The Impact of Government Expenditures, Gross Fixed Capital Formation, and Exports on Indonesia's Gross Domestic Product

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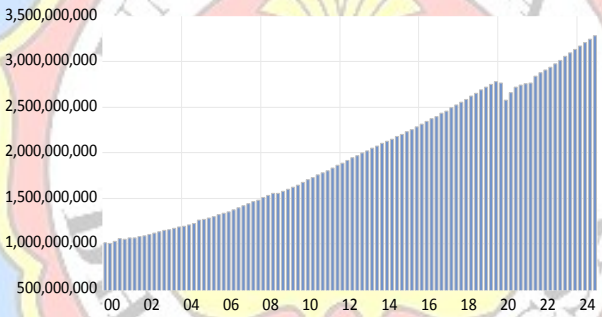
Abstract: This study analyzes the short-term and long-term relationship between government spending, gross fixed capital formation (PMTB), and exports to Indonesia's Gross Domestic Product (GDP) for the period 2000-2024 using the Vector Error Correction Model (VECM) model. The results of the study show that in the long term, government expenditure has a positive and significant effect on GDP, PMTB has a negative and significant effect, while exports do not have a significant effect. In the short term, the three independent variables have not been shown to have a significant effect on GDP. The results of the Impulse Response Function (IRF) show that the GDP response to shocks of the three variables fluctuates greatly in the initial period (1-19), then towards a stable near zero, indicating that the impact of the shock is temporary. Forecast Error Variance Decomposition (FEVD) analysis revealed that until the 100th period, the contribution of government expenditure to GDP variance was 5.56%, PMTB was 2.00%, and exports was 0.85%, while 91.58% was explained by the GDP variable itself. The study concludes that government spending is effective in driving long-term economic growth, but physical investment still faces structural challenges, and exports have a limited role in the domestic economy.

Keyword: *Government spending, Gross fixed capital formation, Exports, Gross domestic product, VECM*

INTRODUCTION

Over the past two decades, Southeast Asia has become a region that drives global economic growth through ASEAN regional integration. However, the region is now facing a slowdown due to weakening capital accumulation, low total productivity, and limited human resource development. In Indonesia, these structural challenges are more pronounced due to delays in technological progress and innovation that limit competitiveness and productivity. Infrastructure improvements are considered to be able to create new investment opportunities, increase competitiveness, and stimulate local economic activities that are essential to strengthen domestic economic resilience, so that Indonesia can play a more optimal role in regional economic integration (Hermana et al. 2025).

The World Bank estimates that Indonesia's economic growth will only reach an average of 5.1% per year in the 2024-2026 period, while the IMF projects a similar figure until 2029. This target is not adequate to achieve the vision of Golden Indonesia 2045 and still faces structural challenges in strengthening the real sector and its supporting infrastructure (Nugraha 2025). Asian Development Bank in the report Ministry of Finance of the Republic of Indonesia (2019) emphasized that countries trapped in the middle-income trap generally face structural constraints such as low investment rates, suboptimal manufacturing growth, limited industrial diversification, and less conducive labor market conditions, which result in stagnant economic growth and hinder the transition to high-income countries.



Source: Federal Reserve Bank of St. Louis (2026)

Figure 1. Development of Indonesia's Gross Domestic Product for the Period 2000-2024

Indonesia's Gross Domestic Product stabilized after the 1998 crisis. The period 2001-2019 recorded an average growth of 5.1% per year, which placed Indonesia with the third highest growth in the G20 countries with the lowest volatility (OECD 2021). The COVID-19 pandemic caused an economic contraction in the second quarter of 2020 with GDP falling from Rp2,765,967,177 to Rp2,577,195,540. This slowdown was triggered by weakening private consumption, investment and domestic consumption which only grew 2.84% (yoy) in the first quarter of 2020, a figure that fell drastically from 5.01% in the same period in 2019 (Akhlas, 2020). Although the economy has surpassed pre-pandemic levels, recovery has not been fully achieved. The projection for the 2024-2026 period shows that GDP growth slowed to an average of 4.9% from 5% in the current year, due to normalization of commodity prices and global economic pressures (World Bank 2023).

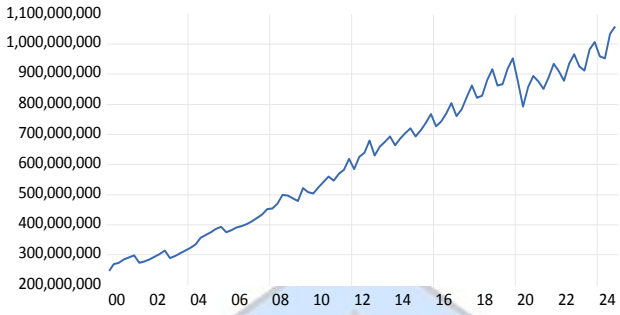
Theoretically, gross domestic product is influenced by the time horizon group. The short term is determined by aggregate demand movements such as household consumption, investment, government spending, net exports, interest rates, and external shocks. The medium

term depends on production capacity through capital accumulation, technological developments, and the quality of labor that adjusts more slowly than demand. Meanwhile, in the long term, growth is determined by structural factors such as the quality of education, national savings rates, technological innovation, and governance (Blanchard 2017).

