



Government Foreign Debt and Macroeconomic Stability in Indonesia

La Ode Suriadi[✉], ²Rostin, ³Andriani ⁴Puspitaningsih, Surianti, ⁵Puspa Dewangga

^{1,2,3,4,5}Development Economics Study Program, Faculty of Economics and Business, Halu Oleo University

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This study examines the short- and long-run relationships between Government Foreign Debt (GFD) and Indonesia's macroeconomic stability using the Vector Error Correction Model (VECM) and annual time-series data covering the period 1995–2024. The analysis incorporates five key variables: Government Foreign Debt (GFD), inflation, economic growth, the exchange rate, and investment. Data were obtained from Statistics Indonesia (BPS), Bank Indonesia, the Ministry of Finance, and relevant international publications. The VECM framework was employed following unit root and cointegration tests to capture both the long-run equilibrium relationships and the short-run dynamic adjustments among the variables. The estimation results indicate that GFD exerts significant long-run effects by increasing inflation, depreciating the exchange rate, and constraining economic growth. In the short run, however, its effects are more limited, although debt-financed fiscal spending may provide temporary support for economic activity. The Impulse Response Function (IRF) analysis further shows that shocks to GFD generate negative responses in economic growth and investment while increasing inflation and causing exchange rate depreciation. Variance Decomposition (VD) results demonstrate that the contribution of GFD to fluctuations in economic growth, inflation, and the exchange rate becomes increasingly substantial over time. Overall, the findings suggest that Government Foreign Debt plays a critical yet potentially risky role in maintaining macroeconomic stability. Therefore, prudent debt management should prioritize productive long-term financing to minimize external vulnerabilities, maintain fiscal sustainability, and strengthen long-term macroeconomic stability.

INTRODUCTION

In most developing countries, limited domestic savings have compelled governments to rely on debt as a primary source of development financing (Todaro & Smith, 2020). Indonesia is among the countries that extensively utilize government foreign debt to finance development programs. In recent years, the government's foreign debt-to-GDP ratio has increased from approximately 30% in 2019 to nearly 40% in 2023 (World Bank, 2023; IMF, 2023). Although this level remains below the statutory fiscal threshold established by the State Finance Law, the upward trend remains economically concerning because it narrows fiscal policy space and increases exposure to exchange rate shocks. Consequently, rising external debt may pose risks to macroeconomic stability, particularly by generating inflationary pressures and increasing uncertainty in the investment climate (Olivia, 2021). Historical evidence also shows that several developing countries have experienced fiscal crises due to weak public debt management (Reinhart & Rogoff, 2010).

From a theoretical perspective, government foreign debt is closely linked to macroeconomic stability through several transmission channels. First, external borrowing may influence inflation dynamics, particularly when debt-financed fiscal expansion increases aggregate demand beyond productive capacity, thereby generating inflationary pressures. Second, government foreign debt is inherently exposed to exchange rate risk because depreciation of the domestic currency increases the domestic value of foreign-currency-denominated liabilities, potentially worsening fiscal balances and amplifying macroeconomic volatility. Third, debt accumulation may affect economic growth and investment through both demand-side and supply-side mechanisms. In the short run, foreign debt can stimulate economic growth by relaxing fiscal constraints and financing productive public expenditure, consistent with Keynesian theory. In the long run, however, excessive debt may crowd out private investment, increase uncertainty, and

weaken growth prospects, as proposed by the Debt Overhang hypothesis.

These interactions suggest that government foreign debt does not operate in isolation but is dynamically interconnected with inflation, exchange rate movements, investment, and economic growth. Understanding these simultaneous relationships is therefore essential for evaluating the overall impact of government foreign debt on Indonesia's macroeconomic stability.

The substantial increase in Indonesia's government foreign debt underscores the need for further investigation. This study focuses on Indonesia's government foreign debt over the period 1995–2024, emphasizing its dynamic interactions with four key indicators of macroeconomic stability: inflation, economic growth, the rupiah exchange rate, and investment. These variables were selected because they serve as fundamental indicators of macroeconomic stability and represent the primary transmission channels through which fiscal policy affects the economy.

A substantial body of literature has examined the relationship between public debt and economic performance. Early and influential studies by Barro (1996) and Panizza & Presbitero (2013) documented the adverse effects of high public debt on economic growth, whereas Sutherland & Hoeller (2012) emphasized the inflationary and fiscal risks associated with rising debt levels. Other studies, such as Merola (2013), highlighted the broader macroeconomic consequences of public debt, including exchange rate volatility and increased financial vulnerability. In the Indonesian context, however, empirical evidence remains relatively limited. For example, Simorangkir & Adamanti (2010) primarily examined the impact of public debt on economic growth without explicitly considering the responses of the exchange rate and investment, both of which are important transmission channels through which external debt affects macroeconomic stability.

The existing literature provides several important theoretical perspectives. From the Keynesian perspective (Schumpeter & Keynes,

1936; Mankiw, 2013), public debt can generate positive short-run effects by financing fiscal stimulus that boosts aggregate demand and supports economic recovery. In contrast, the Debt Overhang hypothesis (Krugman, 1988) argues that excessive debt accumulation imposes long-term economic burdens by discouraging private investment and constraining economic growth. More recent studies suggest that the macroeconomic effects of public debt are not universal but depend largely on debt composition, institutional quality, and policy credibility (Panizza & Presbitero, 2013; IMF, 2024; Akyüz, 2017). Consequently, contemporary research has shifted away from identifying a universal debt threshold toward understanding how institutional capacity and macroeconomic conditions shape the transmission of debt to the real economy.

Despite the growing literature on public debt and macroeconomic performance, empirical studies in the Indonesian context continue to exhibit several important limitations. Most previous studies have examined the impact of public debt on a single macroeconomic indicator, such as economic growth, inflation, or fiscal stability, using partial or single-equation approaches (Simorangkir & Adamanti, 2010; Olivia, 2021). These studies generally focus on the direct effects of debt or fiscal stimulus on economic growth while giving limited attention to the interconnected responses of inflation, exchange rate dynamics, and investment behavior. Consequently, the mechanisms through which government foreign debt simultaneously affects inflation, exchange rates, investment, and economic growth remain insufficiently understood (Merola, 2013; Sutherland & Hoeller, 2012). Furthermore, relatively little empirical attention has been devoted to distinguishing between short-run adjustments and long-run equilibrium relationships within an integrated macroeconomic framework (Panizza & Presbitero, 2013).

