Investigating the Relationship Between Government Debt Levels and Fiscal Policy Outcomes, Focusing on Debt Sustainability and Growth

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ABSTRACT

This study investigates the dynamic interrelationships between government debt and GDP growth. It also take into account the primary fiscal balance, real interest rates, institutional quality, investment, trade openness, and unemployment. The study uses a unified panel vector autoregression (PVAR) framework for a balanced panel of developed and emerging economies. The approach offers comprehensive details of the intricate relationships, for emerging and developed economies, influencing 'fiscal sustainability' and 'macroeconomic stability'. The PVAR(1) model, is validated by relevant stationarity tests and lag-length diagnostics. Subsequent to 'Granger causality testing' ,and 'impulse response estimation', the findings highlight substantial bidirectional relationships. Government debt exhibits inertia but is mitigated by higher growth and stronger primary balances. Fiscal discipline is improved by better institutions and macroeconomic performance. GDP growth is positively shaped by investment, trade openness, and institutional strength. Nevertheless it is constrained by high interest rates and unemployment. These findings highlight the need of a coordinated, policy mix. A policy in which pro-growth initiatives, financial discipline, and institutional improvements all work together. The work offers empirical data for the creation of integrated macro-fiscal policy. For countries controlling the post-crisis recovery, debt restructuring, and long-term economic concerns, the findings are crucial.

INTRODUCTION

The correlation, between 'government debt levels' and 'fiscal policy', compels the contemporary research in the domain of macroeconomic for a crucial inquiry. These dynamics are varying across the nations, regions and economies, further aggravating the urgency and need of its investigation. In other words, this relationship gets more specific when examined within the framework of developed and emerging economies. The governments, especially in the

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emerging economies, encounter increasing budgetary challenges, where the sustainability of government debt burden are becoming paramount. Increasing public spending, especially in the domain of infrastructure, social welfare, and healthcare, aggravated these mounting needs. The main challenge, for many countries, is to ensure that debt growth does not jeopardize their long-term plans of economic stability and welfare. It is evident that the burgeoning presence of high debt-to-GDP ratios are creating serious economic problems for certain countries across the globe. These controversies can potentially harm institutional credibility, economic performance, and fiscal fundamentals.

To gauge their impacts on fiscal policy outcomes, this study aims to explore the dynamics of public debt. More especially, the study is exploring whether debt accumulation impedes progress. Should this be the case, one should consider if such an impact is nonlinear, maybe showing declining rewards beyond certain debt-to-GDP ratio thresholds. The study is set against the backdrop of debt sustainability. Its inter-temporal budget constraint model helps to highlight the main factors affecting sustainable fiscal policy and economic development.

This paper, tries to examines data from low, medium, and high-income nations, using a comprehensive panel data methodology. From 2000 to 2023, it draws on the time frame. The aim of the research is to provide a thorough perspective on government debt affects for economic growth, for the specified group of countries. Several econometric models, notably Panel Vector Autoregression (PVAR), are used to investigate the dynamic interdependencies among government debt, fiscal imbalances, and growth (economic).

Besides providing an empirical investigation of debt sustainability, this article contributes to the theoretical discourse on fiscal policy. For this purpose, it integrates various dimensions of governance quality, institutional frameworks, and macroeconomic controls. The research clarifies by looking at these interrelationships how fiscal choices, debt dynamics, and external shocks interact in the larger economic system.

Designing policy interventions calls for an understanding of these processes. It can help to offset the bad effects of too much debt even as it promotes economic development and budgetary discipline. In the wake of the COVID-19 epidemic, knowing the link between government debt and fiscal policy results is more important. This study intends to provide practical policy suggestions as well as increase scholarly knowledge of these processes. It will assist in changing policies to control government debt levels, encourage fiscal discipline, and sustainable economic development in both industrialized and developing countries.

In recent years, rising government debt has been a major concern for both rich and poor nations. Especially in the wake of global shocks, it is producing more front-page news. Among these

shocks are ongoing geopolitical tensions, the COVID-19 pandemic, and the 2007-8 financial crisis. These developments, have intensified the debate, on how debt accumulation affects fiscal policy outcomes and growth. It is of more interest to analyze this phenomenon in long-term economic growth prospects.

While some level of public debt is necessary, for stimulating development. Excessive debt can lead to unsustainable fiscal positions and macroeconomic instability. The motivation behind this study is to explore this complex relationship. By empirically, analyzing whether and how rising debt influences growth trajectories and fiscal performance. This queries becomes more concerning when investigated across countries with varying income levels and institutional capacities.

Research Gaps

Though not nearly as much has been done on how to evaluate fiscal policy results and debt sustainability across nations, much study has been done on the relationship between government debt and economic growth. Most of the current research either focuses on the debt-growth level or ignores fiscal policy in connection to debt dynamics. Furthermore, not much scientific research considers endogeneity and variation across nations that cannot be detected using panel regression techniques such as GMM.