Source: Federal Reserve Bank of St. Louis (2026)

Figure 2. Development of Government Expenditure in Indonesia in 2000-2024

Government spending plays an important role in developing countries through accelerating GDP growth. This crucial role is evident from the fiscal policy response to the global recession of 2008, where the stimulus implemented not only succeeded in restoring the economy, but also repositioning fiscal policy as the main instrument of economic development (Ahuja and Pandit 2020). The allocation of public funds for infrastructure, public services, and social welfare shows a positive correlation of government spending with growth (Ridwan and Nawir, I 2019). On the other hand, higher levels of public spending are often associated with higher growth rates, but large government size is often associated with lower growth (Afonso and Furceri 2010). The government's spending strategy is structured in stages: (1) in the short term, the main priority is directed to mitigating urgent problems such as extreme poverty and the prevalence of stunting; (2) In the medium to long term, the focus of state spending shifts to strengthening economic foundations through improving the quality of human capital, accelerating infrastructure development, and transforming institutions and regulatory systems (Indrawati and Satriawan 2024).



Source: Federal Reserve Bank of St. Louis (2026)

Figure 3. Development of Government Expenditure in Indonesia in 2000-2024

In addition to government spending, gross fixed capital formation (PMTB) also refers to expenditures made on the purchase of physical assets that contribute to a country's productive capacity. The existence of this investment is one of the main drivers of economic growth because the addition of capital allows production activities to take place more optimally (World Bank 2014). PMTB in Indonesia experienced positive growth despite fluctuations. However, a sharp contraction was seen in the second quarter of 2020 due to the COVID-19 pandemic which had direct implications for the decline in PMTB due to the restraint of business expansion, postponement of investment projects, and increasing economic uncertainty.

Source: Federal Reserve Bank of St. Louis (2026)

Figure 4. Export Development in Indonesia in 2000-2024

Indonesia's exports for the period 2000-2024 have experienced an upward trend, but there have been four significant declines related to global shocks: the economic slowdown of the early 2000s (2001-2002), the global financial crisis (2008-2009), the COVID-19 pandemic (2019-2020), and the recovery driven by rising commodity prices until 2024. This movement shows that Indonesia's real exports tend to increase in the long term, but are strongly influenced by global economic dynamics.

Previous research has shown mixed results, where Molefe and Choga (2017) finding a long-term negative relationship between government spending and economic growth, Juma, Ouyang, and Cai (2018) shows short- and long-term relationships between government spending, foreign direct investment, PMTB, inflation, and economic growth, while Onifade et al. (2020) indicates the negative impact of routine government spending on economic growth in the long run. This variation of findings confirms that the relationship between variables is contextual, especially in developing countries such as Indonesia. However, most previous studies still use multiple linear regression approaches or panel data that have not been able to capture the short- and long-term dynamics simultaneously and adjust mechanisms towards equilibrium.

Based on the background, inequality of empirical findings, and the lack of many studies that use a dynamic approach in Indonesia, this study aims to analyze the short-term and long-term relationship between government spending, Gross Fixed Capital Formation (PMTB), exports, and the Gross Domestic Product (GDP) in Indonesia for the period 2000-2024. Through the *Vector Error Correction Model* (VECM) approach, this study also measures the speed of adjustment towards equilibrium and projects the response and contribution of each variable to shocks that occur in the short, medium, and long term.

METHOD

Data Types and Sources

This research was carried out in Indonesia with a time period starting from September 2025 until completion. The data used covers a 24 year time span, from 2000 to 2024. This study uses quantitative secondary data in the form of an annual time series for the period 2000-2024.

Table 1. Research Variables and Operational Definitions

Variable	Operational Definition	Units	Source
Gross Domestic Product (GDP)	An increase in the production capacity of goods and services in an economy over a certain period. The data used is Real Gross Domestic Product	Billion Rupiah	Federal Reserve
Government Expenditure (GE)	Total government spending is in order to support economic activities and the provision of public services. The data used is Real Government Final Consumption Expenditure	Billion Rupiah	Federal Reserve
Gross Fixed Capital Formation (PMTB)	The allocation of expenditure for the acquisition of capital goods with a useful life exceeding one year, includes buildings, infrastructure, machinery, and production equipment. The data used is Real Gross Fixed Capital Formation	Billion Rupiah	Federal Reserve
Export (EX)	The export value of goods and services that has been adjusted to changes in price levels. The data used is Real Exports of Goods and Services	Billion Rupiah	Federal Reserve

Source: Research data

Data Analysis Techniques

This study uses a quantitative approach with the Vector Error Correction Model (VECM) model. VECM was first popularized by Engle and Granger to correct short-term imbalances against their long-term equilibrium. This model is a development of Vector Autoregressive (VAR) which is devoted to non-stationary data that is proven to have a cointegration relationship (Kilian and Lütkepohl 2017).

The general equations of VECM in this study are formulated as follows:

$$\Delta Y_t = \Pi Y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta Y_{t-i} + \varepsilon_t$$

where, by being a long-term cointegration relationship, $\Pi = \alpha\beta'\beta' Y_{t-1}\alpha$ is the coefficient of adjustment (speed of adjustment), and is the short-term dynamic coefficient.Γ_i

The error correction term (ECT) equation is expressed as:

$$ECT_{t-1} = Y_{t-1} - \beta_0 - \beta_1 G_{t-1} - \beta_2 I_{t-1} - \beta_3 X_{t-1}$$

VECM Testing Procedure

Before estimating with the VECM model, a series of diagnostic tests is required to ensure the validity of the model. The test procedures included stationarity tests, optimal lag length determination, VAR stability tests, Johansen cointegration tests, Granger causality analysis, VECM estimation, and Impulse Response Function (IRF) and Variance Decomposition (FEVD) analysis. All tests in this study were processed using EViews software.

