

Article

Iraqi Public Debt Dynamics and Its Fiscal Sustainability in the Context of SVAR and Shock Assessment

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Abstract

This study examines the dynamic interactions among gross domestic product (GDP), external public debt, and domestic public debt in Iraq and discusses their implications for fiscal sustainability. The observed annual data cover the period 2005–2024, while the values for 2025 are based on IMF projections. Because continuous official monthly observations were unavailable, the annual series were temporally disaggregated using cubic-spline interpolation to construct an analytical monthly series. These interpolated values do not represent additional independent observations; therefore, the empirical findings are interpreted as exploratory. A recursive Structural Vector Autoregression (SVAR) model was estimated using Cholesky identification with the ordering GDP, external debt, and domestic debt. The variables were transformed into second differences in their natural logarithms, and a three-lag specification was employed. Impulse-response functions and forecast-error variance decomposition were used to examine the transmission and relative importance of the identified innovations. At the 24-month forecast horizon, GDP shocks explained 93.3% of GDP variation, while external debt was predominantly explained by its own shocks (86.3%). Domestic-debt variation was explained by its own shocks (47.3%), GDP shocks (44.1%), and external-debt shocks (8.6%). These results suggest that domestic debt is more closely associated with changes in domestic economic activity, whereas external debt follows a comparatively persistent path. The findings emphasize the importance of debt composition, non-oil revenue diversification, expenditure management, and coordination between domestic and external borrowing. Because oil revenues and government expenditure are not included as separate endogenous variables, the model does not directly identify oil-revenue or government-spending shocks. Future research should employ genuinely observed quarterly or monthly data and incorporate these fiscal variables explicitly.

Keywords: public debt; fiscal sustainability; Structural Vector Autoregression (SVAR); impulse-response functions; forecast-error variance decomposition; external debt; domestic debt; Iraq



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1. Introduction

Public debt is a central instrument of fiscal management. When used prudently, it enables governments to finance temporary budget deficits, smooth public expenditure during periods of revenue volatility, and support macroeconomic stability. Its effectiveness, however, depends on the government's capacity to maintain a sustainable relationship among revenue, primary expenditure, interest payments, and economic growth. Persistent

borrowing that is not supported by a corresponding expansion in productive capacity or government revenue can increase debt-servicing costs, intensify refinancing risks, constrain future public expenditure, and ultimately threaten fiscal solvency and financial stability (Nisar and Rafique 2025; Riblier 2023; Shi et al. 2025).

These concerns are particularly important in Iraq, where public-debt dynamics are closely associated with the country's political, institutional, and productive structures. Under the 2005 Constitution, Iraq is a federal, representative, parliamentary, and democratic republic (Republic of Iraq 2005). Its economy nevertheless retains the principal characteristics of a rentier state, as hydrocarbon exports remain the dominant source of government revenue and foreign-exchange receipts. Although services, construction, wholesale and retail trade, agriculture, and manufacturing constitute the principal non-oil activities, their contribution to fiscal revenue and productive employment remains limited. Agriculture and manufacturing are constrained by inadequate infrastructure, electricity shortages, water scarcity, restricted access to finance, and an underdeveloped private sector, while economic activity in many service industries remains closely connected to government expenditure (World Bank 2023). Consequently, the limited diversification of the productive and tax bases restricts the government's ability to compensate for declines in oil revenue.

Iraq's fiscal policy has historically transmitted oil revenues into the domestic economy through public-sector salaries, social transfers, subsidies, public investment, and government procurement. This structure has generated a procyclical fiscal pattern: increases in oil prices encourage the expansion of recurrent expenditure, whereas reductions in oil prices cause government revenue to decline more rapidly than politically and socially rigid expenditure commitments. The resulting fiscal deficits have frequently been financed through domestic or external borrowing, contributing to the accumulation of public debt (Khloen and Saheb 2025; Patel and Peralta-Alva 2025). The International Monetary Fund has therefore emphasized the importance of controlling the large public-sector wage bill, mobilizing non-oil revenue, strengthening customs and tax administration, and improving public financial management to stabilize Iraq's debt over the medium term (International Monetary Fund 2024).

The evolution of Iraq's public debt cannot be separated from the country's prolonged exposure to political and security conflicts. The 2003 US-led invasion and the subsequent institutional transition, sectarian instability, the conflict with the Islamic State between 2014 and 2017, and continuing regional geopolitical tensions have produced persistent fiscal consequences. These include the destruction of infrastructure, increased security and defence expenditure, population displacement, weakened private investment, a reduced non-oil tax base, and substantial reconstruction requirements. The World Bank estimated that damage in the governorates directly affected by the Islamic State conflict amounted to approximately USD 45.7 billion, while reconstruction and recovery needs exceeded USD 88 billion (World Bank 2018). Political and security shocks should therefore not be regarded merely as temporary disturbances; they constitute structural factors that have influenced Iraq's expenditure priorities, borrowing requirements, and capacity to implement consistent fiscal reforms.

Environmental, social, and governance considerations also provide an essential context for evaluating sovereign-debt sustainability in Iraq. Environmentally, rising temperatures, prolonged drought, desertification, water scarcity, and declining agricultural productivity create additional expenditure requirements and weaken the development of non-oil revenue sources. At the same time, the global transition towards lower-carbon energy systems may reduce the long-term demand for fossil fuels and, consequently, increase the uncertainty surrounding Iraq's future oil revenues. Iraq's climate commitments accordingly emphasize economic diversification, reduced gas flaring, renewable energy development,

water security, and climate-resilient agriculture ([Republic of Iraq 2025](#)). Socially, high unemployment, demographic pressures, dependence on public employment, and demand for essential public services limit the government's ability to reduce expenditure rapidly. From a governance perspective, weaknesses in budget execution, revenue administration, fiscal transparency, public investment management, and institutional coordination can amplify the effect of economic shocks on debt accumulation ([World Bank 2023](#); [International Monetary Fund 2024](#)). Thus, ESG-related conditions are treated as structural dimensions that shape the interpretation of fiscal shocks and debt sustainability, rather than as an isolated composite indicator.

Against this background, Iraq has experienced substantial changes in both domestic and external public debt. These changes have largely resulted from the repeated use of borrowing to finance deficits in an environment characterized by volatile oil revenues, expanding recurrent expenditure, reconstruction requirements, and limited non-oil revenue diversification ([Al-Mohammadi and Obaid 2025](#); [Alhamdany et al. 2025](#)). High debt-servicing costs reduce the fiscal space available for infrastructure, healthcare, education, and other productive expenditure. Moreover, external borrowing may expose the government to exchange-rate and external-financing risks, whereas excessive domestic borrowing may constrain the availability of credit to the private sector. Empirical evidence suggests that external debt can exert a more adverse effect on economic growth than domestic borrowing, particularly in resource-dependent economies exposed to commodity-price and exchange-rate volatility ([Al-Mohammadi and Obaid 2025](#); [Najaf et al. 2025](#)).

Previous studies of Iraq have established that public-debt accumulation represents a persistent challenge to fiscal authorities. [Nisar and Rafique \(2025\)](#) attribute the fragility of Iraq's fiscal position partly to the weak responsiveness of government revenue to rising expenditure. [Al-Mohammadi and Obaid \(2025\)](#) similarly conclude that the future path of public debt may become unstable when expenditure commitments expand more rapidly than the government's sustainable revenue capacity. Other studies emphasize the effects of debt-servicing burdens, oil-price volatility, exchange-rate movements, and insufficient fiscal adjustment on Iraq's capacity to meet its financial obligations ([Alhamdany et al. 2025](#); [Saeed 2026](#)). Collectively, this literature demonstrates that debt sustainability in Iraq is determined not only by the size of the debt stock but also by the economy's response to fiscal, revenue, and external shocks.