This study addresses these research gaps by examining the dynamic interactions among government foreign debt, inflation, exchange

rates, investment, and economic growth within a unified macroeconomic framework for Indonesia over the period 1995–2024. Unlike previous studies that primarily focus on the direct effects of debt on economic growth or fiscal performance, this study emphasizes the broader macroeconomic transmission mechanisms through which government foreign debt influences macroeconomic stability (Reinhart & Rogoff, 2010; Merola, 2013). By employing a Vector Error Correction Model (VECM), the analysis captures both short-run dynamics and long-run equilibrium adjustments among the variables (Enders, 2015), thereby providing a more comprehensive understanding of debt-related macroeconomic vulnerability in Indonesia.

The primary contribution of this study lies in its integrated analysis of fiscal vulnerability and macroeconomic stability by simultaneously examining the relationships among government foreign debt, inflationary pressures, exchange rate risk, investment responses, and economic growth within a single endogenous framework. In doing so, this study contributes empirical evidence to the ongoing debate between the Keynesian perspective, which emphasizes the short-run stimulative effects of debt-financed fiscal expansion (Mankiw, 2013), and the Debt Overhang perspective, which highlights the long-run macroeconomic risks associated with excessive external borrowing (Krugman, 1988; Sachs, 1989). The findings are expected to provide policy-relevant insights for improving debt management and strengthening macroeconomic stabilization strategies in emerging economies such as Indonesia.

RESEARCH METHODS

The study focuses on Indonesia's macroeconomic system, particularly the dynamic relationship between government foreign debt and macroeconomic stability. Using annual time-series data spanning the period 1995–2024, the analysis captures both long-run macroeconomic dynamics and major structural episodes in the Indonesian economy, including the Asian

Financial Crisis, the Global Financial Crisis, and the COVID-19 pandemic. The data were obtained from Statistics Indonesia (BPS), Bank Indonesia, the Ministry of Finance of the Republic of Indonesia, and relevant international publications, ensuring the reliability and consistency of the dataset across all variables.

Nevertheless, the authors acknowledge that the relatively limited number of annual observations, combined with the inclusion of five endogenous variables and two lags in the VECM framework, may raise concerns regarding potential overparameterization and estimation efficiency. To mitigate this issue, the lag structure was selected carefully based on the Akaike Information Criterion (AIC) and further supported by the Hannan–Quinn Criterion (HQ). Prior to model estimation, unit root, cointegration, and diagnostic tests were

conducted to ensure the validity of the empirical framework and the stability of the model's dynamic properties.

Furthermore, the analysis primarily focuses on explaining the direction and dynamic interactions among macroeconomic variables rather than on short-term forecasting performance. Given the relatively limited sample size and the complexity of the VECM specification, the empirical findings should be interpreted with appropriate caution, particularly regarding the magnitude of the estimated long-run coefficients and the impulse response dynamics. Future research could further enhance the robustness of the findings by employing higher-frequency data, alternative model specifications, or more parsimonious estimation approaches.

Table 1. Operational Definition of Research Variables

Variable Name	Definition	Indicator	Measurement	Data Source
Government Foreign Debt (GFD)	Total outstanding central government external debt denominated in foreign currency.	Government external debt stock	Billion IDR	Ministry of Finance; World Bank
Inflation (CPI)	Annual percentage change in the general price level of goods and services	Consumer Price Index (CPI)	Percent (%)	Statistics Indonesia (BPS); Bank Indonesia
Economic Growth (EG)	Annual growth rate of real economic output	Real GDP growth rate	Percent (%)	Statistics Indonesia (BPS)
Exchange Rate (EXR)	Average annual value of the Indonesian rupiah against the US dollar	IDR/USD exchange rate	Rupiah per USD	Bank Indonesia
Investment (GFCF)	Total real fixed capital formation, reflecting domestic and foreign investment contributing to productive capacity	Gross Fixed Capital Formation (GFCF)	Billion IDR	Statistics Indonesia (BPS); BKPM

Source: Data Processed, 2025

Although the selected variables are widely employed in the macroeconomic debt literature, the novelty of this study lies in integrating them within a unified dynamic framework tailored to

the Indonesian context. Specifically, the focus on central government foreign debt captures Indonesia's institutional exposure to exchange rate risk and external fiscal vulnerability. By

modeling inflation, the exchange rate, investment, and economic growth as jointly endogenous variables, the study explicitly examines the transmission mechanisms through which external debt shocks propagate to macroeconomic stability via investment and real economic activity. This integrated perspective remains relatively underexplored in empirical studies on Indonesia.

Based on these operational definitions, the empirical analysis employs a Vector Error Correction Model (VECM), in which all variables are treated as endogenous. According to Enders (2004), the VAR framework is particularly appropriate when exogenous variables cannot be identified a priori because each variable is modeled as a function of its own lagged values as well as the lagged values of all other variables in the system. Accordingly, the VECM extends the VAR framework by incorporating the long-run cointegration relationship among the variables while simultaneously capturing their short-run dynamic adjustments toward equilibrium. In general, a VAR(p) model can be expressed as:

$$Y_t = c + \sum_{i=1}^p A_i Z_{t-i} + \varepsilon_t \dots\dots\dots(1)$$

where Y_t denotes a vector of endogenous variables including government foreign debt (GFD), inflation (CPI), economic growth (EG), exchange rate (EXR), and investment (GFCF); c is a vector of constants; A_i are coefficient matrices; and ε_t represents the error terms.