LITERATURE REVIEW

Theoretically, gross domestic product is influenced by the time horizon. The short term is determined by movements in aggregate demand, such as household consumption, investment, government spending, net exports, interest rates, and external shocks. The medium term depends on production capacity through capital accumulation, technological development, and labor quality, which adjust more slowly than demand. Meanwhile, in the long term, growth is determined by structural factors such as the quality of education, the national savings rate, technological innovation, and governance (Blanchard, 2017:283-298).

RESULTS AND DISCUSSION

Before estimating the VECM model, all raw data consisting of Gross Domestic Product (GDP), Government Expenditure (G), Gross Fixed Capital Formation (PMTB), and Exports (EX) in the period 2000-2024 were first transformed into the form of natural logarithms (Ln). This transformation aims to stabilize data variance, equalize the unit scale between different variables, and reduce the distance or difference in value between data that has a long range so that the interpretation of the elasticity coefficient becomes more economically meaningful (Gujarati 2025).

Data Stationery Test (Root Test)

The stationarity test in this study was carried out using the Augmented Dickey Fuller (ADF Test) method to detect the presence of unit roots in each variable. The decision-making criteria were based on a probability value that was smaller than the significance level of 5 percent (α = 0.05), so the data was declared stationary. On the other hand, if the data is not stationary at the level level, a differentiation process is carried out until the data becomes stationary (Engle and Granger 1987).

Table 2. Stationarity Test Results at the Level and First Difference

Variable	Level		1st Difference	
	t-Statistic	Prob.	t-Statistic	Prob.
LOG_PDB	-2.890926	0.7940	-2.891234	0.0000
LOG_GE	-2.891550	0.0320	-2.891550	0.0000
LOG_PMTB	-2.892879	0.1929	-2.892200	0.0002
LOG_EX	-2.890926	0.6097	-2.891234	0.0000

Source: Research data

Based on the results of the unit root test, the variables GDP, PMTB, and EX are not stationary at the level level because they have a probability value (p-value) greater than the significance level of 5% (α = 0.05). In contrast, the GE variable was found stationary at the level level with a probability value smaller than 0.05. Based on these results, the test was continued at the first difference level and the results of all variables were stationary after the first difference was carried out, as evidenced by a p-value of less than 0.05.

Optimal Lag Test

The selection of the optimal lag is based on the evaluation of several statistical criteria, namely Likelihood Ratio (LR), Final Prediction Error (FPE), Akaike Information Criterion

(AIC), Schwarz Criterion (SC), and Hannan Quinn Criterion (HQ). In this study, the author uses guidelines from Gujarati & Porter (2025) where the lag with the minimum AIC value is the most optimal.

Table 3. Results of the Optimum Lag Test

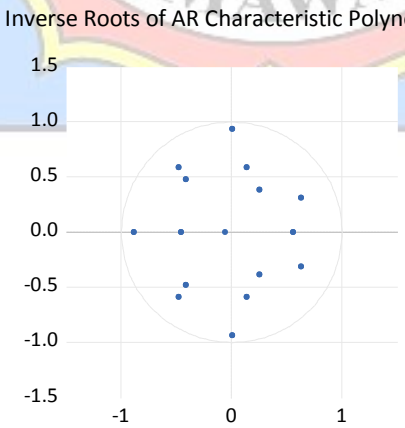
Lag	LogL	LR	FPE	AIC	SC	HQ
0	809.5647	OR	2.40e-13	-17.70472	-17.59435*	-17.66019*
1	826.2021	31.44648	2.37e-13	-17.71873	-17.16689	-17.49610
2	849.7453	42.42950	2.01e-13	-17.88451	-16.89121	-17.48377
3	873.2076	40.22101	1.72e-13	-18.04852	-16.61374	-17.46967
4	894.9105	35.29712	1.53e-13*	-18.17386*	-16.29761	-17.41691
5	904.1250	14.17618	1.81e-13	-18.02473	-15.70701	-17.41691
6	912.1257	11.50537	2.21e-13	-17.84892	-15.08973	-16.73576
7	921.0461	12.15531	2.67e-13	-17.69332	-14.49267	-16.40206
8	942.7504	27.66700*	2.46e-13	-17.81869	-14.17656	-16.34932

Source: Research data

The estimated results show that the AIC value reaches the most optimal at the 4th lag.

VAR Stability Test

The stability test was carried out by examining the Inverse Roots of AR Characteristic Polynomial of the estimated model. A model is said to be stable and valid if the entire modulus of its characteristic root is less than 1 and is within the circle of the unit.



Source: Research data

Figure 5. VAR Stability Test Results

Referring to the stability test results in the Figure, it can be seen that the entire characteristic root point is inside the unit circle. Quantitatively, the highest modulus value recorded is less than 1.

Granger's Causality Test

This test is used to determine the direction of the causal relationship between variables, whether it is one-way, two-way, or there is no causal relationship (Gujarati and Porter 2025). This test was estimated using the optimal lag length of four (4) that had been determined in the previous optimum lag test and using a significance threshold of 5%.

