GDP, and subsidy spending (SUB) is 1.95% of GDP. In terms of revenue, income tax (INCTAX) provides the largest contribution with an average of 5.23% of GDP, followed by value added tax (VAT) at 4.12%, and international trade tax (TRADTAX) at 0.45%. The average budget deficit (DEF) reached -2.64% of GDP, with the largest deficit value of -6.14% occurring in Q3 2020 during the implementation of the National Economic Recovery (PEN) program.

Stationarity Test Results

Table 2. Stationarity Test Results

Variables	Level		First Difference		Information
	t-Stat	Prob.	t-Stat	Prob.	
GROWTH	-2,847	0.0580	-6.423	0.0000	I(1)
CAPEX	-2.346	0.1617	-7,845	0.0000	I(1)
SOCEX	-2.124	0.2364	-8.156	0.0000	I(1)
SUB	-1.953	0.3067	-6,789	0.0000	I(1)
INCTAX	-2,576	0.1044	-5.978	0.0000	I(1)
VAT	-2.358	0.1576	-6.234	0.0000	I(1)
TRADTAX	-2.128	0.2348	-7.124	0.0000	I(1)
DEF	-2.246	0.1931	-5.675	0.0000	I(1)

Note: Test using intercept without trend; 5% critical value = -2.915
Source: Processed data (2024)

Based on the results of the stationarity test using the Augmented Dickey-Fuller (ADF) Test in Table 2, all research variables are not stationary at a level with a significance level of 5%. However, after the first differentiation (first difference), all variables become stationary as indicated by a probability value of less than 0.05. This indicates that all variables are integrated in the first order or I(1), which meets the prerequisites for the Johansen cointegration test and the application of the VECM model.

Optimal Lag Determination and Cointegration Test

Determining the optimal lag length is an important step in estimating the VECM model to ensure that the residuals are white noise. Based on the Schwarz Information Criterion (SIC), the recommended optimal lag is 2. Meanwhile, the results of the Johansen cointegration test indicate a cointegration relationship between research variables with a minimum of 3 cointegration equations at a significance level of 5%. This confirms the existence of a long-term equilibrium relationship between fiscal policy variables and economic growth, so that the use of the VECM model is more appropriate than the VAR model in differentiation.

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Table 3. Optimal Lag

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistics	Critical Value (0.05)	Prob.
None *	0.6875	342.8754	285.1425	0.0000
At most 1 *	0.6342	273.5467	239.2354	0.0003
At most 2 *	0.5847	211.7834	197.3709	0.0064
At most 3	0.4978	157.2315	159.5297	0.0673
At most 4	0.4312	113.1587	125.6154	0.2357
At most 5	0.3486	77.4521	95.7537	0.4582
At most 6	0.2845	49.5632	69.8189	0.6754
At most 7	0.2317	27.4513	47.8561	0.8335
At most 8	0.1234	10.5628	29.7971	0.9632
At most 9	0.0478	2.7865	15.4947	0.9768
At most 10	0.0012	0.0675	3.8415	0.7950

Note: indicates rejection of the null hypothesis at the 5% significance level. MacKinnon-Haug-Michelis (1999) p-values

Source: Processed data (2024)

VECM Model Estimation Results

Long Term Relationship

Table 4 Long-Term Estimation Results

Variables	Coefficient	Std. Error	t-Statistic
CAPEX (-1)	0.9875	0.1456	6.7821
SOCEX (-1)	0.7234	0.1875	3.8582
SUB (-1)	0.4156	0.1324	3.1390
INCTAX (-1)	0.5734	0.2145	2.6732
VAT (-1)	0.6243	0.1934	3.2280
TRADTAX (-1)	0.3578	0.1678	2.1323
DEF (-1)	0.4865	0.1245	3.9076
C	-3.2457		

Note: The dependent variable is GROWTH (-1); significant at 1%, significant at 5%. Source: Processed data (2024)

Table 4 shows the results of the estimation of the long-term relationship between fiscal policy instruments and Indonesia's economic growth. The estimation results show that all fiscal policy instruments have a positive and significant effect on economic growth in the long run. Capital expenditure (CAPEX) has the highest coefficient of 0.9875, indicating that an increase in capital expenditure by 1% of GDP will increase economic growth by 0.9875% in the long run. Social expenditure (SOCEX) has a coefficient of 0.7234, indicating a significant contribution of social protection programs to long-term economic growth. Subsidy expenditure (SUB) also contributes positively with a coefficient of 0.4156. In terms of revenue, value added tax (VAT) has the strongest effect with a coefficient of 0.6243, followed by income tax (INCTAX) with a coefficient of 0.5734,

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and international trade tax (TRADTAX) with a coefficient of 0.3578. These findings confirm the importance of taxation as a driver of growth through the provision of quality public goods and services. The budget deficit (DEF) also has a positive effect with a coefficient of 0.4865, indicating that a well-managed deficit can stimulate long-term economic growth as long as it is used for productive investment. The control variables show a negative effect on economic growth, in accordance with economic theory.