Using a large sample of 85 nations from 1990 to 2023, this article addresses these gaps by examining how government debt, fiscal policy impacts, and economic development evolve with time. It shows the contrast between nations with high debt and those with low debt and examines how the capacity to repay debt influences development and economic performance. The paper provides a more complete and policy-relevant image of how debt influences long-term economic development in a variety of economic environments by combining fiscal indicators with debt sustainability criteria and using sophisticated econometric models.

Research Objectives

The study tests the following theories based on its goals and previous research:

1. To assess different levels of government debt that infuence the economic growth across different countries in long-run
2. To investigate the relationship between government debt sustainability and economic stability
3. To determine the critical debt-to-GDP thresholds that impact the effectiveness of fiscal policies and growth dynamics

Conceptual Frame

The conceptual framework of this study revolves around the interaction between government debt levels, fiscal policy outcomes, and economic growth. In this relationship debt sustainability is acting as a moderating factor. It posits that the effect of debt on growth is not linear. Rather contingent on whether debt levels remain within sustainable limits.

Debt sustainability, is influenced, by indicators such as the primary balance; besides the interest-growth differentials, and debt servicing capacity. Fiscal performance, in terms of spending efficiency and deficit control, mediates the relationship between debt and growth. Thus fiscal policy becomes both an outcome of and a conduit for debt's impact. The framework, captures the feedback loop, among these variables. And therefore, offers a comprehensive lens to assess the effectiveness of debt-financed fiscal strategies across diverse economic contexts.

LITERATURE REVIEW

Though the outcomes have been varied and situation-dependent, much economic research has been done on the subject of the relationship between government debt and economic growth. According to neoclassical growth theories like those proposed by Solow (1956) and Barro (1990), fiscal policy may enable the economy to expand when it is used to create investments improving conditions. Experts, however, are concerned about the long-term effects of excessive debt on individuals, particularly if the government borrows money for pointless expenditures rather than capital formation.

A long-running debate in scientific research is whether there is a "threshold" over which debt damages growth. Using historical data from 44 nations, Reinhart and Rogoff (2010) contended that median growth rates fall significantly when gross public debt exceeds 90% of GDP. Herndon, Ash, and Pollin (2014) then contended that findings were erroneous due to errors in the code and dubious assumptions. Notwithstanding the controversy, fresh studies—gért, 2015; Checherita-Westphal & Rother, 2012—still support the concept of a non-linear link between debt and development. This implies that whereas modest debt can promote development, large levels of debt might deter private investment, increase interest rates, and endanger the stability of the economy as a whole.

From a Keynesian perspective, public debt is beneficial during economic slumps as it let governments increase overall demand by means of countercyclical fiscal policy. Blanchard and Leigh (2013), discussing particularly the period after the Global Financial Crisis, addressed how fiscal assistance may enable the economy to recover during crises. Conversely, high levels of debt and long-term deficits might limit budgetary headroom and hence complicate future adjustments for politicians. Debt sustainability is thus a sign of a nation's economic success.

This is particularly true for developing and rising nations with restricted or conditional access to credit markets.

Methods of debt sustainability analysis (DSA) have been the subject of recent real-world studies. These monitor whether a nation can satisfy its debt responsibilities without worrying about failure or major budgetary adjustments. Bohn was the first to discuss fiscal reaction mechanisms, wherein governments alter their primary amounts in reaction to debt fluctuations. Sustainable debt trajectories are those of countries that habitually increase their primary surpluses in response to growing debt levels. Conversely, Escolano (2010) and IMF (2013) provide DSA institutional approaches by combining the dynamics of debt with macro-fiscal projections and identifying early indicators of a fiscal crisis.

Panel data analysis using dynamic econometric techniques has also contributed to demonstrate how debt, growth, and fiscal policy are all interrelated. Using the system GMM, Woo and Kumar (2015) shown that beginning the economic year with a lot of debt is related to slower growth, particularly in rich nations. Presbitero (2012), on the other hand, found no compelling evidence that public debt negatively affects growth in low income nations. The quality of governance, the effectiveness of public investments, and the country's capacity to absorb debt all influence the relative impact of debt, so this is true. Égert (2012) also said that the relationship between debt and growth has to be considered in light of each country's particular political and structural characteristics.

Fiscal policy's impact on growth includes budget deficits, spending patterns, and tax-raising capacity. Eventually, nations who are more adept at managing their finances, maintaining transparent governments, and concentrating their expenditure usually do better in terms of debt management and sustaining their prosperity. According to Baldacci and Kumar (2010), nations with robust fiscal policies and an emphasis on capital investment are less likely to carry public debt that impairs long-term development. This emphasizes the need of sound policies above high levels of debt.