Table 4. Causality Test Results

Null Hypothesis	Obs	F-statistic	Prob.
D(LOG_GE) does not Granger Cause D(LOG_PDB)	96	1.62070	0.1762
D(LOG_PDB) does not Granger Cause D(LOG_GE)		1.57942	0.1869
D(LOG_PMTB) does not Granger Cause D(LOG_PDB)	96	1.63999	0.1714
D(LOG_PDB) does not Granger Cause LOG_I		3.72391	0.0076
D(LOG_EX) does not Granger Cause D(LOG_PDB)	96	2.28130	0.0669
D(LOG_PDB) does not Granger Cause D(LOG_EX)		0.95757	0.4350
D(LOG_PMTB) does not Granger Cause D(LOG_GE)	96	1.69156	0.1592
D(LOG_GE) does not Granger Cause D(LOG_PMTB)		3.81469	0.0066
D(LOG_EX) does not Granger Cause D(LOG_GE)	96	2.24329	0.0708
D(LOG_GE) does not Granger Cause D(LOG_EX)		1.83149	0.1300
D(LOG_EX) does not Granger Cause D(LOG_PMTB)	96	4.33938	0.0030
D(LOG_PMTB) does not Granger Cause D(LOG_EX)		1.36381	0.2531

Source: Research data

From the results obtained above, it is known that those who have a causal relationship are those who have a probability value less than 0.05.

1. Government spending has no causal relationship with gross domestic product, shown by probability values of 0.1762 and 0.1869 ($p > 0.05$).
2. Gross Fixed Capital Formation did not affect GDP ($p=0.1714$), but GDP significantly affected PMTB ($p=0.0076$).
3. Exports have no causal relationship with GDP, as evidenced by probability values of 0.0669 and 0.4350 ($p > 0.05$).
4. Gross Fixed Capital Formation did not affect government expenditure ($p=0.1592$), but government expenditure significantly affected PMTB ($p=0.0066$).
5. Exports have no causal relationship with government spending, shown by probability values of 0.0708 and 0.1300 ($p > 0.05$).
6. Exports significantly affected Gross Fixed Capital Formation ($p=0.0030$), but Gross Fixed Capital Formation did not affect exports ($p=0.2531$).

Cointegration Test

This test is used to identify the existence of a long-term equilibrium relationship between variables. The zero hypothesis states that there is no cointegration equation. If the trace statistic value or maximum eigenvalue is greater than the critical value at α=5%, then H0 is rejected and it is concluded that there is a cointegration relationship.

Table 5. Cointegration Test (Trace Values)

Hypothesized No. of CE (s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.289532	87.65919	47.85613	0.0000
At most 1 *	0.215957	55.52707	29.79707	0.0002
At most 2*	0.198143	32.65763	15.49471	0.0001
At most 3 *	0.118911	11.90007	3.841465	0.0006

Source: Research data

Based on the results of the trace statistics, the zero hypothesis at the rank of None was rejected because the trace statistical value of 87.65919 was greater than the critical value of 47.85613 at a significance level of 5% with a probability of 0.0000. Rejection of the null hypothesis also occurs in ranks At most 1, At most 2, and At most 3, where all trace statistical values remain above critical values at the same level of significance. These results show that there is a long-term relationship so the appropriate model specification for advanced estimation is the Vector Error Correction Model (VECM).

Long-Term VECM Estimation

Long-term VECM estimation aims to analyze the equilibrium relationships between variables over a long period of time after the system has reached a stable state. The test was carried out at a significance level of 5% with a t-table value of 1.9849. The following is a summary of the estimated results for each endogenous variable.

Table 6. Long-Run VECM Estimation Results

Endogenous Variable	Variable Exoges	Coefficients	Standard Error	T-Statistics
D(LOG_PDB(-1))	D(LOG_GE(-1))	0.592106	0.14762	4.01091
	D(LOG_PMTB(-1))	-0.827929	0.19449	-4.25700
	D(LOG_EX(-1))	0.173507	0.11390	1.52331
	C	-0.010347		

Source: Research data

Based on the results of the estimates in Table 2, it is known that in the long term there are two variables that have a significant effect on Indonesia's Gross Domestic Product (GDP), namely government expenditure and PMTB, while exports have not been proven to have a significant effect.

Based on the results of long-term VECM estimation, the government expenditure variable has a positive coefficient of 0.592106 with a t-statistic of 4.01091 which exceeds the t-table value (1.9849), so that government expenditure is proven to have a significant and positive effect on GDP where every one unit increase will increase GDP by 0.592106 units assuming other variables are constant. On the other hand, the PMTB variable has a negative coefficient of -0.827929 with a t-statistic of -4.25700 which also exceeds the t-table value, so that PMTB has a significant but negative effect on GDP, meaning that every increase in PMTB of one unit will actually decrease GDP by 0.827929 units. Meanwhile, the export variable has a positive coefficient of 0.173507 with a t-statistic of 1.52331 which is smaller than the t-table, so exports are not proven to have a significant influence on GDP in the long term. A constant value of -0.010347 indicates that when all independent variables are zero, GDP is expected to fall by 0.010347 units, although this interpretation has economic limitations because the scenario is hypothetical.

Short-Term VECM Estimation

Short-term VECM estimation aims to analyze the dynamic influence of changes in independent variables on changes in GDP over a short period, before the system adjusts towards long-term equilibrium. The model used is VECM(4) with an optimal lag of 4. The test was carried out at a significance level of 5% with a t-table value of 1.9849.