Because the variables are non-stationary at their levels but integrated of the same order and cointegrated, the empirical analysis employs a Vector Error Correction Model (VECM) to capture both the long-run equilibrium relationships and the short-run dynamic adjustments among the variables. The VECM is specified as:

$$\Delta Y_t = \alpha \beta' Y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta Y_{t-i} + \varepsilon_t \dots\dots\dots(2)$$

where $\beta' Y_{t-1}$ captures the long-run equilibrium relationships, α measures the speed of adjustment toward equilibrium, and Γ_i reflects short-run dynamics.

Prior to estimating the VECM, the stationarity of each variable was examined using the Augmented Dickey–Fuller (ADF) unit root test. The existence of a long-run equilibrium relationship among the variables was subsequently assessed using the Johansen cointegration test. The optimal lag length was selected based on the Akaike Information Criterion (AIC), with the Hannan–Quinn (HQ) criterion used as a robustness check. After confirming the appropriate model specification, the dynamic relationships among the variables were further analyzed using Impulse Response Functions (IRFs) and Forecast Error Variance Decomposition (FEVD) to evaluate the responses of macroeconomic variables to government foreign debt shocks and to quantify the contribution of each variable to forecast error variance over time. The IRF traces the response of each endogenous variable to a one-standard-deviation shock in another variable. At the same time, VD quantifies the relative contribution of each shock to the system's forecast-error variance.

RESULTS AND DISCUSSION

Before estimating the Vector Error Correction Model (VECM), a series of preliminary econometric tests was conducted to evaluate the validity of the empirical framework. The Augmented Dickey–Fuller (ADF) and Phillips–Perron (PP) unit root tests indicate that most variables are non-stationary at their levels but become stationary after first differencing, implying that they are integrated of order one, $I(1)$. In contrast, economic growth (EG) is found to be stationary at the level according to both the ADF and PP tests. This result is economically reasonable because economic growth is measured as a growth rate, which is generally expected to exhibit stationary behavior.

Despite this difference in the order of integration, EG is retained in the VECM because of its theoretical importance in explaining the macroeconomic transmission mechanisms through which government foreign debt affects

macroeconomic stability. Moreover, the remaining variables are predominantly integrated of order one, and the Johansen cointegration test confirms the existence of at least one cointegrating vector, indicating a stable long-run equilibrium relationship among the variables. Accordingly, the VECM remains an appropriate modeling framework for capturing both the long-run equilibrium relationships and the short-run dynamic adjustments within the system.

The optimal lag length was selected using the Akaike Information Criterion (AIC), with the Hannan–Quinn (HQ) criterion employed as a robustness check. Additional diagnostic tests were subsequently performed to evaluate the adequacy and stability of the VAR/VECM specification. Based on these econometric results, the analysis proceeds to estimate and interpret the long-run equilibrium relationships and short-run dynamic responses among the variables.

Table 2. Unit Root and Order of Integration Test Results

Variable	Test on Level Data				Order of integration
	ADF Test		PP Test		
	Intercept	Intercept and trend	Intercept	Intercept and trend	
GFD	-2.341383 (0.1666)	-8.847495 (0.0000)	-2.230904 (0.2003)	-2.829610 (0.1988)	
CPI	-1.548719 (0.4917)	-1.931056 (0.6061)	-5.183014 (0.0002)	-7.215753 (0.0000)	
GFCF	-0.501803 (0.8770)	-2.248191 (0.4471)	-0.703759 (0.8304)	-2.248191 (0.4471)	
EXR	-1.881890 (0.3357)	-2.729148 (0.2331)	-1.896623 (0.3292)	-2.722714 (0.2354)	
EG	-4.251624 (0.0024)	-4.291706 (0.0104)	-4.209991 (0.0027)	-4.236994 (0.0118)	
Stationarity Test on First Difference					
GFD	-5.441628 (0.0001)	-5.330401 (0.0009)	-7.244124 (0.0000)	-6.872641 (0.0000)	I (1)
CPI	-7.245279 (0.0000)	-6.737570 (0.0001)	-27.53818 (0.0001)	-23.54643 (0.0000)	I (1)
GFCF	-5.666405 (0.0001)	-6.718381 (0.0000)	-5.664568 (0.0001)	-6.718381 (0.0000)	I (1)
EXR	-4.873291 (0.0005)	-4.954762 (0.0023)	-4.872823 (0.0005)	-4.959147 (0.0023)	I (1)
EG	-6.749269 (0.0000)	-6.651203 (0.0000)	-13.97765 (0.0000)	-11.11677 (0.0000)	I (0)*

Note:* EG is stationary at the level based on ADF and PP tests. Nevertheless, the variable is retained in the VECM framework due to its theoretical importance in explaining macroeconomic transmission effects

Source: Data Processed, 2025

Although most characteristic roots lie within the unit circle, one modulus slightly exceeds unity, suggesting that the VAR/VECM system may exhibit limited near-instability in its dynamic specification. Consequently, the impulse response and forecast error variance decomposition (FEVD) results should be interpreted with appropriate caution, particularly

with respect to the magnitude and persistence of the estimated dynamic responses. Nevertheless, the model is retained because it provides valuable insights into the broader macroeconomic interactions among government foreign debt, inflation, the exchange rate, investment, and economic growth within the Indonesian economy.

Table 3. Johansen Cointegration Test Results

Hypothesized No. of CE(s)	Eigenvalue	Trace	0.05	Prob.
		Statistic	Critical Value	
None	0.937753	1.396.490	6.981.889	0.0000
At most 1	0.738907	6.745.644	4.785.613	0.0003
At most 2 *	0.514411	3.254.160	2.979.707	0.0236
At most 3	0.368961	1.375.941	1.549.471	0.0898