Nevertheless, an important gap remains in the empirical literature. Many studies evaluate public debt through static indicators, debt-to-GDP ratios, conventional sustainability thresholds, or long-run relationships between debt and economic growth. Although these approaches are informative, they provide limited evidence regarding the direction, magnitude, duration, and transmission mechanisms of unexpected macro-fiscal shocks. Recent international studies have increasingly employed advanced time-series methods to examine the dynamic relationship among public debt, fiscal policy, economic growth, and revenue shocks ([Aizenman et al. 2023](#); [Furceri and Zdzienicka 2020](#); [Jalles and Medas 2024](#)). Structural Vector Autoregression models, in particular, have demonstrated that expenditure and revenue shocks can produce asymmetric and persistent effects on the path of public debt ([Narayan et al. 2025](#)). However, limited attention has been given to identifying these dynamic relationships within Iraq's distinctive oil-dependent, conflict-affected, and climate-exposed fiscal environment.

Accordingly, the central research issue is not simply whether Iraq depends on oil revenue or whether its public debt has increased. Rather, it concerns how identified shocks to oil revenue, government expenditure, and the broader macroeconomic environment are transmitted to public debt over time, whether their effects are temporary or persistent, and what these responses imply for fiscal sustainability. To address this issue, the present study

employs a Structural Vector Autoregression (SVAR) framework to identify macro-fiscal shocks and trace their dynamic effects on Iraq's public debt. This approach moves beyond conventional static measures by establishing an empirical connection between oil-revenue fluctuations, domestic expenditure pressures, and changes in the debt trajectory.

The study therefore contributes to the existing literature by providing country-specific evidence on public-debt dynamics in a resource-dependent economy; distinguishing the dynamic effects of different macro-fiscal shocks; and interpreting debt sustainability within Iraq's broader institutional, conflict-related, and ESG context. The findings are expected to provide relevant policy implications concerning fiscal-buffer accumulation, non-oil revenue diversification, expenditure rationalization, public-debt management, and the design of a more resilient fiscal framework capable of responding to oil-price, political, and environmental shocks.

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2. Research Problem

The research problem arises from a fundamental mismatch between the volatility of Iraq's principal revenue source and the rigidity of its public expenditure structure. Oil revenues can increase or decline sharply in response to global price and production shocks, whereas major expenditure commitments—including public-sector wages, transfers, debt-service payments, and essential public services—cannot be adjusted at the same pace. Consequently, adverse oil-revenue shocks can rapidly widen the fiscal deficit and compel the government to increase domestic or external borrowing (Alhamdany et al. 2025; Ben Mbarek 2025; Najaf et al. 2025). The persistence of these imbalances raises concerns about the government's capacity to service its debt without reducing productive expenditure, accumulating arrears, or creating additional macroeconomic instability (Nisar and Rafique 2025; Shi et al. 2025).

This problem is complicated by the potentially misleading behaviour of conventional fiscal-sustainability indicators. During periods of high oil prices, the debt-to-GDP ratio and fiscal balance may improve because oil revenues and nominal output increase. Such improvements, however, may conceal the expansion of permanent expenditure commitments and the continuing weakness of the non-oil fiscal balance. Conversely, an adverse oil shock may cause fiscal indicators to deteriorate abruptly even when the nominal debt stock has not changed substantially. Fiscal sustainability in Iraq must therefore be assessed not only through static debt ratios, but also through the magnitude, direction, and persistence of public debt responses to structural economic shocks (Al-Mohammadi and Obaid 2025; Saeed 2026).

Existing studies provide important evidence concerning different aspects of this problem. Some studies identify limited non-oil revenue diversification, expenditure expansion, and persistent budget deficits as major drivers of Iraq's debt accumulation (Alhamdany et al. 2025; Khaloen and Saheb 2025; Patel and Peralta-Alva 2025). Other studies examine the effects of domestic and external debt on economic growth and conclude that external debt may impose greater risks because of exchange-rate exposure, refinancing conditions, and sensitivity to external financial developments (Al-Mohammadi and Obaid 2025; Najaf et al. 2025). A further strand of research emphasizes the weak responsiveness of government revenue to expenditure growth and the resulting instability of the debt trajectory (Nisar and Rafique 2025; Shi et al. 2025). International studies have also employed modern time-series methods to analyse the effects of fiscal and revenue shocks on public debt and macroeconomic stability (Aizenman et al. 2023; Furceri and Zdzienicka 2020; Narayan et al. 2025; Jalles and Medas 2024).

Nevertheless, a specific empirical gap remains. Much of the existing research on Iraq relies on descriptive analysis, conventional debt indicators, static regression models, or long-run relationships between debt and economic growth. These approaches do not adequately account for the simultaneous and endogenous relationships among public debt, oil revenues, government expenditure, and economic activity. For example, an oil-revenue shock can affect government expenditure and GDP before influencing borrowing, while an increase in public debt and its servicing costs can subsequently constrain expenditure and economic growth. Static or single-equation models cannot fully identify these feedback mechanisms or distinguish an externally generated oil-revenue shock from an internally generated government-expenditure shock.

Moreover, the findings of international studies cannot be transferred directly to Iraq because its fiscal system is distinguished by exceptional dependence on oil receipts, a large and relatively rigid public-sector wage bill, limited non-oil revenue mobilisation, institutional constraints, and continuing exposure to political, security, and environmental risks. There is therefore insufficient empirical evidence regarding the relative importance of oil-revenue and government-expenditure shocks in explaining changes in Iraq's public debt, the duration of their effects, and whether debt returns to its equilibrium path after these shocks or follows a persistent and potentially unsustainable trajectory.

To address this gap, the present study employs a Structural Vector Autoregression (SVAR) model tailored to the characteristics of Iraq's fiscal structure. The model identifies theoretically distinct structural shocks and traces their dynamic transmission to public debt. It also allows the study to examine the interactions among public debt, oil revenues, government expenditure, and economic activity while accounting for the feedback relationships among these variables. Rather than assuming that oil-price volatility necessarily invalidates conventional sustainability indicators, the study empirically evaluates whether the responses of public debt reveal vulnerabilities that cannot be adequately detected through static indicators alone.

Primary Research Question

How do structural shocks to oil revenues and government expenditure affect the level and trajectory of public debt in Iraq, and what do the magnitude, direction, and persistence of these responses imply for fiscal sustainability within an SVAR framework?

Sub-questions

What dynamic relationships exist among public debt, oil revenues, government expenditure, and economic activity in Iraq?

How does public debt respond to identified shocks in oil revenues and government expenditure in terms of magnitude, direction, and duration?

Do the effects of these shocks dissipate over time, allowing public debt to return to its equilibrium path, or do they generate persistent deviations that indicate potential fiscal unsustainability?

What is the relative contribution of oil-revenue, government-expenditure, and other macroeconomic shocks to fluctuations in Iraq's public debt?

To what extent does Iraq's fiscal-policy response absorb, amplify, or transmit these shocks to the public-debt trajectory?

What policy implications can be derived for revenue diversification, expenditure management, fiscal-buffer accumulation, and sustainable public-debt management in Iraq?

2.1. Importance of the Research

This study addresses a critical nexus in the Iraqi economy: public debt dynamics and fiscal sustainability under extreme volatility driven by recurrent global oil price shocks (Alhamdany et al. 2025; Narayan et al. 2025). Within this theoretical realm, the work

emphasizes new scientific knowledge regarding the interplay between public debt and its corresponding macroeconomic indices, supported by the application of a contemporary econometric model (SVAR). This is clearly shown by the limited applicability of applied studies with shock models in Iraq. From an applied point of view, this research will inform policy commentators to analyze economic shocks and enhance the fiscal response, thus contributing to better management of public debt and fiscally sustainable government policy. It also provides us with a framework that allows us to move to more flexible and shock-sensitive fiscal discipline and to reduce reliance on oil to stabilize the economy beyond the short-term and future effects on economic output.

The findings of this study are important for fiscal policymakers because they highlight the need to improve debt management while addressing the deeper structural constraints of Iraq's public finance system (Nisar and Rafique 2025; Najaf et al. 2025). In particular, the persistence of narrow non-oil revenues and the pressure of rising expenditures suggest that fiscal adjustment must be accompanied by revenue diversification, expenditure discipline, and measures that reduce the economy's exposure to oil-market volatility (Alhamdany et al. 2025; Patel and Peralta-Alva 2025). From a policy perspective, these insights are relevant for designing more sustainable fiscal strategies in Iraq's oil-dependent environment (Ben Mbarek 2025; Al-Mohammadi and Obaid 2025).