Table 7. Short-Term VECM Estimated Results

Endogenous Variable	Variable Exoges	Coefficients	Std. Error	t-Statistic	R-Square
D(LOG_PDB,2)	Coint Eq 1	0.019402	0.12063	0.16084	
	D(LOG_PDB(-1),2)	-0.941207	0.19680	-4.78246	
	D(LOG_PDB (-2),2)	-0.817435	0.20858	-3.91899	R-square
	D(LOG_PDB (-3),2)	-0.552752	0.18871	-2.92917	0.492708Adj
	D(LOG_PDB (-4),2)	-0.321645	0.12992	-2.47569	R-square
	D(LOG_GE(-1),2)	0.025266	0.06528	-0.38702	0.379235
	D(LOG_GE(-2),2)	0.022049	0.05796	-0.38045	
	D(LOG_GE(-3),2)	0.000970	0.04517	-0.02148	

D(LOG_GE (-4),2)	-2.50E-05	0.02847	-0.00088
D(LOG_PMTB(-1),2)	0.031223	0.09562	0.32655
D(LOG_PMTB(-2),2)	-0.010341	0.07924	-0.13050
D(LOG_PMTB(-3),2)	-0.029302	0.06088	-0.48132
D(LOG_PMTB(-4),2)	-0.016365	0.04402	-0.37171
D(LOG_EX(-1),2)	0.039677	0.04222	0.93975
D(LOG_EX(-2),2)	0.060325	0.04769	1.26504
D(LOG_EX-3),2)	0.012222	0.04468	0.27357
D(LOG_EX(-4),2)	0.011661	0.03470	0.33606
C	-2.28E-05	0.00112	-0.02032

Source: Research data

Based on the estimated results in the Table, it is known that in the short term the Gross Domestic Product (GDP) variable is only significantly influenced by the value of GDP itself in all lags 1 to lag 4. The negative coefficient that is getting smaller as the lag increases shows that the GDP growth of the previous period tends to reduce GDP growth in the current period, with the greatest influence coming from lag 1 (coefficient -0.941207) and the smallest influence from lag 4 (coefficient -0.321645).

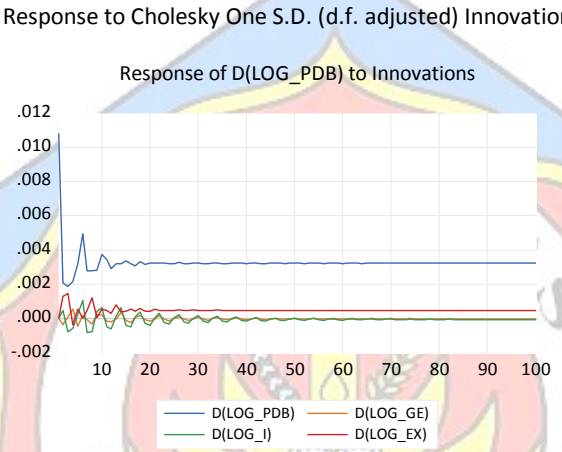
Meanwhile, the variables of government spending, PMTB, and exports were not proven to have a significant influence on GDP in the short term on the overall lag. This can be seen from the t-statistical value of all these variables which are below the t-table (1.9849). These findings indicate that shocks or changes in government spending, investment, and exports do not directly impact GDP growth in a short period of time.

The error correction term coefficient (CointEq1) of 0.019402 with a t-statistically of 0.16084 is not statistically significant. This shows that the speed of adjustment towards long-term equilibrium is relatively slow and insignificant, or in other words, the deviation from the long-term equilibrium is not immediately corrected in the short term. The constant value of -0.0000228 with a t-statistic of -0.02032 is insignificant, which means that in the absence of changes from the four variables (GDP itself, government spending, PMTB, and exports), there is no systematic change in GDP in the short term.

Based on the results of the goodness of fit (adjusted R-square) test, the ability of exogenous variables to explain GDP variables in the short term is 37.92% (from the adjusted R-square value of 0.379235 in the original table), while the remaining 62.08% is influenced by factors outside the research model such as household consumption, interest rates, inflation, exchange rates, and other external shocks.

Impulse Response Function (IRF) Analysis

IRF is used to describe how a shock to one variable affects other variables in the system over time (Sims and Zha 1999). The horizon used is 24 periods following the approach Ronayne (2011).



Source: Research data

Figure 6. Impulse Response Function PDB Results

The results of the analysis of the Impulse Response Function (IRF) of GDP on government expenditure variables, gross fixed capital formation and exports fluctuated in the initial period and then moved towards stable conditions in the next period. The development of the GDP response from the 1st to 100th period can be explained as follows:

1. The D(LOG_PDB) response to internal shocks showed large fluctuations in periods 1 to 9 characterized by a sharp decrease from 0.010836 in the first period to 0.002074 in the second period as well as changes in values in subsequent periods. Starting from the 10th period, the response began to stabilize and then moved in a narrow range in the range of 0.00319 to 0.00325 until the 100th period.
2. The response of D(LOG_PDB) to the shock D(LOG_GE) showed large fluctuations in the 1st to 14th period with changes in positive and negative values. Starting from the 15th period the response began to stabilize and then moved in a narrow range close to zero until the end of the 100 period.
3. The response of D(LOG_PDB) to the shock D(LOG_PMTB) showed large fluctuations in period 1 to the 19th period, characterized by a change in response that alternated between

positive and negative values in the initial period. Starting from the 20th period, the response began to stabilize and then moved in a narrow range close to zero until the 100th period.

4. The response of D(LOG_PDB) to the shock D(LOG_EX) showed large fluctuations in period 1 to the 19th period. Starting from the 20th period the response began to stabilize and then moved in a narrow range in the range of around 0.00047 until the 100th period.

Forecast Error Variance Decomposition (FEVD) Analysis

This analysis is used to measure the relative contribution of each shock in explaining the variation of a variable over various time horizons, both short-term and long-term (Belsley and Kontoghiorghes 2009).