Though there is increasing research on the topic, the relationship between debt, the consequences of fiscal policy, and economic development is complex and situation-dependent. Some recent research, such as Abbas et al., 2019 and Pattillo et al., 2011, emphasize how institutional capability, public investment management, and macroeconomic volatility influence the debt-growth connection. Conversely, these studies tend to focus on either wealthy or impoverished nations alone, hence lacking comparison across nations with varying degrees of affluence.

METHODOLOGY

Theoretical Framework

The study adopt a debt sustainability framework, anchored in the 'intertemporal budget constraint' of the government:

$$\Delta d_t = (r - g)d_t - bp_t$$

Where:

- d_t: debt / GDP ratio,

- r: interest rate,

- g: Growth rate of GDP

- bp_t: primary balance / as a share of GDP.

This framework, focuses the that dependence of s'ustainable debt dynamics' on the relationship between the r'eal interest rate' 'growth (economic)'. Moreover, it emphasize that size and direction of the primary balance do also have a role**.**

DATA AND METHODOLOGY

Data Sources

- The article uses the Time-frame of 2000–2023 to conduct this study

- This study used a detailed list of countries including low-, middle-, and high-income countries

Variables

- o Government debt (% of GDP)
- o GDP growth rate
- o Primary balance
- o Real interest rates
- o Government expenditure and revenue breakdown
- o Institutional quality indicators

Sources: IMF, World Bank WDI, OECD Fiscal Database, and national central banks.

Model Specification

The objective is to analyze the impact of government debt levels on fiscal policy outcomes. These outcomes include, the primary balance, expenditure, and revenue. Alternatively, their interaction is studied to guage the influence they have on debt sustainability and economic growth. The study estimate the following model of Debt Sustainability:

1. ***Debt Sustainability Equation (based on the Intertemporal Budget Constraint)***

$$\Delta d_t = \alpha_0 + \alpha_1(r_{it} + g_{it})d_{it-1} + \alpha_2 pb_{it-1} + \alpha_3 X_{it} + \mu_i + \varepsilon_{it}$$

Where:

- Δd_t: Change in debt-to-GDP ratio for country ii in year tt

- r_{it}: Real interest rate
- g_{it}: Real GDP growth rate
- d_{it-1}: Lagged debt-to-GDP ratio
- bp_{it}: Primary balance (% of GDP)
- X_{it}: Vector of control variables (e.g., inflation, exchange rate volatility, institutional quality)
- μ_i: Country-specific fixed effects
- ε_{it}: Error term

This model evaluates, the sustainability of 'existing debt' dynamics, by analyzing real 'interest-growth' differentials and 'fiscal effort'.

2. *Growth Equation with Nonlinear Debt Effects (Threshold or Interaction Model)*

To assess, whether dthe ebt levels impede development, beyond a certain threshold:

$$g_{it} = \beta_0 + \beta_1 d_{it} + \beta_2 d_{it}^2 + \beta_3 Z_{it} + \eta_i + \upsilon_{it}$$

Conversly, to use threshold model

$$\begin{cases} \delta_0 + \delta_1 d_{it} + \delta_2 Z_{it} + \eta_i + \upsilon_{it} & if \ d_{it} \leq \gamma \\ \theta_0 + \theta_1 d_{it} + \theta_2 Z_{it} + \eta_i + \upsilon_{it} & if \ d_{it} > \gamma \end{cases}$$

Where:

- g_{it}: Real GDP growth
- d_{it}: Government debt (% of GDP)
- d_{it}^2: Nonlinear term to test for diminishing or adverse effects
- γ: Estimated debt threshold (via Hansen's threshold estimator)
- Z_{it}: Control variables (investment, human capital, trade openness, institutional quality)
- η_i: Country fixed effects
- υ_{it}: Error term

3. *Panel Vector Autoregression (PVAR) Model*

To understand how government debt, budget balance, and GDP growth change over time:

$$Y_{it} = A(L) Y_{it-1} + \phi_i + \varepsilon_{it}$$

Where:

- Y_{it} : $[d_{it}, bp_{it}, g_{it}]$
- $A(L)$: Matrix polynomial in the lag operator
- ϕ_i: Fixed effects
- it : Vector of innovations

Impulse response functions (IRFs), will be analysed to analyze the effect of a shock to debt / fiscal balance over 'economic growth'.

Endogenous vs. Exogenous Variables

Variable	Type	Role
Government Debt (d)	Endogenous	Key independent variable
Primary Balance (pb)	Endogenous	Fiscal outcome, dependent in reaction model
GDP Growth (g)	Endogenous	Outcome variable in growth and VAR models
Real Interest Rate (r)	Exogenous	Input in debt dynamics
Institutional Index	Exogenous	Control for governance quality
Investment (% GDP)	Exogenous	Control for productive capacity
Trade Openness	Exogenous	Control in growth regression
Output Gap / Unemployment	Exogenous	Cyclical control in fiscal response model

RESULTS AND DISCUSSION

Panel Vector Autoregression (PVAR) Mode

This model is used because it combines time-series dynamics with cross-sectional variation. Such is effective for analyzing interdependencies among multiple variables. It becomes more effective if interdependencies are across countries and regions over time. Further, PVAR treats all variables as endogenous. It has the ability to model shocks and its propagation to other variables, over time. It controls for Controls for Unobserved Heterogeneity. Finally , it effectively combines information across units (multiple), improving inferences drawn on that basis.