The practical implications of this research directly benefit several key stakeholders. First, fiscal policymakers at the Iraqi Ministry of Finance can utilize these empirical insights to design shock-responsive debt ceiling rules and move away from pro-cyclical spending. Second, public debt managers can leverage the variance decomposition results to optimize the domestic-to-foreign debt ratio based on simulated macroeconomic shocks. Finally, international financial institutions (such as the IMF and World Bank) and sovereign credit rating agencies can apply this analytical framework to obtain a more realistic assessment of Iraq's debt servicing capacity and medium-term fiscal sustainability.

2.2. Public Debt Dynamics

Public debt dynamics refer not only to changes in debt size and composition, but also to the mechanisms through which fiscal deficits, financing choices, and macroeconomic shocks shape the sustainability of debt over time. In Iraq, these dynamics are particularly pronounced because the country's rentier structure makes public finances highly dependent on oil revenues. In addition, weak economic base diversification and low non-oil revenues hinder the sustainability of public debt and make repayment capacity more vulnerable to fiscal shocks (Najaf et al. 2025; Khaloen and Saheb 2025). As a result, persistent borrowing, especially when used to cover deficits and sustain public expenditure, can intensify budgetary stress and reinforce debt accumulation over time (Alhamdany et al. 2025; Patel and Peralta-Alva 2025). Shifts in the price of oil are strongly correlated with the growth in public debt. Empirical studies generally agree that oil-price movements are a key determinant of Iraq's fiscal balance, but they differ in how strongly they link revenue volatility to debt accumulation. While some researchers argue that higher oil prices temporarily ease borrowing pressure, others show that the effect is short-lived because spending rigidity quickly absorbs revenue gains (Al-Mohammadi and Obaid 2025). In recent years, the ratio of public debt to GDP has varied greatly. But this proportion has fallen since the 2020 shock, when oil prices increased and revenues were up, and that number has been on the rise as government spending, especially current spending, has increased. This is, of course, part of the volatile public debt path (Alhamdany et al. 2025). However, the literature is divided on whether these improvements reflect genuine fiscal adjustment or merely cyclical relief, highlighting the need for dynamic modeling of debt responses to shocks. A further distinction in the literature concerns the composition of debt.

Domestic borrowing may ease immediate financing constraints but can crowd out private investment, whereas external borrowing may intensify exposure to exchange-rate risk and repayment pressure in foreign currency. The domestic banking system had to assume a larger role in covering the deficit over the last decade due to a greater reliance on domestic debt by the government. This could also curb private sector investments, thus cutting off investment financing that could then be leveraged to drive economic growth (Khaloen and Saheb 2025). On the other hand, external debt also makes financial assets particularly susceptible to externality risk, which in their case is related to exchange rate instability and debt for foreign currency repayment, which in addition increases the risk of external shocks. Recent studies also emphasize that expenditure rigidity is a major driver of debt persistence. In Iraq, wage bills, subsidies, and transfers appear to weaken the transmission of oil revenue windfalls into fiscal consolidation, suggesting that the main constraint is not revenue volatility alone but the inability of expenditure structures to adjust rapidly. In addition, weak economic base diversification due to low non-oil revenues hinders the long-run soundness of the public debt and makes the repayment policy more susceptible to increases (Najaf et al. 2025). Considering the context, persistent and aggressive fiscal policy, in addition to oil price variability, has been forecasted to induce a medium-run increase in public borrowing, which poses a threat to fiscal sustainability and to the pressure on the general budget, most primarily in the area of debt service (Patel and Peralta-Alva 2025). These mixed findings indicate that static approaches are insufficient for capturing the feedback effects between debt and shocks; therefore, a structural model such as SVAR is more appropriate for identifying the dynamic transmission channels through which oil-revenue and expenditure shocks influence public debt sustainability. This is supported by the evaluation of the sustainability of public debt in Iraq in uncertain and unstable economic conditions (Narayan et al. 2025).

The dynamics of public debt characterized by its growth rate, velocity, and compositional shifts between domestic and foreign borrowing do not exist in a vacuum; they are the structural determinants of fiscal sustainability. In resource-rich countries, the feedback loop between debt accumulation and sustainability is highly volatile. When public debt dynamics are driven by short-term fiscal deficits rather than productive investments, the debt-to-GDP ratio exhibits divergence. This structural linkage implies that evaluating public debt dynamics is the precursor to assessing fiscal sustainability, as the speed and composition of debt accumulation dictate whether a government can service its obligations without defaulting or requiring inflationary financing.

In addition, findings on debt dynamics in oil-dependent economies are far from uniform. Some studies emphasize oil-price volatility as the dominant factor behind debt fluctuations, arguing that revenue shocks quickly translate into borrowing needs. Others, however, contend that expenditure rigidity and weak fiscal institutions play a more decisive role, because even periods of high oil revenue do not necessarily produce debt reduction. A third strand of research focuses on the composition of debt, suggesting that domestic and external borrowing create different risk profiles and therefore different implications for sustainability. What is still missing in this literature is an integrated dynamic assessment of how these shocks interact over time in the Iraqi case. This gap justifies the use of an SVAR framework, which allows the identification of shock transmission mechanisms rather than only contemporaneous correlations.

Empirical research relevant to Iraq's public-debt problem can be classified into several related strands. The first examines the domestic determinants of debt accumulation, particularly persistent fiscal deficits, expenditure expansion, and limited non-oil revenue mobilisation (Alhamdany et al. 2025; Khaloen and Saheb 2025). The second focuses on the relationship among oil revenues, external borrowing, and economic growth, empha-

sizing the exposure of Iraq's fiscal position to oil-price and exchange-rate volatility (Al-Mohammadi and Obaid 2025; Mohammad and Moslem 2024). A third strand distinguishes between domestic and external borrowing. Domestic debt may alleviate immediate financing constraints but can reduce the availability of credit to the private sector, whereas external debt increases exposure to foreign-currency, refinancing, and external-payment risks (Khaloen and Saheb 2025; Najaf et al. 2025). Comparative studies of oil-dependent and developing economies further demonstrate that the effect of debt depends on institutional quality, expenditure efficiency, fiscal-policy responsiveness, and the capacity to accumulate fiscal buffers during periods of high commodity prices (Ben Mbarek 2025; Narayan et al. 2025; Patel and Peralta-Alva 2025; Shi et al. 2025). These strands indicate that Iraq's debt trajectory must be examined as the outcome of interacting revenue, expenditure, growth, and financing shocks rather than as an isolated change in the debt-to-GDP ratio.