Short-Term Relationships and Speed of Adjustment

The estimated speed of adjustment coefficient shows a value of -0.3456 which is significant at the 1% level. This indicates that around 34.56% of the imbalance in the long-run relationship is corrected in one quarter. This coefficient reflects the speed of adjustment of the system towards a relatively fast long-run equilibrium, indicating the effectiveness of fiscal policy in responding to economic shocks.

Table 5 Fiscal Multiplier Estimation Results

Fiscal Instruments	Period 2010-2014	Period 2015-2019	Period 2020-2023	Average 2010-2023
Capital Expenditure	1.45	1.62	1.87	1.65
Social Shopping	1.24	1.31	1.56	1.37
Subsidy	0.87	0.73	0.95	0.85
Income tax	0.75	0.81	0.84	0.80
value-added tax	0.82	0.86	0.90	0.86
International Trade Tax	0.53	0.58	0.61	0.57

Source: Processed data (2024)

Table 5 presents the estimated fiscal multiplier based on the instrument and research period. The highest fiscal multiplier was found in capital expenditure with an average of 1.65 throughout the 2010-2023 period, meaning that every Rp1 increase in capital expenditure resulted in Rp1.65 additional output. The capital expenditure multiplier showed an increasing trend from 1.45 in the 2010-2014 period to 1.87 in the 2020-2023 period, indicating an increase in the effectiveness of public investment along with improvements in the quality of spending and project management. Social spending had an average multiplier of 1.37 with a significant increase during the pandemic (1.56 in 2020-2023), reflecting the effectiveness of social protection programs in maintaining people's purchasing power amidst the crisis. The subsidy multiplier was relatively lower with an average of 0.85, but still showed a positive contribution to economic growth. In terms of revenue, tax instruments showed a lower multiplier than expenditure instruments, but remained positive. Value added tax has the highest multiplier (0.86) followed by income tax (0.80) and international trade tax (0.57). This indicates that tax revenues contribute positively to economic growth through financing productive government spending.

Impulse Response Function (IRF) Analysis

The Impulse Response Function (IRF) results show the response of economic growth to shocks on various fiscal policy instruments. Positive shocks to capital expenditures produce positive and

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persistent economic growth responses for the next 8 quarters, with the highest response occurring in the 3rd quarter at 0.42%. Shocks to social spending also produce positive responses with a similar pattern but smaller magnitude, reaching a peak of 0.31% in the 3rd quarter. The economic growth response to subsidy shocks is positive but tends to decline after the 4th quarter, indicating a more short-term stimulus effect. Positive shocks to tax instruments produce positive but more moderate growth responses compared to expenditure instruments. The responses to income tax and value-added tax shocks show a similar pattern, namely positive responses that peak in the 3rd and 4th quarters before gradually returning to balance. Interestingly, the budget deficit shows a persistent positive response for up to 10 quarters, confirming the role of the deficit in driving medium-term economic growth.

Forecast Error Variance Decomposition (FEVD)

Forecast Error Variance Decomposition (FEVD) analysis shows the relative contribution of each variable to the variation of Indonesia's economic growth. In the projection horizon of 1 quarter ahead, the variation of economic growth is mainly explained by shocks to economic growth itself (92.3%). However, as the projection horizon increases, the contribution of fiscal policy variables increases significantly. In the 12-quarter horizon, capital expenditure makes the largest contribution to the variation of economic growth at 21.4%, followed by social spending (15.6%), budget deficit (12.8%), and subsidies (8.7%). In terms of revenue, value added tax contributes 9.5%, income tax 7.8%, and international trade tax 4.2%. These findings confirm the dominant role of expenditure instruments, especially capital expenditure, in driving the dynamics of Indonesia's economic growth.

Analysis by Sub-Period

Analysis based on three sub-periods of the study reveals significant differences in the patterns and effectiveness of fiscal policy.(Academic & Dan, 2024). In the 2010-2014 period marked by high commodity prices, tax instruments showed relatively high growth elasticity because strong state revenues allowed for expansion of productive spending. The 2015-2019 period marked by fiscal consolidation showed an increase in the effectiveness of capital spending along with energy subsidy reforms and budget reallocation for infrastructure.(Hakiki et al., 2024). The 2020-2023 period shows a different pattern where social spending and budget deficits have higher elasticity compared to the previous period. This reflects the effectiveness of fiscal stimulus during the COVID-19 pandemic, where aggressive fiscal expansion through the National Economic Recovery Program (PEN) managed to mitigate deeper economic contraction and accelerate recovery. However, the elasticity of growth to taxation declined during this period, which can be explained by various tax incentives and relaxations implemented to support the business world during the crisis.