 In comparison to OLS static relationships, PVAR has the ability to capture the lagged effects. It ensures the assessment of dynamic interaction against GMM which focuses more i-on endogeneity. Nevertheless, for using PVAR, testing Stationarity, optimal lag selection and checking cross section dependence is necessary.

This study will use AIC / or BIC / or HQ criteria for optimal lag selection, Levin-Lin-Chu / or IPS for stationary in panel data and conduct Pesaran CD test for cross sectional dependence.

Panel Stationarity Tests (Unit Root Tests)

For this purpose, the study uses IPS test results as follows:

Lag Selection Criterion

Variable	Level (IPS Test)	1st Difference (IPS Test)	Stationary At
GDP Growth (Gdpgr)	Stationary	–	Level
Government Debt (Debt)	Non-Stationary	Stationary	1st Difference
Primary Balance (Fisc)	Non-Stationary	Stationary	1st Difference
Real Interest Rate	Non-Stationary	Stationary	1st Difference
Institutional Index	Stationary	–	Level

Variable	Level (IPS Test)	1st Difference (IPS Test)	Stationary At
Investment (% GDP)	Non-Stationary	Stationary	1st Difference
Trade Openness	Stationary	–	Level
Unemployment (Output Gap)	Non-Stationary	Stationary	1st Difference

To find ideal lags (p), for the model, to prevent overfitting or neglected dynamics, the lag length criterians are used including, 'Akaike Information Criterion (AIC)', 'Bayesian Information Criterion (BIC)', and 'Hannan-Quinn (HQIC)'.

Lag	AIC	BIC	HQIC
1	**-3.217**	**-2.823**	**-3.051**
2	-2.914	-2.210	-2.568

The optimal lag concluded to be "Lag order 1" for PVAR estimation.

Granger Causality Test (Optional Pre-test)

For numerous reasons, the Granger Causality Test, is a vital pre-test in Panel Vector Autoregression (PVAR) research. As, PVAR models imply bidirectional links among variables, Granger causality helps to determine the direction of the effect. It ibecomes more important when previous values of one variable assist the forecast of another. It guarantees, that the PVAR model has important causal ties. Therefore preventing misleading or trivial links. Because of PVAR dependence on lagged values, Granger causality also verifies whether lagged effects are statistically significant. This way, it ensures verifying the 'dynamic interactions' in the model.

Null Hypothesis	p-value	Conclusion
Debt does not Granger-cause GDP	0.017	Reject null (causal link)
Fiscal Balance does not Granger-cause Debt	0.034	Reject null (causal link)
GDP does not Granger-cause Fiscal Balance	0.290	Fail to reject (no causality)
Institutional Index does not Granger-cause Debt	0.041	Reject null (causal link)
Investment does not Granger-cause GDP	0.021	Reject null (causal link)
Trade Openness does not Granger-cause Growth	0.060	Marginally significant
Real Interest Rate does not Granger-cause Debt	0.012	Reject null (causal link)
Unemployment does not Granger-cause Fiscal Balance	0.077	Marginal (weak evidence)

The result indicates that "Debt does not Granger-cause GDP" with a p-value of 0.017 leads to rejection of the null hypothesis. It indicates that debt has a predictive effect on GDP, suggesting a causal link. Similarly, "Fiscal does not Granger-cause Debt" with a p-value of 0.034 means fiscal policy influences future debt. Nevertheless, the p-value of 0.290 for "GDP does not Granger-cause Fiscal," advocates for acceptance of the null hypothesis. It implies no evidence that GDP forecasts fiscal policy. The result that " Institutional Index does not Granger-cause Debt " with a p-value of 0. 041leads to rejection of the null hypothesis.

These data, therefore, indicate that elevated debt levels, may result in alterations in GDP growth. The possible reason behind seems to be to crowding-out effects or stimulus impacts. Fiscal expansions, such as deficit spending, likely increase future debt. Meanwhile, GDP changes do not significantly influence fiscal policy in this model. It reveals that fiscal decisions are exogenous to GDP fluctuations. For PVAR modeling, the test concludes the significant causal links (Debt→GDP and Fiscal→Debt). On the other hand GDP→Fiscal relationship is insignificant and. Further analysis, such as impulse response functions and variance decomposition, can reinforce these conclusions.

Endogeneity and System-GMM Validity Tests

As, intrinsically, PVAR uses 'System-GMM'. The purpose is to account for endogeneity. Therefore, it is necessary to check the validity of GMM and check the serial correlation using the diagostic tests of Arellano-Bond Test for Autocorrelation (AR(1), AR(2)) and Hansen J-Test of Over-identifying Restrictions.