Table 8. Variance Decomposition Results

Period	S.E.	D(LOG_PDB)	D(LOG_GE)	D(LOG_PMTB)	D(LOG_EX)
1	0.010103	100.0000	0.000000	0.000000	0.000000
2	0.014485	99.64086	0.157332	0.154402	0.047403
4	0.019832	96.86951	2.000370	0.550546	0.179906
8	0.027849	93.98538	4.132711	1.322713	0.639198
12	0.033308	92.75695	4.828674	1.723324	0.691049
16	0.038204	92.47492	4.980283	1.811863	0.732935
20	0.042547	92.29419	5.097228	1.843805	0.764974
24	0.046475	92.13249	5.202917	1.882432	0.782159
40	0.059680	91.84587	5.388455	1.947187	0.818510
100	0.093846	91.58380	5.559437	2.004440	0.852321

Source: Research data

Based on the results of the FEVD, in the short term (periods 1-4) the variation in GDP is almost entirely explained by the shocks of the variables themselves, with the contribution decreasing from 100% in period 1 to 96.87% in period 4, while the cumulative contribution of government spending, PMTB, and exports is still below 2%. Entering the medium to long term, the contribution of government expenditure increased from 4.83% in period 12 to stable at around 5.44% until period 100, the contribution of PMTB increased from 0.55% to 2.00%, while the contribution of exports only reached 0.85% in period 100. Overall, up to the 100-period horizon, Indonesia's GDP variance is still dominated by shocks from the GDP variables themselves (91.58%), while the three independent variables cumulatively contribute only 8.42%, which confirms that the ability of the three variables to explain GDP fluctuations is very limited compared to other factors outside the model.

The Effect of Government Spending on Gross Domestic Product in the Long and Short Term

In the long term, government spending has proven to have a positive and significant effect on Indonesia's GDP, where every increase in one unit of state spending will increase GDP by 0.592106 units. These results are in line with the theory Musgrave (1989) which emphasizes the dominance of the role of government at the beginning of the development phase, especially in providing high investment with long-term returns that are difficult for the private sector to achieve. These findings are also supported by Jama et al. (2024) which confirms the validity of Keynesian theory in ASEAN-5 countries, that government spending, capital formation, and labor force significantly spur economic growth both in the short and long term. Thus, government spending in Indonesia allocated to infrastructure, public services, and social protection effectively drives domestic economic growth in the long run.

In contrast, in the short term, government spending has no significant effect on GDP in the overall lag. The main cause is the mechanism of fiscal policy transmission that is not instant due to recognition lag, decision lag, and implementation lag, so that the new policy response can only be felt after more than a quarter (Blanchard and Perotti 1999). These findings are in line with Safari & Fikri (2016) which concludes that government spending hampers GDP due to an unproductive spending structure, where the budget is absorbed for subsidies and debt interest obligations. Ilzetzki et al. (2013) also states that the cumulative multiplier value for developing countries is negative and insignificant, where government consumption is pushed by other components of GDP such as investment, private consumption, or net exports.

The Effect of Gross Fixed Capital Formation and Gross Domestic Product in the Long and Short Term

In the long term, PMTB has a significant but negative effect on Indonesia's GDP, where every increase in one unit of PMTB actually decreases GDP by 0.827929 units. This result is in contrast to Solow's theory which positions capital formation as a fundamental determinant of production capacity expansion. This divergence is explained through the crowding out phenomenon (Sundararajan and Thakur 1980), where capital accumulation does not always guarantee growth if it is not followed by efficient resource allocation (Blomstrom, Lipsey, and Zejan 1994). Linen (2010) through the New Structural Economics approach, it is explained that capital scarcity and low quality of infrastructure and institutions cause the allocation of

resources to capital-intensive sectors to be less competitive. Pasara & Garidzirai (2020) emphasized that the role of capital investment remains highly dependent on the effectiveness of government policies and the efficiency of resource allocation. This is reinforced by Bonokeling et al. (2022) which indicates a negative relationship between investment and long-term economic growth in Indonesia.

In the short term, PMTB has no significant effect on GDP. Kydland & Prescott (1982) Explains that the positive relationship between the shadow price of capital and investment activity is considered inconsistent because investment decisions are made based on state variables throughout the economy, so the relationship between investment and output is not always direct or proportional. Investment behavior is also influenced by the project completion time horizon, where Mayer (1960) indicates an average of six months lag between investment decision and the start of physical construction, as well as more than one year until project completion. Market imperfections cause investments not always to flow to the sectors with the highest rates of return, resulting in capital miss and low productivity (Banerjee and Duflo 2005). Squirrelly (2025) emphasizing that massive investment in Indonesia requires synergy with increasing labor productivity and TFP, while Tammar (2021) recommend that policymakers direct government spending to productive projects and provide an appropriate environment for local investors.

The Influence of Exports and Gross Domestic Product in the Long and Short Term

In the long term, exports do not have a significant effect on Indonesia's GDP. This insignificance is allegedly caused by Indonesia's export performance which is not followed by strengthening productivity and diversifying added value in manufactured products. Felipe et al. (2019) It shows that the acceleration of domestic output cannot be separated from the capacity of the external sector, where if economic growth is limited by the balance of payments, the current account will continue to deteriorate. In addition, Lee et al. (2023) stated that the Export Led Growth hypothesis can be valid if developing countries have access to a wide common market, in contrast to the condition of Indonesia which still implements various forms of trade protection through non-tariff barriers. As a result, exports are less competent in spurring long-term development due to their high dependence on world market fluctuations, the threat of protection policies, and the dualistic nature of the economy that hinders the integration of the export sector with the domestic economy (Aliman and Purnomo 2001).