Source: Data Processed, 2025

Table 4. Optimum Lag Length Selection Results

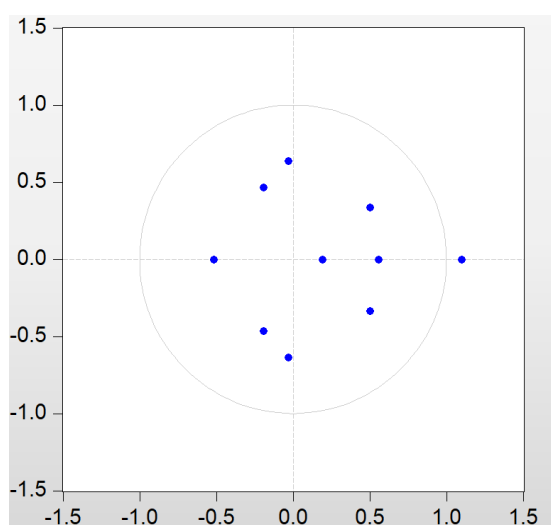
Lag	FPE	AIC
1	2.08e+25	7.246.568
2	1.81e+25*	72.16357*

Source: Data Processed, 2025

Table 5. VAR Stability Test Results

Root	Modulus
.101.365	1.101.365
-0.029513 - 0.635113i	0.635798
-0.029513 + 0.635113i	0.635798
0.500996 - 0.333984i	0.602115
0.500996 + 0.333984i	0.602115
0.556411	0.556411
-0.514818	0.514818
-0.194167 - 0.467309i	0.506042
-0.194167 + 0.467309i	0.506042
0.192255	0.192255

Source: Data Processed, 2025

**Figure 1.** Inverse Roots of AR Characteristic Polynomial

Source: Data Processed, 2025.

Taking these econometric considerations into account, the discussion now turns to the interpretation of the estimated long-run equilibrium relationships and short-run dynamic adjustments, as well as their implications for Indonesia's macroeconomic stability.

The normalized cointegrating equation confirms the existence of a long-run equilibrium relationship among government foreign debt (GFD) and the selected macroeconomic variables. The estimation results indicate that inflation (CPI) and exchange rate depreciation (EXR) are positively associated with government foreign debt in the long run, whereas investment (GFCF) and economic growth (EG) exhibit negative associations. However, not all estimated coefficients are statistically significant. Overall,

these findings suggest that the sustainability of government foreign debt is closely linked to broader macroeconomic conditions, particularly inflationary pressures, exchange rate

movements, investment performance, and economic growth, all of which shape Indonesia's external vulnerability over the long term.

Table 6. Long-Term Estimation Results (VECM) equation.

Variable	Coefficient	Std. Error	t-Statistic	Interpretation
CPI	36847.87	4494.03	8.19930	Positive and statistically significant
GFCF	-2.870994	2.96122	-0.96953	Negative but statistically insignificant
EXR	49.52210	16.3296	3.03267	Positive and statistically significant
EG	-214.0151	9688.48	-0.02209	Negative and statistically insignificant
Constant	-647.9496	—	—	Constant term

Source: Data Processed, 2025.

The long-run equilibrium relationship derived from the normalized cointegrating vector can be expressed as follows:

$$GFD_t = 36847.87CPI_t - 2.871GFCF_t + 49.522EXR_t - 214.015EG_t - 647.950 \dots (3)$$

The exchange rate (EXR) exhibits a positive and statistically significant relationship with government foreign debt in the long run. This finding implies that exchange rate depreciation increases the burden of government foreign debt. In the Indonesian context, where a substantial proportion of external debt is denominated in foreign currencies, depreciation of the domestic currency raises debt-servicing obligations and intensifies fiscal pressure. This result supports the findings of Reinhart and Rogoff (2010), who argue that external debt vulnerability in emerging economies is closely associated with exchange rate instability and exposure to external shocks.

Inflation (CPI) also demonstrates a positive and statistically significant relationship with government foreign debt in the long run. This result suggests that rising external debt may contribute to inflationary pressures through expansionary fiscal financing and increasing macroeconomic imbalances. From a Keynesian perspective, debt-financed fiscal expansion can stimulate aggregate demand and support economic activity in the short run (Mankiw, 2013). However, persistent reliance on external borrowing may undermine macroeconomic stability and generate long-run inflationary risks,

particularly when debt accumulation is not accompanied by productive public expenditure. This finding is consistent with Sutherland and Hoeller (2012), who argue that excessive debt accumulation increases macroeconomic vulnerability and fiscal instability.

Investment (GFCF), by contrast, exhibits a negative relationship with government foreign debt, although the estimated coefficient is not statistically significant. This finding may suggest that rising government foreign debt tends to weaken investment confidence because of concerns regarding fiscal sustainability and macroeconomic uncertainty. According to the Debt Overhang theory, excessive external debt discourages private and productive investment because economic agents anticipate higher future tax burdens and greater macroeconomic instability (Krugman, 1988). Nevertheless, the lack of statistical significance indicates that the long-run relationship between government foreign debt and investment remains relatively weak during the study period. This result is also consistent with empirical evidence from developing economies showing that the investment effects of external debt depend more on institutional quality, fiscal effectiveness, and macroeconomic stability than on debt accumulation alone.

Economic growth (EG) also displays a negative, although statistically insignificant, relationship with government foreign debt in the long run. This finding suggests that increasing external debt does not necessarily promote

sustainable economic growth, particularly when borrowed funds are allocated inefficiently or used for less productive purposes. The result is broadly consistent with the Debt Overhang hypothesis proposed by Krugman (1988) and Sachs (1989), which argues that excessive debt accumulation discourages investment and weakens long-run economic performance because of expectations of future fiscal burdens. However, because the estimated coefficient is not statistically significant, this relationship should be interpreted cautiously and cannot be considered strong empirical evidence of a long-run negative growth effect.

Overall, the long-run estimation results suggest that government foreign debt in Indonesia is more strongly associated with macroeconomic stability, particularly through inflation and exchange rate dynamics, than with long-run economic growth. These findings highlight the importance of prudent debt management, exchange rate stabilization, and productive fiscal allocation in maintaining long-run macroeconomic sustainability in developing economies such as Indonesia.

The short-run estimation results indicate that the macroeconomic adjustment process in Indonesia exhibits heterogeneous dynamic responses across variables. The Error Correction Term (ECT) in the economic growth (EG) equation is negative and statistically significant, indicating that deviations from the long-run equilibrium are gradually corrected over time. This finding suggests that economic growth responds to short-run disequilibria and converges toward the long-run equilibrium. In macroeconomic theory, a negative and statistically significant ECT coefficient reflects the presence of an effective adjustment mechanism following short-run shocks (Engle & Granger, 1987; Enders, 2015).