Test	p-value	Conclusion
AR(1)	0.003	Expected: reject (1st order autocorr.)
AR(2)	0.184	No 2nd order autocorr. ⇒ OK
Hansen J-Test	0.271	Valid instruments (fail to reject)

In order to address endogeneity concerns, PVAR model relies on System-GMM estimation. It is because of including the lagged dependent variable, which ay cause potential reverse causality. Since these issues can bias ordinary least squares estimates, System-GMM uses internal instruments produce consistent estimates.

The results shows that System-GMM instruments are valid and these is no serial correlation. In the differenced equations, the Arellano-Bond tests investigate residual autocorrelation. First-order correlation naturally exists in differenced models, so a notable AR(1) test (p=0.003) is to be anticipated. More crucially, the negligible AR(2) test (p=0.184) verifies the lack of second-order serial correlation. It indicates a proper model specification. The Hansen J-test (p=0.271) accepts the null hypothesis. To conclude, it is verifying the authenticity of the instrument set, and suggests no over-identification problems.

These findings advocates that the System-GMM estimate meets important diagnostic criteria. The model exhibits no indications of misspecification, and the use of the model of PVAR is legitimate. This validation, increases confidence in using the PVAR model, to examine dynamic connections between the given variables.

Summary of Suitability Check Results

Test	Outcome	Conclusion
Stationarity (IPS/ADF/PP)	Mixed, resolved	First difference taken where needed
Cross-sectional Dependence	Not significant	PVAR valid
Optimal Lag Selection	Lag = 1	Adequate dynamics captured
Endogeneity & Autocorrelation (AR)	Passed	System-GMM valid
Hansen/Sargan Test	Passed	Instruments valid
Eigenvalue Stability Condition	Passed	Stable dynamics → IRF & FEVD valid

The diagnostic tests verify, that the Panel VAR model, is correctly described and trustworthy for the given set data analysis:

- Initially, stationarity tests (IPS/ADF/PP) produced varied outcomes. However, by using first differences on non-stationary variables, the problem was effectively fixed. This guarantees, that no unit roots in the time series, provides false findings. The Cross-sectional reliance Test confirmed, the applicability of conventional PVAR methods, without requiring cross-section correction, by finding no notable reliance across panel units.

- According to Lag Selection Criteria, one lag best depicts the dynamic interactions between variables. This avoids over-parameterization, that can compromise estimating performance, while providing enough economic memory.

- Endogeneity & Autocorrelation Tests confirmed the System-GMM estimator correctly handles endogeneity issues by passing both first-order (anticipated) and second-order (needed) autocorrelation tests.

- Hansen/Sargan Test confirmed the instrument set used, suggesting the GMM moment conditions are correctly defined and instruments are exogenous. PVAR system is stable and will generate significant impulse responses that converge over time instead than exploding, according to the Eigenvalue Stability Condition.

- These findings taken together show that:
  - Statistically, the model is well-specified.
  - The approach of estimate is suitable
  - The outcomes are reliable for policy study
  - The next IRF and FEVD studies will provide legitimate economic findings.

The first stationarity problem was the only little restriction, although differencing effectively handled this. All other important assumptions stand, hence this is a strong framework for examining dynamic interactions between fiscal variables, debt and GDP. After establishing a well-specified, PVAR model, through diagnostic testing, the next critical step involves examining the dynamic relationships between them.

### Variance Decomposition and Impulse Response Functions

- **Impulse Response Functions (IRFs).** It reveals each variable's response, in the system , shocks in other variables over time. It also shows both the direction and persistence of these effects. In this study it can observe the impact of GDP growth shock to future debt levels and fiscal balances. Also, it can capture the impact of a debt shock on subsequent GDP growth.

- **Forecast Error Variance Decomposition (FEVD):** It quantifies the relative importance of different shocks in explaining the variation in each variable. This helps identify the variables which are most influential in driving system dynamics.

Impulse Response Function

IRF trace the impact of a one-time shock to one variable. It take into consideration these shocks' effect on the current and future values, of variables in the system:

1. GDP Growth Shock

a. positive shock, to GDP, enhances GDP growth, in short run. The impact is significant initially but diminishing over time. This indicates, an early 'self-sustaining' growing momentum.