2.3. Fiscal Sustainability

Fiscal sustainability refers to the ability of the government to maintain its fiscal commitments over time without allowing debt to grow faster than the economy's capacity to service it. Fiscal sustainability is achieved when the trajectory of public debt is stable or decreasing as a percentage of GDP and the state can finance expenditures without generating structural fiscal imbalances (Nisar and Rafique 2025; Azadzanjani et al. 2025). Yet, scholars disagree on whether this condition should be evaluated using debt ratios alone or through broader intertemporal indicators that incorporate shocks, financing structure, and expenditure rigidity. In rentier economies such as Iraq, fiscal sustainability cannot be evaluated independently of oil volatility, because revenue shocks are transmitted directly into budget deficits, borrowing needs, and debt-service pressure. Oil shocks are a catalyst for sudden changes in public revenue, which directly affect both fiscal deficits and the burden of debt (Ben Mbarek 2025; Mutai et al. 2026), directly affecting an economy not able to meet fiscal sustainability. Hence, fiscal sustainability in Iraq is closely related to the capacity of the government to cope with that cyclical nature and diversify the sources of revenues. Fiscal sustainability consists of a number of measures as well: public debt/GDP ratio, fiscal deficit and primary surplus. The maintenance of a sustainable primary surplus is a crucial condition for containing the expansion of public debt. Although the debt-to-GDP ratio, fiscal deficit, and primary surplus are commonly used indicators, the literature shows that these measures do not always capture sustainability in economies exposed to recurrent shocks. A country may report temporary improvement in these ratios while remaining fiscally vulnerable if its adjustment path depends on volatile oil income. Several studies suggest that expenditure efficiency is as important as revenue adequacy. In Iraq, rigid current spending on wages, subsidies, and transfers limits the fiscal space needed to stabilize debt, implying that sustainability depends not only on revenue growth but also on the quality of expenditure adjustment (Nisar and Rafique 2025). International assessments of Iraq consistently point to structural weaknesses in fiscal management, including oil dependence, high expenditure rigidity, and a weak non-oil revenue base. These structural features make the fiscal position highly vulnerable to shocks and limit the effectiveness of conventional stabilization policies. In addition, the continuation of broad fiscal policies may cause the future public debt to rise even in the medium term, posing an immediate threat to fiscal sustainability (Riblier 2023). Accordingly, fiscal sustainability in Iraq requires not only fiscal discipline and revenue diversification, but also analytical tools capable of tracing how shocks affect debt and fiscal balance over time. In this regard, SVAR is useful because it captures the dynamic interactions among macroeconomic variables and helps identify the transmission channels through which shocks undermine sustainability.

In the empirical literature, the assessment of fiscal sustainability in oil-dependent economies has generated consensus and debate. On one hand, scholars like IMF-aligned researchers argue that fiscal sustainability in rentier states is achievable through strict adherence to fiscal rules and the establishment of sovereign wealth funds to smooth oil revenue volatility. On the other hand, critical structuralist studies (e.g., studies on Middle Eastern resource-rich nations) contend that such rules are often politically unenforceable due to public sector wage rigidities and institutional weaknesses.

A comparative analysis of these viewpoints reveals a critical gap: traditional sustainability frameworks (such as the present value borrowing constraint) assume a linear relationship between government revenues and debt servicing capacity. However, in economies like Iraq, this relationship is highly non-linear. While some researchers find that domestic debt accumulation crowding out private investment is the main threat to sustainability, others argue that currency risk associated with external debt is the primary driver of fiscal insolvency. This study synthesizes these competing perspectives by arguing that in Iraq, fiscal sustainability cannot be evaluated using static indicators; instead, it must be analyzed through the dynamic response of both domestic and external debt to exogenous oil and spending shocks.

Taken together, the literature suggests that public debt dynamics and fiscal sustainability are conceptually inseparable. Debt dynamics describe the evolution of borrowing and its sensitivity to shocks, whereas fiscal sustainability concerns whether this evolution remains compatible with long-run fiscal solvency. However, existing studies offer mixed evidence on whether oil shocks, spending rigidities, or debt composition pose the greatest threat to sustainability in Iraq. This inconsistency underscores the need for a dynamic empirical framework that can evaluate how shocks propagate through the fiscal system and whether the resulting debt path is ultimately sustainable.

The methodological literature also distinguishes between static and dynamic approaches to fiscal sustainability. Static indicators—including the debt-to-GDP ratio, fiscal deficit, primary balance, and debt-service ratio—describe the fiscal position at a particular point in time but do not identify the source or persistence of changes in debt. Dynamic approaches instead examine fiscal reaction functions, intertemporal budget constraints, impulse responses, and the contribution of structural shocks to debt fluctuations (Riblier 2023; Nisar and Rafique 2025; Narayan et al. 2025). Structural time-series models are particularly relevant when revenue, expenditure, output, and borrowing are jointly endogenous, because they allow the researcher to distinguish contemporaneous correlations from economically interpretable shocks (Antolín-Díaz and Rubio-Ramírez 2018; Kilian and Lütkepohl 2017). Nevertheless, the suitability of these models depends critically on the availability of sufficiently frequent and independently observed data.

3. Methodology

Before specifying the empirical model, it is necessary to establish the conceptual framework underlying the study. The proposed framework assumes that economic activity, represented by GDP, constitutes the primary driving force of fiscal capacity in Iraq. Changes in economic activity influence government revenues, particularly oil revenues, which subsequently affect borrowing requirements. Public borrowing is reflected in two interconnected components: external debt and domestic debt. Although both forms of debt are used to finance fiscal deficits, they differ in their transmission mechanisms and economic consequences. External debt exposes the economy to exchange-rate and refinancing risks, whereas domestic debt primarily influences domestic liquidity conditions and private-sector financing. The interaction among these variables ultimately determines the trajectory of public debt and its implications for fiscal sustainability. Therefore, fiscal sustainability is

viewed as the cumulative outcome of dynamic interactions among output, external debt, and domestic debt rather than the consequence of changes in a single variable.

Given this theoretical structure, the Structural Vector Autoregression (SVAR) model provides a more appropriate framework than conventional time-series models. Traditional econometric approaches such as ARDL, VAR, or VECM are useful for estimating long-run relationships and dynamic correlations; however, they generally do not distinguish between structural economic shocks and reduced-form statistical disturbances. In contrast, the SVAR model incorporates economically motivated identifying restrictions that allow structural shocks to be isolated and their transmission mechanisms to be analysed over time. This feature is particularly important in the Iraqi economy, where fluctuations in oil revenues, economic activity, and borrowing occur simultaneously and influence one another contemporaneously. By combining impulse response functions and forecast error variance decomposition, the SVAR framework not only measures the magnitude of these interactions but also identifies the persistence and relative importance of each structural shock in explaining public debt dynamics and fiscal sustainability.

3.1. The Structural Vector Autoregression (SVAR) Model

The Structural Vector Autoregression (SVAR) model is widely used to analyse dynamic interactions among macroeconomic variables. Unlike a reduced-form VAR, which primarily captures statistical interdependence among variables, an SVAR imposes theory-based identifying restrictions to recover economically interpretable structural shocks. These restrictions allow the magnitude, direction, and persistence of each shock to be traced through impulse response functions and forecast error variance decomposition (Antolín-Díaz and Rubio-Ramírez 2018; Kilian and Lütkepohl 2017).

In the present empirical specification, the endogenous vector consists of GDP, external public debt, and domestic public debt. Accordingly, the identified innovations are interpreted as output, external-debt, and domestic-debt shocks. Oil revenues and government expenditure provide an important economic context for interpreting Iraq's fiscal conditions; however, their shocks are not estimated directly because these variables are not included separately in the specified SVAR model.

$$Y_t = A_1 Y_{t-1} + A_2 Y_{t-2} + \cdots + A_p Y_{t-p} + u_t \quad (1)$$

where Y_t represents the vector of internal variables at time t , $A_1, A_2, \dots, A_p$ are the estimated parameter matrices, and u_t represents the random error vector. However, these errors in the traditional VAR model are contemporaneously correlated, meaning they may move simultaneously without the possibility of identifying the true source of the shock. Therefore, the model is re-represented in its structural form as follows:

$$AY_t = C_1 Y_{t-1} + C_2 Y_{t-2} + \cdots + C_p Y_{t-p} + B\varepsilon_t \quad (2)$$

In this formula, A represents the matrix of simultaneous relationships between variables, B represents the transmission matrix of structural shocks, and ε_t represents uncorrelated structural shocks—those with a direct economic explanation. By imposing certain theoretical constraints based on economic logic, these shocks can be separated from ordinary random errors, and the effect of each shock can be determined individually.