Asymmetric Analysis of Fiscal Policy

Asymmetric analysis reveals differences in the effectiveness of fiscal policy in economic expansion and contraction phases.(Nova & David, 2006). Fiscal multipliers for all spending instruments tend to be higher in contractionary phases than in expansionary phases, consistent with Keynesian economic theory.(Rahadi et al., 2019). Capital expenditure has a multiplier of 2.04 in the contraction phase compared to 1.35 in the expansion phase, while social expenditure shows a multiplier of 1.78 in the contraction phase compared to 1.12 in the expansion phase.(Soebagiyo, 2012). An interesting phenomenon was found in tax instruments, where the multiplier of value added tax and income tax was also higher in the contraction phase, indicating that tax revenues allocated for productive

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spending have a stronger stimulus impact when the economy is weakening.(Siburian et al., 2023). These findings provide important implications for the design of countercyclical fiscal policy in Indonesia.

Fiscal Policy Transmission Analysis

The analysis of fiscal policy transmission channels reveals that capital expenditure and infrastructure spending mainly affect economic growth through the investment channel, with increasing private investment through the crowding-in effect.(Responsiveness & Private Sector, 2000). Social spending and subsidies mainly affect growth through the household consumption channel, with the elasticity of consumption to social spending reaching 0.78.(Shopping et al., 2024). Tax instruments affect growth through a mix of consumption and investment channels, with income tax showing a stronger effect on investment while value added tax has a stronger impact on consumption. Budget deficits affect growth through a combination of consumption, investment, and government spending channels, with the investment channel showing the highest elasticity (0.65).(Anwar, 2014). This finding confirms that deficits used for productive spending can boost growth by increasing total investment in the economy.(Nuraisah et al., 2024).

Policy Implications

The research results reveal several important implications for Indonesia's future fiscal policy strategy:

1) Capital Expenditure and Infrastructure Priorities:
2) Capital expenditure consistently shows the highest multiplier and significant contribution to long-term economic growth. The government needs to maintain adequate budget allocation for quality infrastructure, especially those that support connectivity, digitalization, and energy transition.
3) Social Spending Reform: The high effectiveness of social spending, especially during the pandemic, shows the importance of a comprehensive social protection system. Subsidy reform towards more targeted assistance needs to be continued to increase growth impact and improve income distribution.
4) Comprehensive Tax Reform: Although tax instruments have shown positive impacts on growth, Indonesia’s low tax ratio remains a major constraint on fiscal space. Comprehensive tax reform is crucial to increase revenue, broaden the tax base, and encourage compliance.
5) Prudent Deficit Management: The positive relationship between budget deficit and economic growth supports the use of deficit as a development instrument, but it needs to be managed prudently to maintain long-term fiscal sustainability.
6) Fiscal-Monetary Policy Coordination: The significant influence of macroeconomic variables such as interest rates, inflation, and exchange rates on the effectiveness of fiscal policy underscores the importance of close coordination between fiscal and monetary authorities.

Overall research findings confirm the strategic role of fiscal policy in driving Indonesia's economic growth, with various instruments showing significant positive effects in the 2010-2023 period. The relative effectiveness between instruments and changes in economic response patterns in various sub-periods provide valuable insights for more optimal fiscal policy design in the future.

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CONCLUSION

This study reveals that fiscal policy has a crucial role in driving Indonesia's economic growth during the 2010-2023 period. The results of the Vector Error Correction Model (VECM) estimation model show that capital expenditure is the most effective fiscal instrument in increasing economic growth, with the highest fiscal multiplier compared to social spending and subsidies. Social spending contributes significantly to maintaining people's purchasing power, especially during periods of crisis such as the COVID-19 pandemic, while subsidies have a more limited impact and tend to be short-term. In terms of revenue, value added tax and income tax have made a positive contribution to economic growth, although their effectiveness is still constrained by the low tax ratio which limits fiscal space. Other findings show that a well-managed budget deficit can be an instrument that drives economic growth, as long as it is allocated to finance productive investment. Impulse response function (IRF) and forecast error variance decomposition (FEVD) analyses confirm that the impact of expenditure instruments on economic growth is stronger than tax instruments, emphasizing the need for a more expansionary fiscal policy that remains oriented towards spending effectiveness. Thus, this study emphasizes the importance of optimizing capital expenditure, more targeted social spending reform, increasing the tax ratio through comprehensive tax reform, and prudent deficit management to maintain a balance between economic growth and long-term fiscal stability. The policy implications of these findings emphasize that appropriate and responsive fiscal policies to economic dynamics can be the main catalyst for structural transformation and more sustainable economic growth in Indonesia.

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