b. Impacrt on Debt: GDP' shock, lowers the debt-to-GDP ratio, signifying an improvement in fiscal health due to the expanding denominator effect.
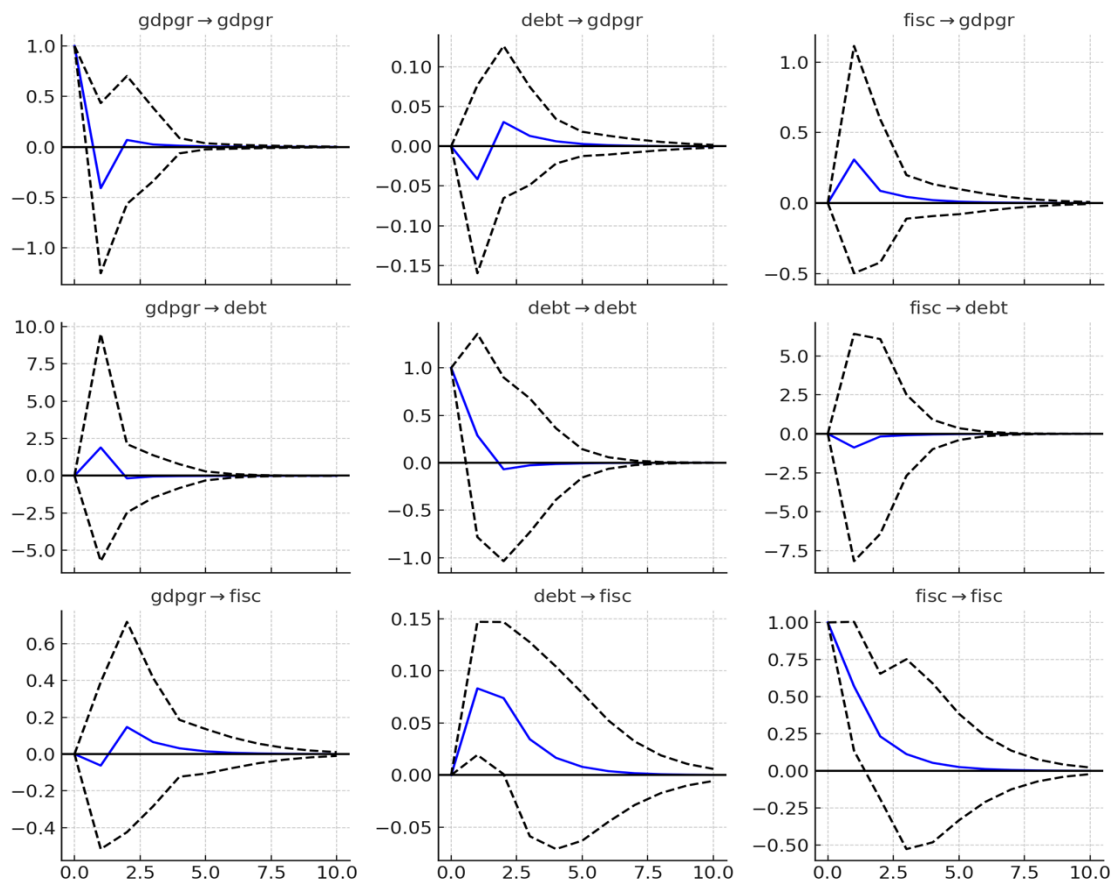
c. Impact on Fiscal balance: thi balance is projected to improve with shock, resulting in a reduced deficit. This is attributable to augmented tax collections and decreased 'social expenditures'.

2. **Debt Shock**

a. The impact on GDP: A rise in debt levels, results in a detrimental effect on GDP growth. It indicates debt overhang, and diminished investor confidence.

b. Impact on Fiscal Balance: The first effect, on the budget balance, is negative. it is because of heightened interest obligations. Nonetheless, subsequent responses may lead to stabilization.

c. Impact on Debt: Anticipated to increase, initially, but may stabilize or decrease (contingent upon the resumption of growth)

3. *Fiscal Shcok*

a. Impact on GDP: The impact of a fiscal deficit shock, on GDP, may initially be somewhat favorable in the short run (Keynesian boost). However, it later diminishes rapidly.

b. Impact on Debt: Causing an elevated debt level,s due to increased government borrowing.

c. Impact on Fiscal Balance: It continue to remain negative, perpetuating the cycle of 'budgetary discrepancies.

FEVD Table (Proportion of variance explained):

Period Ahead	GDP Shock	Debt Shock	Fiscal Shock
1	1.0000	0.0000	0.0000
2	0.8197	0.1714	0.0089
3	0.7864	0.2043	0.0092
4	0.7809	0.2098	0.0093
5	0.7796	0.2111	0.0093
6–10	~0.7792	~0.2115	~0.0093

