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Safeguarding economic stability: the interplay of fiscal dominance and monetary policy in South Africa

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Abstract

Purpose – The purpose of this study is to investigate the interplay between fiscal dominance and monetary policy in South Africa from 1960 to 2023.

Design/methodology/approach – The study employs a structural vector autoregression (SVAR) medel to analyze the relationship between fiscal dominance and monetary policy. Short-term and long-term shocks of government borrowing and deficits are examined to understand their impact on inflation dynamics.

Findings – Fiscal dominance has a significant effect both in the short and long run. There is evidence that government debt and deficits increase inflation, overriding the effects of monetary policy aimed at maintaining price stability. On the other hand, the study reveals that money supply shocks have a greater effect in reducing fiscal dominance compared to interest rate shocks. The variance movement on inflation is significantly explained by government debt and deficits. This emphasizes the persistence of inflationary pressures associated with fiscal dominance, highlighting the importance of effective policy interventions to mitigate inflationary risks.

Originality/value – This study contributes to the existing literature by providing insights into the dynamics of fiscal dominance in South Africa. Moreover, this study extends the theoretical framework of the fiscal theory of the price level (FTPL) and the government budget constraint. This study contributes valuable insights into the dynamics of fiscal dominance in South Africa and offers guidance for policymakers in formulating strategies to safeguard economic stability.

Keywords Fiscal dominance, Monetary policy, Structural vector autoregression (SVAR)

Paper type Research paper

1. Introduction

Despite significant strides in economic policy research, the intricate relationship between fiscal dominance and monetary policy by (Nwagu *et al.*, 2022; Orji *et al.*, 2022; Subbarao, 2022; Mogaji, 2023; Shvets, 2023) South Africa remains relatively unexplored. Fiscal dominance, characterized by the dominance of fiscal policy over monetary policy, poses substantial challenges to economic stability and policymaking effectiveness (Buthelezi and Nyatanga,

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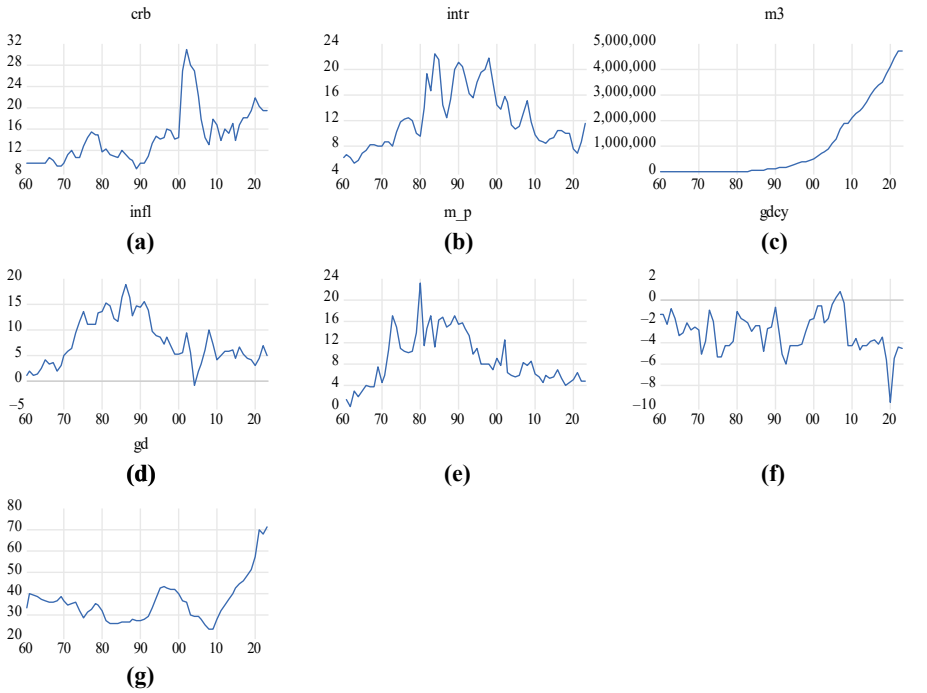
2018; Buthelezi, 2023a, b, c, d; Buthelezi and Nyatanga, 2023a, b). While fiscal dominance has been acknowledged as a potential concern, there is a lack of consensus on its specific manifestations and implications for monetary policy effectiveness (Jia, 2020, Lehmann *et al*., 2020, Heinemann and Kemper, 2021, Liu *et al*., 2021, Havlik *et al*., 2022, Ascari *et al*., 2023, De Grauwe and Foresti, 2023, Ikram and Si Mohammed, 2023, Batool *et al*., 2024). Moreover, existing literature often overlooks the dynamic interplay between fiscal and monetary policies, hindering a nuanced understanding of their joint impact on economic outcomes. The prevailing economic indicators, such as rising government debt levels, increasing debt service costs, and inflationary pressures, underscore the urgency of addressing fiscal dominance and its impact on monetary policy in South Africa.