By contrast, the ECT coefficients in several other equations are either statistically insignificant or have positive signs, indicating that the adjustment process for some macroeconomic variables does not fully converge to equilibrium within the observation period. This pattern may reflect the Indonesian

economy's vulnerability to external shocks, particularly those arising from inflationary pressures, exchange rate volatility, and fluctuations in external debt. Similar evidence of incomplete adjustment has frequently been reported in developing economies characterized by high external dependence and macroeconomic instability (Todaro & Smith, 2020). Consequently, the short-run results should be interpreted with appropriate caution.

Among the short-run dynamics, inflation (CPI) plays a central role within the macroeconomic system. The first lag of inflation has a positive and statistically significant effect on government foreign debt (GFD), suggesting that rising inflation increases the government's short-term demand for external financing. From a fiscal perspective, inflationary pressures increase public expenditure and financing requirements, thereby encouraging additional foreign borrowing. This finding is consistent with Keynesian fiscal theory, which argues that governments often respond to periods of macroeconomic stress through expansionary fiscal policies financed by increased public borrowing (Mankiw, 2013). Similar evidence is reported by Sutherland and Hoeller (2012), who emphasize that persistent fiscal imbalances and inflationary pressures increase debt vulnerability in developing economies. Likewise, Easterly and Schmidt-Hebbel (1993) show that inflation instability tends to intensify government financing pressures and debt accumulation.

Inflation also exerts a statistically significant negative effect on investment (GFCF) and economic growth (EG) in the short run. This finding indicates that rising inflation discourages investment and weakens economic growth by eroding purchasing power, increasing production costs, and amplifying macroeconomic uncertainty. These results are consistent with Fischer (1993), who argues that macroeconomic instability, particularly inflation, reduces economic efficiency and long-run growth performance. Similarly, Barro (1995) finds that high inflation adversely affects both economic growth and investment across developing countries. Bruno and Easterly (1998) likewise

conclude that episodes of high inflation are generally accompanied by declining economic growth and deteriorating macroeconomic performance.

The exchange rate (EXR) has a positive and statistically significant effect on inflation in the short run. This finding suggests that exchange rate depreciation contributes to inflation through the imported inflation mechanism. In Indonesia, where imported goods and foreign-currency-denominated transactions constitute a substantial share of economic activity, exchange rate fluctuations are closely associated with domestic price instability. This result is consistent with the

open-economy macroeconomic framework proposed by Krugman and Obstfeld (2009), which argues that currency depreciation raises import prices and accelerates inflation transmission. Similar evidence has been documented in exchange rate pass-through studies, which demonstrate that currency depreciation significantly influences domestic inflation through higher import prices and production costs (Taylor, 2001).

For brevity and ease of interpretation, Table 7 reports only the statistically significant short-run coefficients together with the key error-correction parameters.

Table 7. Short-Run Dynamics and Error Correction Results (VECM)

Variable	Coefficient	Std. Error	t-Statistic	Interpretation
Error Correction Term (ECT)				
ECT → D(GFD)	0.148845	0.06240	2.38522	Significant
ECT → D(CPI)	0.000101	9.8E-06	10.3202	Significant
ECT → D(GFCF)	-0.010613	0.00880	-1.20604	Not significant
ECT → D(EXR)	0.003029	0.00189	1.60039	Marginal
ECT → D(EG)	-2.98E-05	6.5E-06	-4.58127	Significant
Significant Short-Run Dynamics				
D(CPI(-1)) → D(GFD)	5240.002	1610.38	3.25389	Positive and significant
D(CPI(-1)) → D(CPI)	1.535199	0.25265	6.07647	Positive and significant
D(CPI(-2)) → D(CPI)	0.381348	0.15783	2.41627	Positive and significant
D(CPI(-2)) → D(GFCF)	-509.7885	141.861	-3.59358	Negative and significant
D(CPI(-1)) → D(EG)	-0.778153	0.16805	-4.63052	Negative and significant
D(CPI(-2)) → D(EG)	-0.284039	0.10498	-2.70571	Negative and significant
D(GFCF(-1)) → D(GFCF)	-0.561678	0.20175	-2.78401	Negative and significant
D(EXR(-1)) → D(CPI)	0.005262	0.00136	3.85939	Positive and significant
D(EXR(-1)) → D(GFCF)	-3.976721	1.22546	-3.24509	Negative and significant
D(EG(-1)) → D(EG)	-0.630564	0.25514	-2.47145	Negative and significant
D(EG(-2)) → D(EG)	-0.576639	0.28357	-2.03351	Negative and significant

Furthermore, exchange rate depreciation exerts a negative and statistically significant effect on investment (GFCF) in the short run. This finding suggests that exchange rate instability reduces investor confidence and increases uncertainty surrounding production and investment decisions. In developing economies, volatile exchange rates often heighten business risk and discourage capital formation, particularly when firms rely heavily

on imported intermediate goods and foreign financing. This result supports the findings of Servén (2003), who argues that macroeconomic uncertainty and exchange rate volatility tend to reduce investment activity in developing countries. Similar evidence was reported by Aizenman and Marion (1999), who found that macroeconomic instability significantly discourages private investment in emerging economies.

Economic growth (EG) also exhibits negative and statistically significant short-run dynamics through its lagged coefficients. This finding suggests the presence of short-run adjustment processes following fluctuations in previous periods. These dynamics may reflect cyclical adjustments within Indonesia's macroeconomic system during periods of economic instability and external shocks. This result is broadly consistent with the business cycle adjustment framework proposed by Blanchard and Johnson (2013), which emphasizes that macroeconomic fluctuations often generate temporary corrections in economic growth. Similar patterns have also been documented in developing countries characterized by fiscal vulnerability and external dependence, where economic growth responds sensitively to macroeconomic shocks and debt instability (Reinhart & Rogoff, 2010).