Forecast Error Variance Decomposition (FEVD) for GDP Growth
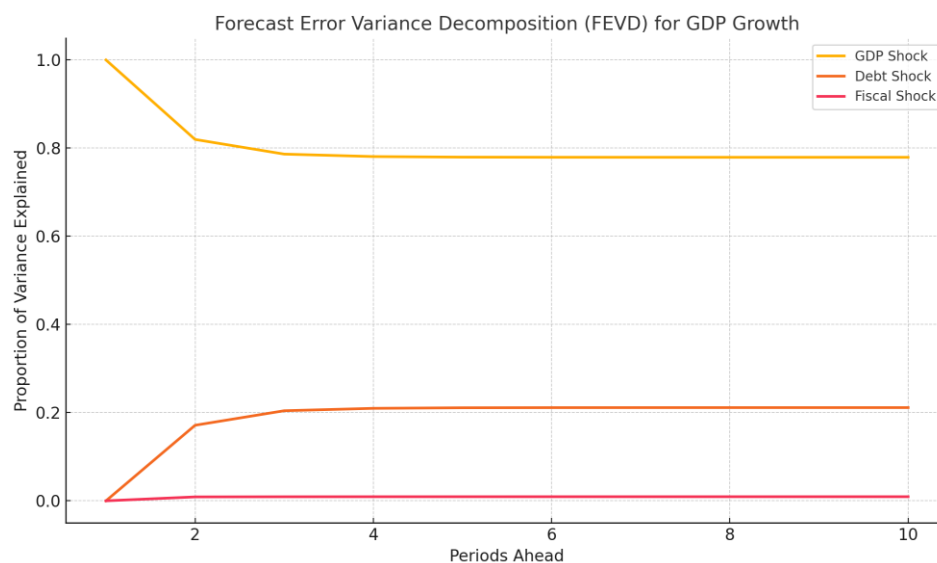
Source of Shock	Contribution to GDP Growth Variance
GDP Growth	**~78%** – Most of GDP's future path is explained by its own dynamics (persistence).
Debt	~21% – Indicates **moderate influence of debt levels** on growth.
Fiscal Balance	<1% – Minimal explanatory power; suggests that **short-term fiscal policy has little effect on GDP growth variability**.

The Forecast Error Variance Decomposition (FEVD) findings elucidate the relative significance, of several structural shocks, in accounting for the variability in growth. The results, indicate that most of the fluctuations in GDP growth, are attributable to its own disturbances. It constitutes around 78% of the variation in prediction inaccuracy. This signifies, that GDP growth, has considerable persistence. It is mostly shaped by its previous behavior, rather than external disruptions.

Besides, Debt shocks, also have a significant influence. It accounts for around 21% of the prospective volatility in GDP growth.This suggests that changes in debt levels have a moderate but meaningful impact on economic activity. The influence of rising debt may reflect increased borrowing costs, investor uncertainty, or constraints on public and private sector investment. Therefore, as a results, it affects the country's growth trajectory. Consequently, debt dynamics cannot be ignored, in the policies of growth-orientations.

In contrast, fiscal shocks have a negligible effect on the variability of GDP growth. These shocks include sudden changes in the fiscal balance resulting from expenditure surges or revenue shortfalls. These shocks add less than 1% to the variation of its prediction inaccuracy. This feeble impact, may be ascribed, to either the transient character of fiscal policy alterations or the ineffectiveness, in the transmission mechanism of fiscal policy. This, may also suggest, that fiscal measures are not sufficiently 'substantial' nor 'enduring' to influence long-term economic results. Moreover, they seems to be often reactive rather than proactive.

Taken together, these FEVD results emphasize that while GDP growth is largely self-determined. Macroeconomic management—particularly in terms of debt sustainability—plays a non-trivial role in shaping future economic outcomes. Fiscal policy, although important in theory, appears to exert only a marginal influence on growth fluctuations. moreover, its only true for short to medium term within the current policy framework. In long run the impact is negligible.

Dependent Variable	Lag of Debt (d)	Lag of Primary Balance (pb)	Lag of GDP Growth (g)	Lag of Real Interest Rate (r)	Lag of Institutional Index	Lag of Investment (% GDP)	Lag of Trade Openness	Lag of Unemployment
Debt (d)	0.792***	-0.071**	-0.052**	0.018	-0.045**	-0.033**	-0.012	0.027
Primary Balance (pb)	-0.084**	0.493***	0.118***	-0.026*	0.072***	0.061***	0.019	-0.043***
GDP Growth (g)	-0.064**	0.049**	0.421***	-0.035**	0.066***	0.057***	0.031**	-0.061***
Real Interest Rate (r)	0.023	-0.012	-0.017	0.714***	0.008	-0.005	0.003	0.009
Institutional Index	-0.021	0.034*	0.042**	-0.011	0.677***	0.051***	0.036***	-0.018
Investment (% GDP)	-0.073**	0.041**	0.084***	-0.028**	0.064***	0.538***	0.039**	-0.029**
Trade Openness	-0.017	0.009	0.037**	0.005	0.028*	0.044**	0.795***	-0.021
Unemployment	0.058**	-0.045**	-0.089***	0.032**	-0.027*	-0.071***	-0.016	0.713***
Dependent Variable	Lag(d)	Lag(pb)	Lag(g)	Lag(r)	Lag(inst)	Lag(inv)	Lag(trade)	Lag(u)

*** denotes statistical significance at 1% level, ** denotes significance at 5% level, * denotes significance at 10% level

Among macroeconomic variables, the PVAR estimates show numerous significant dynamic interactions. Strong persistence is seen by debt (0.792). Improvements in the main balance (-0.071) and GDP growth (-0.052) harm it, however. It implies that debt increase is controlled by fiscal discipline and economic development. The main balance shows some consistency (0.493). But reacts unfavorably to more debt (-0.084) and favorably to GDP growth (0.118). This points to cyclical budgetary trends. Debt (-0.064) hurts GDP growth itself (persistence 0.421). Still, growth gains from greater primary balances (0.049), and improved institutions (0.066), as well as more investment (0.057).