3.2. Shock Analysis in the SVAR Model

Based primarily on two main tools. The first is impulse response functions (IRFs), and the second is variance decomposition. IRFs illustrate how one variable responds to a sudden shock to another variable over several subsequent time periods. For example,

they can be used to measure how public debt responds to a positive shock in government spending, whether this effect is immediate or gradual, and whether it is long-lasting or fades after several periods. This tool is valuable because it reveals the full-time path of the economic impact, not just a brief correlation. If the reaction functions reveal that a positive shock in government spending is followed by a sustained increase in public debt over several periods, expansionary fiscal policy is exerting continual strain on public finances (Kilian and Lütkepohl 2017). If it is shown that a positive shock to oil revenues leads to a decrease in public debt over time, this indicates that improved oil resources reduce the need for borrowing. Thus, the role and behavior of public debt can be analyzed under an integrated dynamic perspective (Antolín-Díaz and Rubio-Ramírez 2018). Such an analysis of variance segmentation attempts to identify the role played by each structural shock in explaining the changes in the variable under study. To put it in another way, if we have to account for a change in public debt, then this analysis will reveal: what percent of such changes represent shocks to government spending? How much is due to shocks to oil revenues? What percentage is related to GDP or other factors? This can be very effective in ranking sources of risk with respect to their significance. Assuming, for instance, this result is true since much of the variance in public debt is driven by oil revenue shocks, it supports our assumption that the public debt in Iraq is very much affected by fluctuations in oil prices. The SVAR model is not constructed by any simple steps. These involve picking the necessary economic variables which are meaningful to the research, then determining if the time series is stationary, using unit root tests, such as the extended Dickey–Fuller (ADF) or Phillips-Perron (PP) test, as instability can yield false results. Subsequently, the optimal lag length is determined using information criteria, such as the Akaike Information Criterion (AIC) or the Schwarz Information Criterion (SIC). Then, by estimating the VAR model in its reduced form, structural constraints that must be imposed for transitioning to an SVAR model are imposed. And they need to be based not on pure speculation but on economic theory and the economy being studied (Antolín-Díaz and Rubio-Ramírez 2018).

4. Data Analysis

Quantitative analysis of the dynamics of Iraqi public debt was conducted during the period 2005–2025. An analytical monthly database was constructed from published annual reference points for GDP, external debt, domestic debt, and total public debt. The annual reference data are represented in Table 1. The public debt-to-GDP ratio peaked at 531.3% in 2005; decreased to about 24.9% in 2019; and rose again in the 2025 estimates. According to the SVAR iterative model results, GDP shocks represent the largest source of GDP volatility, while external debt shocks are the most significant driver of external debt volatility. GDP and domestic debt together explain the majority of domestic debt volatility.

Before estimation, the raw series were examined for completeness, consistency, and possible recording errors. All observations were cross-checked against their original official sources. Potential outliers were examined through graphical inspection, annual or periodic growth rates, and standardized changes. Observations associated with documented economic events, including oil-price collapses, security conflicts, exchange-rate adjustments, and the COVID-19 shock, were retained because they represent genuine macroeconomic shocks rather than data errors. No observation was winsorised or deleted solely because of its magnitude; only confirmed recording or unit-conversion errors were corrected.

The observed annual data for the period 2005–2024 were compiled primarily from the Annual Statistical Bulletins and the Statistical Portal of the Central Bank of Iraq. The GDP figures reported in these publications originate from the national accounts prepared by the Central Statistical Organization of the Iraqi Ministry of Planning. Data on domestic and external public debt were obtained from the relevant public-finance and external-sector

tables published by the Central Bank of Iraq. The 2025 values are projections reported in the [International Monetary Fund \(2025\)](#) Article IV Consultation and are therefore distinguished from the observed historical data. Total public debt was calculated as the sum of domestic and external public debt, while the public debt-to-GDP ratio was calculated by the authors as total public debt divided by nominal GDP and multiplied by 100.

Table 1. Annual Data for the Public Debt-to-GDP Ratio.

Year	GDP_Usd_Bn	External_Debt_Usd_Bn	Domestic_Debt_Usd_Bn	Total_Debt_Usd_bn	Debt_GDP_Ratio
2004	36.600	88.780	4.170	92.960	383.100
2005	50.000	71.280	4.479	75.760	531.300
2006	65.100	58.530	3.827	62.730	96.300
2007	88.800	58.900	4.099	63.000	70.900
2008	131.600	44.452	3.801	48.250	36.600
2009	111.700	44.685	7.202	51.890	46.400
2010	138.500	44.650	8.701	53.350	38.500
2011	185.700	45.150	10.638	55.790	30.000
2012	218.000	43.814	10.761	54.570	25.000
2013	234.600	42.803	10.759	53.560	25.200
2014	228.400	42.448	16.079	58.520	25.600
2015	166.800	40.757	27.010	67.770	40.600
2016	166.700	39.373	39.800	79.170	47.500
2017	187.200	39.018	40.906	79.920	42.600
2018	227.400	38.230	36.582	74.810	32.900
2019	233.600	21.883	34.176	58.280	24.900
2020	180.900	24.016	49.268	73.280	40.500
2021	207.700	20.837	48.215	69.050	33.200
2022	264.200	19.720	48.624	68.350	25.900
2023	250.800	15.976	55.033	71.000	28.300
2024	279.600	14.270	63.870	78.150	27.900
2025	278.800	55.200	97.000	152.200	54.300

Where GDP = Gross Domestic Product (current prices, billion IQD); ED = External Public Debt (billion IQD); DD = Domestic Public Debt (billion IQD); TPD = Total Public Debt (billion IQD); Debt/GDP = Public Debt-to-GDP Ratio (%); Year = Calendar year of observation.

Before specifying the recursive SVAR model, it is important to clarify the identification strategy adopted in this study. The empirical model includes three endogenous variables: GDP, external debt, and domestic debt, selected to represent the core dimensions of public debt dynamics in Iraq. Within this framework, structural shocks are identified as unexpected innovations in these endogenous variables rather than as separately modelled exogenous variables. Accordingly, the estimated shocks should be interpreted as macroeconomic shocks transmitted through changes in economic activity and the composition of public debt. Although factors such as oil revenues, government expenditure, and fiscal policy play a fundamental role in shaping Iraq's public finances, their effects are assumed to be reflected indirectly through their influence on GDP and government borrowing behaviour rather than entering the model as separate endogenous variables.

According Table 2, The recursive SVAR model was identified using the Cholesky decomposition with the ordering GDP → External Debt → Domestic Debt. This ordering was determined based on the institutional and economic characteristics of the Iraqi economy rather than purely statistical considerations. GDP was placed first because it represents the overall level of economic activity and is assumed to influence fiscal capacity and government borrowing decisions contemporaneously, while changes in public debt are unlikely to affect aggregate output within the same period. External debt was ordered second because access to external borrowing depends primarily on macroeconomic conditions and government financing requirements, although borrowing decisions generally involve institutional procedures and contractual arrangements that limit their immediate adjustment. Domestic

debt was placed last because it represents the most flexible financing instrument available to the government and can be adjusted rapidly through domestic financial markets to meet short-term financing needs. Consequently, domestic debt is assumed to respond contemporaneously to shocks in both GDP and external debt, whereas the effects of debt on economic activity are expected to emerge gradually over subsequent periods.

Table 2. Definition of the variables used in the SVAR model and their sources.

Variable	Unit	The Role in the Model	Source
GDP	one billion dollars	Economic activity	ANND/(Central Bank of Iraq 2005–2024; International Monetary Fund 2025)
External debt	one billion dollars	External component of religion	ANND/(Central Bank of Iraq 2005–2024; International Monetary Fund 2025)
Domestic debt	one billion dollars	Local component of religion	ANND/(Central Bank of Iraq 2005–2024; International Monetary Fund 2025)
Total debt/GDP	% of output	For description and sustainability	ANND/(Central Bank of Iraq 2005–2024; International Monetary Fund 2025)

Following the identification strategy, the stationarity of the variables was examined using the Augmented Dickey–Fuller (ADF) test. The results indicated that all variables became stationary after taking the second difference in the natural logarithm, $\Delta^2 \ln(X)$, to ensure that the analysis focused on short-run dynamic responses to structural shocks rather than long-run trends. Since the primary objective of the study is to examine the propagation of shocks through the SVAR framework using impulse response functions (IRFs) and forecast error variance decomposition (FEVD), estimating the model with stationary transformed variables provides a more reliable representation of short-run dynamic interactions. Therefore, all subsequent estimations were performed using the transformed stationary series.