Overall, the short-run estimation results indicate that inflation and exchange rate dynamics are the primary sources of short-run macroeconomic pressure affecting government foreign debt, investment, and economic growth in Indonesia. These findings underscore the importance of maintaining price stability, stabilizing the exchange rate, and implementing prudent fiscal policies to preserve short-run macroeconomic stability and ensure external debt sustainability.

Impulse response analysis was conducted within the Vector Error Correction Model (VECM) framework to evaluate the dynamic responses of macroeconomic variables following shocks to government foreign debt (GFD). The impulse response functions (IRFs) were estimated using a Cholesky decomposition with the variable ordering based on the assumed macroeconomic transmission mechanism: GFD, CPI, GFCF, EXR, and EG. The responses were traced over a 10-period horizon to capture both short-run and medium-run dynamics among the

variables. Given the indication of near-instability in the VAR/VECM system, the IRF results should be interpreted with appropriate caution and are primarily intended to illustrate the direction and persistence of macroeconomic responses rather than to provide precise forecasting relationships.

The impulse response functions provide further insights into the dynamic effects of government foreign debt shocks on Indonesia's macroeconomic system. A positive shock to government foreign debt generates heterogeneous responses across the selected macroeconomic variables over time. Overall, the results indicate that debt shocks increase inflationary pressure and contribute to exchange rate depreciation, while investment and economic growth gradually exhibit negative responses during subsequent periods. These patterns suggest that debt-financed fiscal expansion may provide temporary fiscal support in the short run but may also generate adverse macroeconomic consequences over the medium and long run.

The response of inflation (CPI) to a positive shock in government foreign debt is positive during the initial periods and remains relatively persistent throughout the response horizon. This finding suggests that increases in government foreign debt may contribute to inflationary pressures through expansionary fiscal financing and higher aggregate demand. In developing economies such as Indonesia, excessive reliance on external borrowing may weaken macroeconomic stability and amplify inflationary risks. This result is broadly consistent with the fiscal dominance perspective and the empirical findings of Sargent and Wallace (1981) and Reinhart and Rogoff (2010), who argue that persistent public debt accumulation can generate inflationary pressures and increase macroeconomic instability.

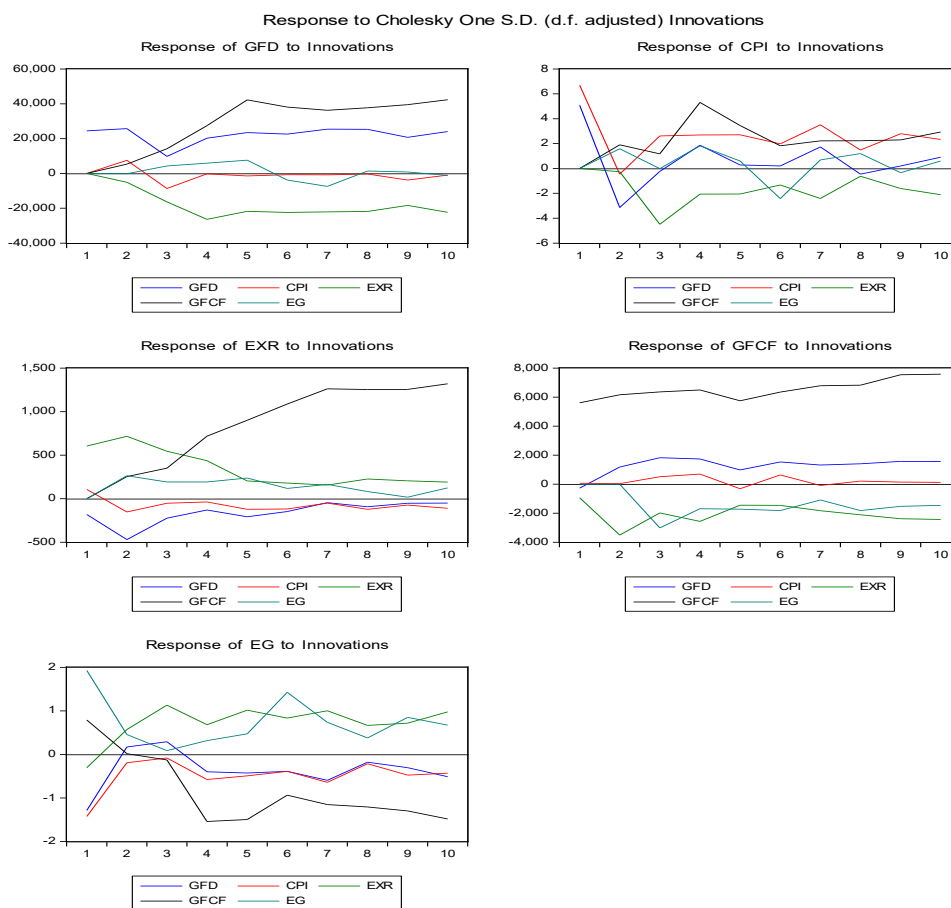


Figure 2. Impulse Response of Government Foreign Debt Shock
Source: Data Processed, 2025.

Investment (GFCF) exhibits a predominantly negative response to shocks in government foreign debt over time. This negative response becomes more pronounced in the medium term, suggesting that rising external debt may reduce investor confidence and discourage productive investment. This finding supports the Debt Overhang hypothesis proposed by Krugman (1988) and Sachs (1989), which argues that excessive public debt weakens investment incentives by creating expectations of future fiscal burdens and macroeconomic uncertainty. Similar evidence is reported by Servén (2003), who highlights that macroeconomic instability and external vulnerability tend to suppress investment performance in developing countries.

The exchange rate (EXR) responds positively to shocks in government foreign debt, indicating currency depreciation following increases in external borrowing. This response suggests that higher government foreign debt

heightens external sector vulnerability and places downward pressure on the domestic currency through rising foreign obligations and increased market uncertainty. In Indonesia, where a substantial share of public debt is denominated in foreign currencies, exchange rate depreciation significantly increases debt-servicing costs and fiscal risks. This finding is consistent with the exchange rate burden hypothesis discussed by Dornbusch (1976) and Merola (2013), which argues that currency depreciation amplifies the real burden of external debt and increases macroeconomic vulnerability.