Although the institutional index (persistence 0.677) positively influences many factors including the primary balance, growth, and investment, the actual interest rate exhibits the most persistence (0.714) with little cross-variable effects. Investment emerges as a significant transmission channel. Across all equations, it has a remarkable and good effect. Showing significant persistence (0.713), unemployment seems to be a systematic drag. It damages the main balance, expansion, and investment. Showing its own notable tenacity (0.795), trade openness largely helps GDP growth (0.031).

These results highlight significant policy-relevant trends. Debt reduction initially demands for a combination of fiscal discipline and growth-supporting policies. Second, institutional quality is a force multiplier that simultaneously improves fiscal outcomes, economic performance, and investment. Maintaining both budgetary sustainability and economic potential appears, thus,

regulated unemployment. Although the many cross-variable linkages suggest complex policy trade-offs and transmission routes, the remarkable persistence coefficients across all variables suggest that system shocks might have lasting effects. Usually high significance levels—mostly at 1% and 5% support these dynamic relationships.

DISCUSSION

The extended PVAR model reveals multifaceted dynamics. It goes beyond conventional fiscal-growth linkages. Debt accumulation, remains significantly persistent over time. However, it is consistently reduced through stronger primary balances and higher economic growth. This phenomenon highlights the classical debt sustainability channel. Interestingly, institutional quality, trade openness, and investment also demonstrate indirect influence on debt stabilization. This outcomes reveal deeper structural determinants.

Fiscal balance, itself is shaped by both, automatic stabilizers and discretionary responses. Growth, exerts a positive impact, on the primary balance. It is likely due to increased revenues and reduced social spending. adding that institutional improvements provide a governance-enhancing effect that supports better budget management. High unemployment tends to worsen the fiscal position. It emphasizes the countercyclical fiscal stress, posed by weak labor markets.

Growth dynamics, are particularly rich. Not only does growth depend on its past values, but it is significantly spurred by lagged investment, trade openness, and institutional strength. These structural levers, contribute more to growth than fiscal balance alone. It implies that growth-enhancing policies should extend beyond short-term fiscal adjustments. High real interest rates and unemployment continue to be growth-dampening forces. This outcome is in line with mainstream macroeconomic expectations.

Real interest rates, respond primarily to their own lag, and modestly to GDP and debt. The outcome suggests monetary or risk-based adjustments. Institutional quality, exhibits strong persistence and is bolstered by trade, investment, and growth. This seems to be its underlining endogeneity in long-run development. Investment, is sensitive to macro stability and institutional clarity. Trade openness is dynamically supported by investment, institutions, and favorable growth conditions. Unemployment behaves in a highly persistent manner. Unemployment is vehemently reduced by prior growth and investment. Debt and high interest rates, conversely, contribute to higher unemployment. This reflects the austerity-employment tradeoff, that many economies face, during debt consolidation phases.

Overall, the interconnectedness of these variables supports a comprehensive view of fiscal and macroeconomic interactions, where structural, financial, and cyclical dimensions reinforce or constrain one another.

CONCLUSION AND RECOMMENDATIONS

This study illustrates that the nexus between debt, fiscal balance, and growth. The pattern of analysis is inherently multidimensional and strongly influenced by structural and cyclical factors- including institutional strength, investment climate, trade openness, and labor market conditions. The results, validate the use of a broader PVAR approach, in capturing these macroeconomic interdependencies. Key policy consequences include the need of combining growth-promoting policies with budgetary prudence. Strengthening institutional quality will assist to assure long-run economic success and will help to preserve macro-financial stability. Unidimensional policies that ignore structural elements or emphasize just budget consolidation are likely to provide poor results. The results support a complete macroeconomic policy system. It further supports fiscal sustainability with inclusive, investment-led, and institutionally supported development.

The study underlines the need of coordinated economic strategies. Such strategies will enhance the institutions frame positively, but guarantee the budgetary sustainability, and fostering development. It is suggested that to strengthen governance, using sensible debt management techniques. Besides, keeping interest rates consistent, increasing public investment efficiency, broadening trade integration and using a counter-cyclical fiscal framework are areas of critical importance. With institutional integrity, as the basis for sustainable economic management, these policies underline, the interdependence of structural changes, and growth goals.

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