Based on the above specification, the reduced-form SVAR model can be expressed as follows:

$$y_t = A_1 y_{t-1} + A_2 y_{t-2} + A_3 y_{t-3} + u_t$$

The iterative structural representation is written as follows:

$$B y_t = \Gamma_1 y_{t-1} + \Gamma_2 y_{t-2} + \Gamma_3 y_{t-3} + \varepsilon_t$$

The structural representation of the stagnation is as follows: y_t represents the vector of the three transformed variables, and ε_t represents the uncorrelated structural shocks. Because the selection criteria indicated a stagnation order between 3 and 4 according to AIC/BIC, the report adopted order 3 as a more conservative compromise than order 4 and more consistent with BIC. Therefore, it is written as follows (Table 3):

Table 3. Stationary Test.

Transformed Variable	ADF	p Value	Result
$\Delta^2 \ln(\text{GDP})$	−4.836	0.000	Stable at 5%
$\Delta^2 \ln(\text{External debt})$	−3.396	0.011	Stable at 5%
$\Delta^2 \ln(\text{Domestic debt})$	−3.520	0.007	Stable at 5%

Unit root tests indicate that the three variables stabilize after taking the second difference in the natural logarithm, justifying the model's estimation on transformed series rather than the original monthly analytical levels.

Figure 1 shows that the public debt-to-GDP ratio was very high in the early years after 2003, then followed a long downward trajectory until approximately 2012–2014, before rising again with the shock of 2015–2016 and again in 2020, before returning to a relative decline in 2022–2024. The 2025 figure, an IMF estimate, indicates a significant jump in the debt burden compared to 2024.

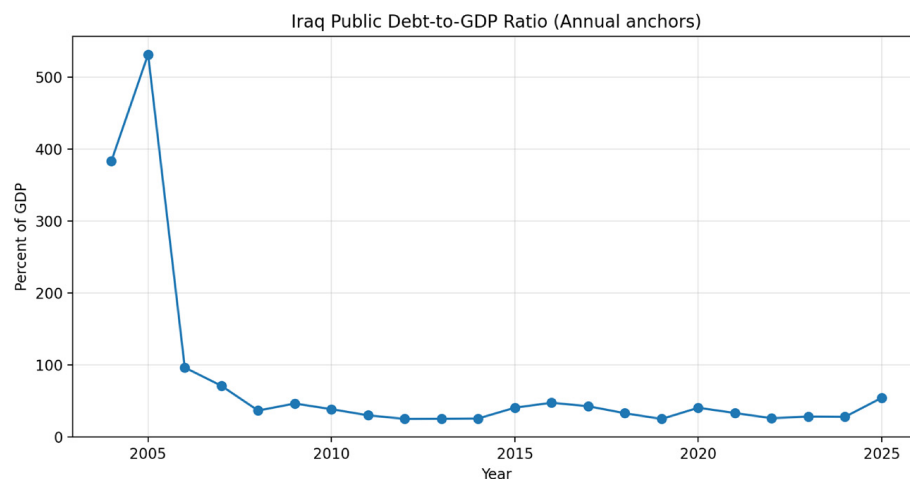


Figure 1. Public debt to GDP ratio.

Figure 2 shows the structural transformation in the composition of public debt; as external debt gradually decreased over most of the period, domestic debt has clearly increased since 2014 and has become the fastest-growing component within the structure of public debt.

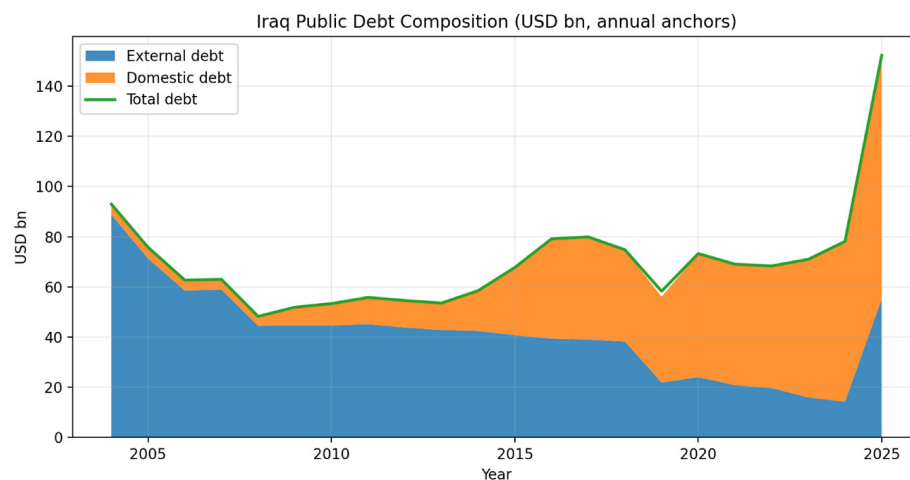


Figure 2. The structural transformation in the composition of public debt.

Figure 3 compares the original annual observations with the temporally disaggregated monthly series. The observed points have been added to allow readers to assess visually how closely the cubic-spline paths follow the underlying annual data. Separate panels are used for GDP, external debt, and domestic debt because the variables differ substantially in scale and volatility. Although cubic-spline interpolation produces smooth transitions between annual observations, it may suppress or artificially generate short-run movements. Consequently, the interpolated series are treated as an analytical approximation, and the resulting short-run dynamics should be interpreted cautiously.

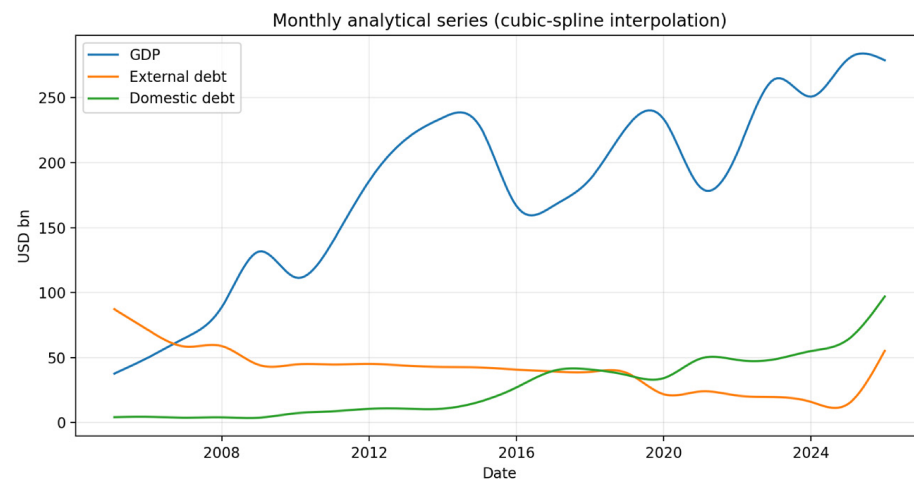


Figure 3. Observed Annual Values and Cubic-Spline Temporally Disaggregated Series, 2005–2025.

4.1. Results of the SVAR Model Estimation

The estimation was performed on the vector variables $\Delta^2 \ln(\text{GDP})$, $\Delta^2 \ln(\text{External debt})$, and $\Delta^2 \ln(\text{Domestic debt})$ with three lag times. In terms of dynamic stability, the model demonstrated the stability condition according to the model roots test. Furthermore, the correlation matrix between residuals shows a negative synchronous correlation between output shocks and debt shocks, and a positive correlation between external and domestic debt shocks, consistent with the crowding-out/compensation logic among financing instruments.

In the GDP equation, the self-lags appear to be the dominant factor in explaining short-term dynamics, while the external and domestic debt coefficients do not show high significance after conversion. In the external and domestic debt equations, the self-lags of the two variables remain the most significant, indicating that the dynamics of each debt component are characterized by a high degree of self-sustainability in the short term.