Economic growth (EG) initially responds only weakly to shocks in government foreign debt but gradually turns negative in subsequent periods. This pattern indicates that although external borrowing may temporarily support fiscal expansion and economic activity, excessive debt accumulation ultimately weakens long-run economic growth. The declining growth response

is consistent with the Debt Overhang theory, which suggests that large debt accumulation discourages investment and productive economic activity because of expectations of future taxation and fiscal adjustment (Krugman, 1988; Sachs, 1989). Similar findings were reported by Panizza and Presbitero (2013), who argue that excessive public debt may hinder long-run growth sustainability in developing economies.

Furthermore, inflation responds strongly to exchange rate shocks, particularly during the early response periods, confirming the importance of exchange rate stability for inflation control in Indonesia. This finding supports the exchange rate pass-through literature, which suggests that exchange rate depreciation significantly affects domestic prices through imported inflation mechanisms (Dornbusch, 1987; Goldberg & Knetter, 1997; Taylor, 2001). Meanwhile, investment exhibits a persistent negative response to exchange rate shocks, reinforcing the importance of currency stability as a key determinant of investor confidence and business certainty (Edwards, 1998).

Overall, the impulse response analysis indicates that shocks to government foreign debt are transmitted throughout Indonesia's macroeconomic system via multiple interconnected channels, particularly inflation, exchange rate dynamics, investment, and economic growth. These findings reinforce the argument that although government foreign debt may provide short-run fiscal flexibility, excessive dependence on external borrowing can increase macroeconomic vulnerability and undermine long-run economic sustainability.

Variance decomposition analysis complements the impulse response analysis by quantifying the relative contribution of each structural shock to fluctuations in the endogenous variables. Compared with the impulse response analysis, variance

decomposition provides a clearer assessment of the relative importance of each variable in explaining macroeconomic fluctuations over time (Enders, 2015).

Over the short horizon, fluctuations in government foreign debt (GFD) are explained primarily by shocks originating from the debt variable itself. Over time, however, shocks to inflation (CPI) and the exchange rate (EXR) account for an increasing proportion of the variation in government foreign debt, highlighting the strong interaction between fiscal dynamics and macroeconomic stability (Reinhart & Rogoff, 2010; Merola, 2013). This finding suggests that Indonesia's external debt dynamics are increasingly intertwined with broader macroeconomic instability and conditions in the external sector. The growing contribution of inflation and exchange rate shocks further underscores the importance of maintaining macroeconomic stability to ensure external debt sustainability.

Inflation variability is increasingly explained by exchange rate shocks, indicating a strong exchange rate pass-through effect in the Indonesian economy. As a developing economy that relies heavily on imported goods and foreign currency transactions, Indonesia is particularly vulnerable to exchange rate depreciation, which accelerates domestic price inflation through imported inflation mechanisms. This result is consistent with the findings of Taylor (2001) and Goldberg and Knetter (1997), who emphasize that exchange rate fluctuations play a significant role in shaping inflation dynamics in emerging economies. Furthermore, the increasing contribution of government foreign debt shocks to inflation variability suggests that persistent external borrowing may generate inflationary pressures through fiscal expansion and broader macroeconomic imbalances (Sargent & Wallace, 1981).

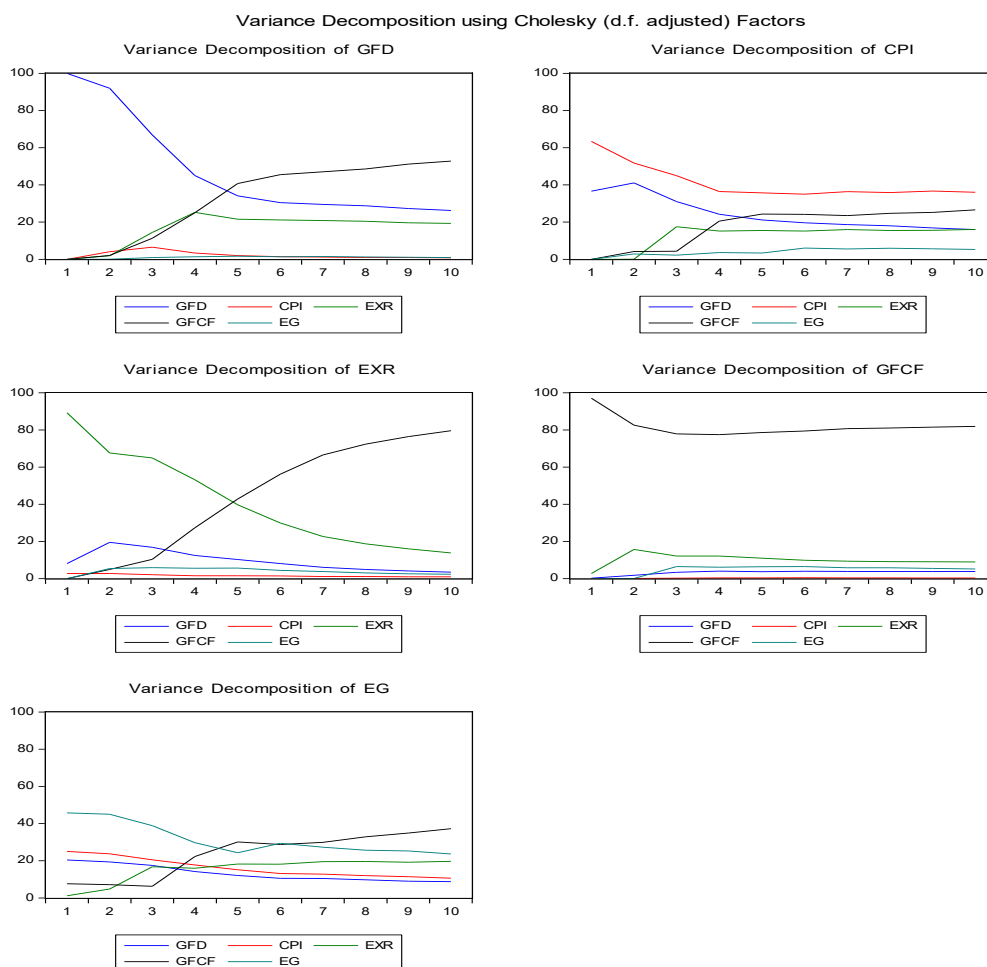


Figure 3. Variance Decomposition of Government Foreign Debt (GFD)
Source: Data Processed, 2025.