In the short term, exports also do not have a significant effect on GDP. Theoretically, the global economic structure dominated by central countries has a surplus of industrial innovation, while peripheral countries tend to transfer some of the results of their technical progress to the center, which exacerbates low productivity in developing countries due to capital scarcity. In aggregate, based on the adjusted R-square value of 37.92%, the ability of government spending, PMTB, and exports in explaining short-term GDP is only 37.92%, while the remaining 62.08% is influenced by external factors such as household consumption, interest rates, inflation, exchange rates, and other external shocks. This confirms that there are other determinants that are more significant in influencing economic dynamics in the short period.

CONCLUSION

In the long run, government spending is proving to be a major driver of Indonesia's economic growth as any increase in state spending is followed by a significant increase in GDP. On the other hand, the increase in PMTB is followed by a decline in GDP in the long term, which indicates that physical investment in Indonesia is still concentrated in low-value-added sectors and has not been supported by efficient resource allocation. Meanwhile, exports have not been proven to have a significant influence on GDP in the long term due to weak value-added diversification and limited international market access.

In the short term, these three independent variables do not significantly affect GDP. This is due to the time lag in the fiscal policy transmission mechanism and the investment process that takes time from the planning stage to project completion. These findings are reinforced by the results of the IRF which show that shocks in government spending, PMTB, and exports only cause temporary fluctuations in GDP in the initial period, then the response subsides towards near-zero stability. Furthermore, the results of the FEVD reveal that the contribution of the three independent variables in explaining the GDP variance is very limited, which is only about 8.42% cumulatively, while the remaining 91.58% is explained by the GDP variable itself as well as other factors outside the model such as household consumption, interest rates, inflation, exchange rates, and external shocks.

The implications of this research for economics in general are that the effectiveness of fiscal policy and investment in driving economic growth is highly dependent on a country’s structural context, including the quality of infrastructure, the efficiency of resource allocation, and the level of total factor productivity. The negative relationship between GFCF and GDP in

the long run serves as a warning that the accumulation of physical capital without improvements in productivity and sectoral diversification can actually become a burden on the economy. Therefore, the government needs to direct public spending toward productive projects with long-term impacts, improve investment efficiency in high-value-added sectors, strengthen synergies between physical investment and improvements in human capital and technology, and expand access to international markets.

REFERENCES

Afonso, António, and Davide Furceri. 2010. "Government Size, Composition, Volatility and Economic Growth." *European Journal of Political Economy* 26(4):517–32. doi:10.1016/j.ejpoleco.2010.02.002.

Ahuja, Deepti, and Deepak Pandit. 2020. "Public Expenditure and Economic Growth : Evidence from the Developing Countries." *FIIB Business Review* 1–9. doi:10.1177/2319714520938901.

Aliman, and A. Budi Purnomo. 2001. "Kausalitas Antara Ekspor Dan Pertumbuhan Ekonomi *." *Jurnal Ekonomi Dan Bisnis Indonesia* 16(2):122–37.

Banerjee, Abhijit V, and Esther Duflo. 2005. "Growth Theory Through the Lens of Development Economics." in *Handbook of Economic Growth*. Vol. 1, edited by P. Aghion and S. N. Durlauf. Elsevier B.V.

Belsley, David A., and Erricos John Kontoghiorghes. 2009. *Handbook of Computational Econometrics*. 1st ed. edited by D. A. Belsley and E. J. Kontoghiorghes. London: John Wiley & Sons, Ltd.

Blanchard, Olivier. 2017. *Macroeconomics Global Edition*. Sevent. England: Pearson Education.

Blanchard, Olivier, and Roberto Perotti. 1999. *An Empirical Characterization of the Dynamic Effects of Changes in Government Spending and Taxes On Output*. 7269. doi:10.3386/w7269.

Blomstrom, Magnus, Robert E. Lipsey, and Mario Zejan. 1994. *What Explains Developing Country Growth*. w4132. doi:10.3386/w4132.

Bonokeling, Daniel Eka, Maimun Sholeh, and Mispandi. 2022. "The Effect of Investment , National Government Expenditure , Exports , and Imports on Indonesia ' s Economic Growth Investment in Economic Growth." *Jurnal Ekonomi Dan Pembangunan* 30(1):56–69. doi:10.14203/JEP.30.1.2022.56-.

Engle, Robert F., and C. W. J. Granger. 1987. "Co-Integration and Error Correction: Representation, Estimation, and Testing." *Econometrica* 55(2):251. doi:10.2307/1913236.

Felipe, Jesus, Matteo Lanzafame, and Gemma Estrada. 2019. "Is Indonesia's Growth Rate Balance of Payments Constrained? A Time-Varying Estimation Approach." *Review of Keynesian Economics* 7(4):537–53. doi:10.4337/roke.2019.04.08.

Gujarati, Damodar N., and Dawn C. Porter. 2025. *Basic Econometrics*. 7th ed. New York: McGraw-Hill.

Gujarati, Darmodar N. 2025. *Basic Econometric*. 7th ed. New York: McGraw-Hill.

Hermana, Alya Adofianti, Harsya Maulana Fajrin, Yayu Nova Reva, and Mohamad Zein. 2025. "Dampak MEA (Masyarakat Ekonomi Asean) Terhadap Pertumbuhan Ekonomi

Indonesia Di Era Globalisasi." *Inisiatif: Jurnal Ekonomi, Akuntansi Dan Manajemen* 4(1):51–62. doi:10.30640/inisiatif.v4i1.3455.