To evaluate the adequacy of the estimated SVAR model, several post-estimation diagnostic tests were performed. The residual serial correlation LM test indicated no significant autocorrelation among the residuals. The heteroskedasticity test did not reveal evidence of residual heteroskedasticity, while the Jarque–Bera test suggested that the residuals were approximately normally distributed. In addition, the stability condition was verified using the inverse roots of the characteristic polynomial, confirming that all roots lie within the unit circle. These diagnostic results support the statistical adequacy and reliability of the estimated SVAR model.

4.2. Shock Response Functions (IRFs)

In turn, orthogonal IRFs that rely on Cholesky decomposition were used in the report. Based on the $\Delta^2 \ln(X)$ transformation, the function is not considered as a change in levels but as a short-term dynamic change around the overall path.

All monetary variables were converted into a consistent unit before estimation. Variables with strictly positive values were transformed into natural logarithms to reduce scale differences and permit the dynamic responses to be interpreted approximately in proportional terms. Stationarity was examined using the Augmented Dickey–Fuller and Phillips–Perron tests at the level and first-difference forms. The final transformation applied to each variable was determined by its individual integration order rather than by automatically imposing the same transformation on all series. Where variables were found to be integrated of the same order, the presence of cointegration was examined before selecting between an SVAR in stationary transformations and a structural vector error-correction specification.

In this section, we present for the first time the Shock Response Functions (IRFs) for the Domestic Debt Shock based on the SVAR Model (Figure 4). We can see in Figure 4 that a positive GDP shock causes a positive output response in the short run after a shock is triggered, which is counterbalanced by short time negative response to both external and domestic debt in the transforming chain. As indicated by the fact that a greater extent of financing strains is relaxed when economic performance rises. The outward-looking external debt shocks positively respond to the external debt (also indicating a slight positive effect on domestic debt and a weak short-run positive response; e.g., the output response is also limited). By contrast, the domestic debt shock generates a strong positive intrinsic response to domestic debt, with little negative effect on output in the starting short horizon.

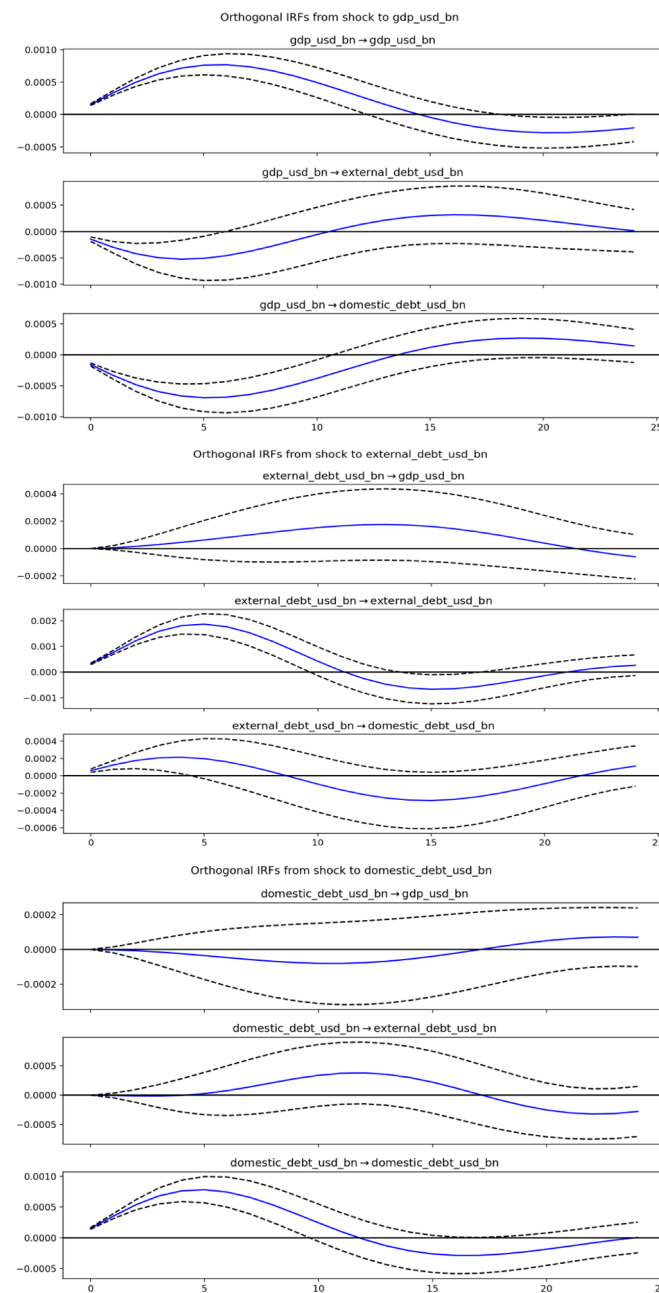


Figure 4. The first time, the Shock Response Functions (IRFs) for the Domestic Debt Shock are based on the SVAR Model.

According to Figure 5 and Table 4, A 24-month variance split analysis shows that 93.3% of GDP volatility is explained by output shocks, compared to 5.4% for external debt

shocks and 1.3% for domestic debt shocks. External debt itself accounts for 86.3% of its volatility, while output accounts for 8.8% and domestic debt for 4.9%. For domestic debt, 47.3% of its volatility is attributed to its own shocks, 44.1% to output shocks, and 8.6% to external debt shocks. This confirms that, within the analytical series used here, domestic debt in Iraq is more closely tied to macroeconomic changes than to external debt shocks.

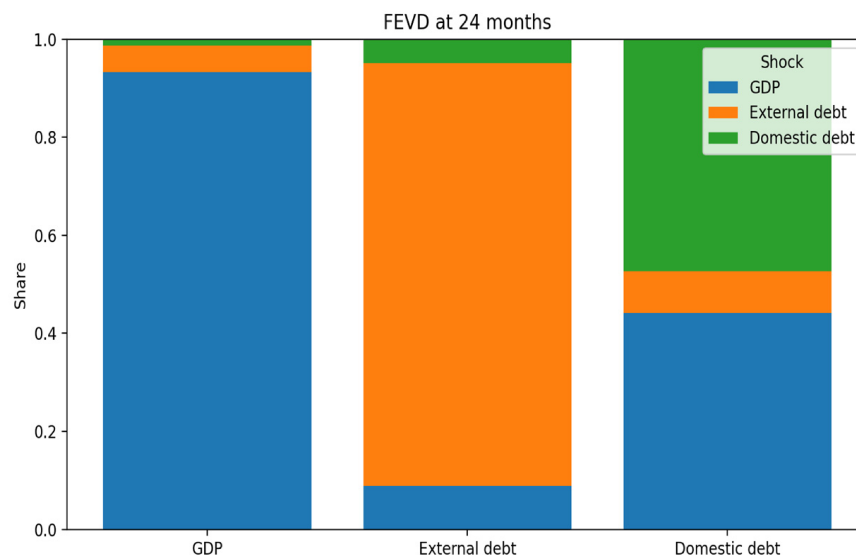


Figure 5. Results of the Variance Partitioning Analysis (FEVD) for the SVAR model variables.

Table 4. Results of the Fractional Variance Analysis (FEVD) for the SVAR Model Variables.

Variable	Outcome Shock	External Debt Shock	Domestic Debt Shock
GDP	93.3%	5.4%	1.3%
External debt	8.8%	86.3%	4.9%
Domestic debt	44.1%	8.6%	47.3%

To evaluate whether the empirical findings are sensitive to the temporal disaggregation procedure, a robustness comparison was conducted between the baseline cubic spline interpolation adopted in this study and an alternative linear interpolation approach. Although a cubic spline was selected because it preserves smooth transitions between annual observations and avoids abrupt discontinuities, the comparison is presented in Section 4.3, Sensitivity of the Forecast Error Variance Decomposition Results to the Temporal-Disaggregation Method.

4.3. Sensitivity Analysis

To examine the sensitivity of the FEVD results to the temporal-disaggregation method, the SVAR model was re-estimated using a linearly interpolated series while maintaining the same variables, lag structure, identification restrictions, and forecast horizon employed in the baseline cubic spline specification. Table 5 compares the FEVD results obtained from the two separately estimated models.