The variance decomposition analysis further reveals that investment (GFCF) variability is increasingly explained by exchange rate and inflation shocks over time. This finding indicates that macroeconomic uncertainty, particularly exchange rate volatility and inflation instability, plays a significant role in shaping investment behavior in Indonesia. In developing economies, unstable macroeconomic conditions often reduce investor confidence and discourage productive investment. This result is consistent with the findings of Servén (2003), who argues that macroeconomic instability and uncertainty significantly reduce investment performance in developing countries. Similar evidence was reported by Aizenman and Marion (1999), who found that macroeconomic volatility discourages private investment in emerging economies.

Meanwhile, the contribution of government foreign debt shocks to economic

growth (EG) variability becomes increasingly pronounced over longer horizons. This finding suggests that persistent external borrowing may gradually influence long-run economic performance through fiscal, financial, and macroeconomic transmission channels. Although foreign debt may provide temporary fiscal flexibility and stimulate economic activity in the short run, excessive reliance on external borrowing can undermine long-run macroeconomic sustainability. This result is broadly consistent with the Debt Overhang hypothesis proposed by Krugman (1988) and Sachs (1989), which argues that excessive debt accumulation may eventually hinder productive economic activity and weaken long-run growth performance. Similar conclusions were reached by Panizza and Presbitero (2013), who contend that high public debt may reduce long-run growth sustainability in developing economies.

Overall, the variance decomposition results confirm that Indonesia's macroeconomic system exhibits strong interdependence among government foreign debt, inflation, the exchange rate, investment, and economic growth. The increasing contribution of macroeconomic shocks across these variables indicates that instability in one sector may gradually propagate to other sectors of the economy. These findings reinforce the importance of maintaining macroeconomic stability through prudent debt management, effective inflation control, and exchange rate stabilization policies to preserve long-run economic sustainability and reduce external vulnerability.

The empirical findings carry several important policy implications for Indonesia. First, although government foreign debt can provide short-term fiscal support, excessive reliance on external borrowing increases vulnerability to inflationary pressures and exchange rate fluctuations. Therefore, debt management policies should prioritize exchange rate stability and adopt a prudent currency composition of public debt to mitigate external risks (Reinhart & Rogoff, 2010; IMF, 2024).

Second, the weak long-run relationship between foreign government debt and investment underscores the need to improve the efficiency and productivity of debt-financed public expenditure. External borrowing should be directed toward productive sectors, such as infrastructure development, human capital investment, and other productivity-enhancing activities, to ensure that debt supports sustainable economic growth rather than exacerbating macroeconomic vulnerability (Panizza & Presbitero, 2013; Akyüz, 2017).

Finally, maintaining macroeconomic stability—particularly low and stable inflation alongside a stable exchange rate—remains essential for preserving investor confidence, strengthening Indonesia's resilience to external shocks, and supporting sustainable long-run economic growth.

CONCLUSION

This study examines the dynamic relationship between government foreign debt and macroeconomic stability in Indonesia using a Vector Error Correction Model (VECM) based on annual data covering the period 1995–2024. By treating inflation, economic growth, the exchange rate, and investment as jointly endogenous variables, the analysis provides a comprehensive assessment of how external debt shocks influence Indonesia's macroeconomic conditions in both the short and long run.

The empirical findings indicate that, in the long run, government foreign debt is significantly associated with inflation and exchange rate movements, whereas its relationships with economic growth and investment are not statistically significant. These results suggest that sustained reliance on external borrowing tends to increase macroeconomic vulnerability through inflationary pressures and exchange rate depreciation without consistently generating productive investment or long-term economic growth. This pattern is consistent with the fiscal dominance perspective and the Debt Overhang hypothesis, both of which emphasize the adverse macroeconomic consequences of persistent public debt accumulation.

In the short run, the results reveal strong interactions among inflation, exchange rate dynamics, and government foreign debt. Exchange rate depreciation intensifies inflationary pressures and reduces investment, while rising inflation increases the government's reliance on external financing. Furthermore, the impulse response and variance decomposition analyses confirm that shocks to government foreign debt generate persistent negative responses in economic growth and investment, accompanied by higher inflation and exchange rate depreciation. These findings demonstrate that the effects of external debt are transmitted through multiple interconnected macroeconomic channels rather than through a single transmission mechanism.

The findings have several important policy implications for Indonesia. Although government foreign debt can provide short-term

fiscal space, excessive dependence on external borrowing may undermine macroeconomic stability and long-term growth prospects. Therefore, debt management strategies should prioritize mitigating exchange rate risk, improving the efficiency of debt-financed public expenditure, and directing external borrowing toward productive sectors that enhance economic competitiveness and long-term growth. Maintaining low and stable inflation, preserving exchange rate stability, and strengthening fiscal discipline are also essential for sustaining investor confidence and enhancing Indonesia's resilience to external shocks.

This study has several limitations. First, the analysis relies on aggregate macroeconomic indicators and therefore does not capture sector-specific or institutional factors that may influence the relationship between government foreign debt and macroeconomic stability. Second, the empirical analysis is based on a single baseline VECM specification, which may not fully account for structural changes or nonlinear dynamics over time. Future research could extend this analysis by incorporating variables such as debt maturity structure, institutional quality, fiscal governance, or debt composition, as well as by conducting sub-period or regime-specific analyses to examine the robustness of the findings under different macroeconomic conditions..

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