Ilzetzki, Ethan, Enrique G. Mendoza, and Carlos A. Vegh. 2013. "How Big (Small?) Are Fiscal Multipliers?" *Journal of Monetary Economics* 60:239–54. doi:10.1016/j.jmoneco.2012.10.011.

Indrawati, Sri Mulyani, and Elan Satriawan. 2024. "Indonesia ' s Fiscal Policy in the Aftermath of the Pandemic." *Bulletin of Indonesian Economic Studies* 60(1):1–33. doi:10.1080/00074918.2024.2335967.

Jama, Abdikarim Bashir, Siti Nurazira Mohd Daud, and Sabri Nayan. 2024. "The Relationship between Government Expenditure and Economic Growth in ASEAN-5 Countries." *Journal of Infrastructure, Policy and Development* 8(7). doi:10.24294/jipd.v8i7.4329.

Juma, Rashid Saleh, Hongbing Ouyang, and Jinghan Cai. 2018. "The Effect of Government Expenditure on Economic Growth : The Case of Tanzania Using VECM Approach." *Journal of Economics and Sustainable Development* 9(2):144–55.

Kementerian Keuangan Republik Indonesia. 2019. *Kerangka Ekonomi Makro Dan Pokok-Pokok Kebijakan Fiskal Tahun 2020: APBN Untuk Akselerasi Daya Saing Melalui Inovasi Dan Penguatan Kualitas Sumber Daya Manusia*. Jakarta, Indonesia.

Kilian, Lutz, and Helmut Lütkepohl. 2017. *Structural Vector Autoregressive Analysis*. Cambridge: Cambridge University Press.

Kydland, Finn E., and Edward C. Prescott. 1982. "Time to Build and Aggregate Fluctuations." *Econometrica* 50(6):1345–70. doi:10.2307/1913386.

Lee, Cheng-wen, Budi Hasyim, and Jan-yan Lin. 2023. "The Export-Led Growth Hypothesis : Some Evidence from the 8-ASEAN." *Journal of Applied Finance & Banking* 13(2):1–12. doi:10.47260/jafb/1321.

Lin, Justin Yifu. 2010. *New Structural Economics A Framework for Rethinking Development*. WPS5197. doi:10.2307/41261429.

Mayer, Thomas. 1960. "Plant and Equiptment Lead Times." *The Journal of Business* 33(2):127–32. doi:10.1086/294329.

Molefe, Kagiso, and Ireeen Choga. 2017. "Government Expenditure and Economic Growth in South Africa: A Vector Error Correction Modelling and Granger Causality Test." *Journal of Economics and Bahaviour Studies* 9(4):164–72. doi:https://doi.org/10.22610/jebs.v9i4(J).1831.

Musgrave, R. .., and P. .. Musgrave. 1989. *Public Finance In Theory and Practice Fith Edition*. 5th ed. edited by S. . Stratford. United State.

Nugraha, Saputra &. 2025. "Bank Dunia-IMF Ramalkan Pertumbuhan Ekonomi RI 2025-2026 Meleset Dari Ambisi Presiden Prabowo."

OECD. 2021. *OECD Economic Surveys INDONESIA March 2021*. Paris.

Onifade, Stephen Taiwo, Savaş Çevik, Savaş Erdoğan, Simplice Asongu, and Festus Victor Bekun. 2020. "An Empirical Retrospect of the Impacts of Government Expenditures on Economic Growth : New Evidence from the Nigerian Economy." *Journal of Economic Structures* 9(6). doi:10.1186/s40008-020-0186-7.

Pasara, Michael Takudzwa, and Rufaro Garidzirai. 2020. "Causality Effects among Gross Capital Formation , Unemployment and Economic Growth in South Africa." *Economies* 8(2). doi:10.3390/economies8020026.

Ridwan, and S. Nawir, I. 2019. *Buku Ekonomi Publik*. Edisi Pert. edited by F. Ridwan, M. Yogyakarta, Indonesia: Pustaka Pelajar.

Ronayne, David. 2011. *Which Impulse Response Function?* 971. England.

Safari, Menik Fitriana, and Aula Ahmad Hafidh Saiful Fikri Fikri. 2016. "ANALISIS PENGARUH EKSPOR, PEMBENTUKAN Modal Dan Pengeluaran Pemerintah Terhadap Pertumbuhan Ekonomi Indonesia." *Repository UNY* 216–27.

Santosa, Perdana Wahyu. 2025. "PDB Tumbuh 5,04 Persen: Kebangkitan Investasi Atau Ilusi Eksternal?"

Sims, Christopher A., and Tao Zha. 1999. "Error Bands for Impulse Responses." *Econometrica* 67(5):1113–55. doi:10.1111/1468-0262.00071.

Sundararajan, V., and Subhash Thakur. 1980. "Public Investment , Crowding Out , and Growth : A Dynamic Model Applied to India and Korea." *Palgrave Macmillan Journals* 27(4):814–55. doi:10.2307/3866958.

Tammar, Amine. 2021. "The Impact of Government Spending on the Economic Growth of a Sample of Developing Countries Using Panel Data." *Theoretical and Applied Economics* XXIX(4):169–78.

World Bank. 2014. *Indonesia Economic Quaterly Hard Choices*. Washington, Dc, U.S.A.

World Bank. 2023. *Climate Action For Devopment*.