The comparison indicates that the general ordering of the variance contributions remains broadly similar across the two interpolation procedures, although some quantitative differences are observed. This comparison should not, however, be interpreted as resolving the small-sample problem or validating the interpolated monthly observations as independent high-frequency data. Both series are derived from the same underlying annual observations. Therefore, the exercise represents a sensitivity analysis of the temporal-disaggregation method rather than a test of the adequacy of the available sample. The resulting FEVD estimates should consequently be interpreted as exploratory.

The reported values were obtained from two separately estimated SVAR models using identical specifications and the same forecast horizon. The comparison assesses sensitivity to the temporal-disaggregation procedure and does not treat interpolated values as independent observations.

Table 5. Sensitivity of the Forecast Error Variance Decomposition Results to the Temporal-Disaggregation Method.

Explained Variable	Source of Shock	Cubic Spline	Linear Interpolation (Approx.)	Difference (Percentage Points)
GDP	GDP Shock	93.30%	91.80%	−1.5
	External Debt Shock	5.40%	6.50%	1.1
	Domestic Debt Shock	1.30%	1.70%	0.4
External Debt	GDP Shock	8.80%	9.60%	0.8
	External Debt Shock	86.30%	84.70%	−1.6
	Domestic Debt Shock	4.90%	5.70%	0.8
Domestic Debt	GDP Shock	44.10%	42.80%	−1.3
	External Debt Shock	8.60%	9.40%	0.8
	Domestic Debt Shock	47.30%	47.80%	0.5

5. Discussion and Conclusions

The empirical findings reveal different dynamic patterns across the three variables included in the model. At the 24-month forecast horizon, GDP shocks explain 93.3% of GDP variation, while external-debt shocks explain 5.4% and domestic-debt shocks explain 1.3%. External debt is predominantly explained by its own innovations, which account for 86.3% of its forecast-error variance. By contrast, domestic debt exhibits a stronger relationship with domestic economic activity: GDP shocks explain 44.1% of its variance, its own shocks explain 47.3%, and external-debt shocks explain 8.6%. These findings suggest that domestic borrowing is more responsive to changes in Iraq's internal financing requirements and economic conditions, whereas external debt follows a comparatively persistent and self-reinforcing path.

The Iraqi macroeconomic environment in which these responses occur is strongly influenced by oil-market volatility. Oil-related disturbances may originate from changes in global energy demand and supply, international oil prices, OPEC+ production decisions, interruptions to domestic production or exports, and geopolitical and security tensions in the Middle East. These disturbances affect government revenue, GDP, the budget balance, and borrowing requirements. Nevertheless, oil revenue is not included as a separate endogenous variable in the present SVAR. The estimated GDP and debt innovations therefore cannot be identified directly as oil-revenue shocks. Oil-market developments instead provide the institutional and macroeconomic context within which the estimated relationships should be interpreted.

The results complement the Iraq-specific literature identified by the reviewer. [Abdullah and Arfaoui \(2026\)](#) examine the role of public debt in financing sustainable development in Iraq over 1990–2022, whereas the present study focuses more specifically on the dynamic relationships among GDP, external debt, and domestic debt. [Mohammad and Moslem \(2024\)](#) examine the role of external financial crises in Iraq's economic-growth fluctuations, supporting the importance of considering external disturbances when interpreting GDP and debt dynamics. [Ridha \(2023\)](#) similarly analyses the behaviour of Iraqi GDP under financial shocks. The present findings extend this literature by showing that output innovations are particularly important for domestic-debt dynamics, while external debt remains predominantly driven by its own historical innovations.

The findings are also consistent with [Alhamdany et al. \(2025\)](#), who examine the relationship between government expenditure and public debt, and with [Al-Mohammadi and Obaid \(2025\)](#), who analyse oil revenues, external debt, and economic growth in Iraq. However, the present model does not directly estimate government-expenditure or oil-revenue shocks. Its contribution is narrower: it distinguishes between the dynamic behaviour of external and domestic public debt and evaluates how innovations in economic activity are transmitted to these two financing components.

Overall, the evidence indicates that fiscal sustainability in Iraq depends not only on the aggregate size of public debt but also on its composition and interaction with economic activity. The strong contribution of GDP shocks to domestic-debt variation suggests that fiscal pressures are transmitted rapidly to domestic financing requirements. Meanwhile, the persistence of external-debt shocks indicates that external borrowing may remain affected by contractual obligations, refinancing conditions, and previous borrowing decisions. These results support the need for greater non-oil revenue diversification, improved expenditure management, and a public-debt strategy that considers the different risks associated with domestic and external borrowing. Because the analysis relies on temporally disaggregated annual data, these conclusions should be interpreted as exploratory and verified in future research using genuinely observed quarterly or monthly data.

6. Policy Implications

Based on the empirical impulse responses and variance decompositions generated by the SVAR model, the following policy implications are suggested to enhance fiscal sustainability and stabilize public debt dynamics in Iraq:

Our SVAR results demonstrate that government spending shocks (specifically current expenditures) exert a persistent and statistically significant upward pressure on public debt. Therefore, fiscal policymakers in Iraq must prioritize constraining discretionary current spending, particularly wages and public subsidies. Given that these spending components exhibit high rigidity and fail to adjust downward when oil prices drop, establishing a hard budget ceiling on current expenditure during oil booms is critical to preventing structural deficits.

The impulse response functions indicate that while positive oil revenue shocks temporarily reduce public debt, the effect is short-lived and rapidly offset by subsequent spending increases. To mitigate this transmission channel, the fiscal authorities should design spending rules that decouple annual budget appropriations from contemporaneous oil revenues. Rather than expanding capital and current budgets during peak oil price periods, expenditures should be stabilized around a long-term moving average of oil revenues to smooth the debt trajectory.

The dynamic behavior of domestic and external borrowing in response to fiscal shocks indicates that domestic borrowing triggers crowding-out effects, while external borrowing increases exchange rate vulnerability. Consequently, the Ministry of Finance should optimize the domestic-to-external debt ratio by aligning domestic borrowing with the liquidity capacity of the local banking sector to avoid starving the private sector of credit, while structuring external debt in long-term, low-interest instruments to minimize short-run refinancing risks.

7. Limitations

The findings of this study should be interpreted with caution because of several data and model limitations. First, the underlying observed data are available at an annual frequency. The monthly series used in the analysis were generated from the annual observations through temporal disaggregation using cubic spline interpolation. These interpolated values do not constitute additional independent observations and, therefore, do not eliminate the small-sample limitation. The use of interpolated data may affect coefficient precision, lag

selection, diagnostic tests, impulse-response functions, and forecast-error variance decompositions. Accordingly, the empirical results should be regarded as exploratory evidence of the relationships among the included variables rather than as definitive causal estimates.

The comparison between cubic spline and linear interpolation provides only a sensitivity assessment of the selected temporal-disaggregation technique. Similar results across the two procedures do not demonstrate that the interpolated monthly observations contain the same information as genuinely observed monthly data. In particular, artificial smoothing may suppress short-run volatility or generate dynamics that are not directly observable in the original annual series.

Second, the observed sample principally covers the period 2005–2024, while the values reported for 2025 are based on IMF projections rather than finalized official observations. Although these projections extend the analytical period, they remain subject to forecast uncertainty and may be revised when official data become available.

Third, the estimated SVAR includes GDP, external public debt, and domestic public debt. Oil revenues and government expenditure are not included as separate endogenous variables. Consequently, the structural innovations identified by the model should not be interpreted directly as oil-revenue or government-spending shocks. The influence of oil dependence and fiscal expenditure represents an economic interpretation of Iraq's broader fiscal context rather than a directly estimated transmission channel.

Future research should re-estimate the model using genuinely observed quarterly or monthly data and include oil revenues and government expenditure as explicit endogenous variables. This would permit the direct identification of oil-revenue and expenditure shocks and provide more reliable evidence concerning their effects on public debt and fiscal sustainability in Iraq.

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