Figure 1 shows the economic variables, it is noted that South Africa's economic stability is under threat due to persistent challenges related to inflation, fiscal deficits, and rising public debt levels. Despite efforts to manage these issues, recent trends indicate a precarious situation that requires urgent attention (Buthelezi, 2023a, b, c, d; Mlangeni and Buthelezi, 2024). Historically, Figure 1, graph (d), South Africa has experienced significant fluctuations in inflation rates, reflecting both domestic and global economic conditions. In the 1970 and 1980s, inflation in South Africa surged due to political instability, international oil crises, and economic decline. Inflation rose from 3.6% in the early 1970s to 14.0% by December 1979 and further to 20.7% in January 1986. The highest inflation in the democratic era was 13.7% in August 2008. In 2019, the average inflation rate was 4.2%, slightly lower than 4.6% in 2018,



Source(s): (IMF 2023) and (SARB 2024), figure computed by the author. Note the economic variables of *crb* are the claims on reserve bank government, *intr* is the lending rate monetary aggregates, *m*3 is the money supply: m3, *infl* is the inflation, consumer prices (annual %) *m p* is the inflation, GDP deflator (annual %), *gdcy* is the national government deficit or surplus as % of GDP, and *gd* is the total gross loan debt as percentage of GDP

Figure 1.
Economic variables

while it increased to 5.6% in 2024. South Africa faces persistent budget deficits and rising public debt, with projected deficits of 4.5% and 4.4% of GDP for 2024 and 2025, and debt expected to reach 75.3% of GDP by 2025. On the other hand, the total gross loan debt as a percentage is 71.2% in 2023. This rate is higher than 60% (Buthelezi and Nyatanga, 2018, Buthelezi, 2023a, b, c, d; Buthelezi and Nyatanga, 2023a, b, Buthelezi, 2024) to be suitable in South Africa. At a monetary level, inflation stands at an elevated rate of 6%, accompanied by a continuous rise in money supply and a recent hike in interest rates observed in 2023.

Despite revenue-driven adjustments, concerns about the realism of projections and the need for further fiscal support persist. Recent interest rate hikes in 2023 highlight the complex interplay between fiscal and monetary policy. The use of the Gold and Foreign Exchange Contingency Reserve Account (GFECRA) underscores this interconnectedness. The main challenge is maintaining economic stability amidst inflation, fiscal deficits, and public debt. Understanding fiscal dominance and monetary policy interplay is crucial for effective responses and long-term resilience. This study aims to identify the causes of these challenges and offer evidence-based recommendations for sustainable economic management. Studies conducted by (Sanusi, 2020, Barbier-Gauchard and Betti, 2021, Mangani, 2021, Moreira and Zambon Monte, 2021, Ascari *et al*., 2023, Benigno *et al*., 2023, Afonso and Sousa, 2024, Batool *et al*., 2024) have explored various aspects of fiscal dominance and its implications for monetary policy and economic outcomes. However, these studies have largely focused on other regions or provided general insights into fiscal-monetary dynamics, leaving a gap in understanding the specific dynamics in South Africa [1].

The theoretical contribution of the study lies in its exploration of the Fiscal Theory of the Price Level (FTPL) and the Government Budget Constraint as frameworks for understanding fiscal dominance and its impact on economic variables, particularly inflation. By employing these theoretical frameworks, the study aims to elucidate the mechanisms through which fiscal policy decisions, such as government debt and deficits, influence inflation dynamics. This contributes to a deeper understanding of the intricate relationship between fiscal and monetary policies and their implications for economic stability. Sanusi (2020) has shed light on the fiscal dominance in compression to other countries. Hoverer, there was a lack the defining fiscal dominance associated with specific economic variables. This study has the following definitions, one, fiscal dominance refers to the possibility that the accumulation of government debt and continuing government deficits can produce increases in inflation (Calomiris, 2023). Hence the first question of the study is their fiscal dominance in South Africa [2]. On the other hand, definition two is that fiscal dominance occurs when reserve bank uses their monetary powers to support the prices of government securities and to peg interest rates at low levels to reduce the costs of servicing sovereign debt (Dorn, 2021). Given the above, this study seeks to investigate the following question of what is the impact of fiscal dominance on monetary policy in South Africa.

The prosed study will have one hypothesis informed by the above economic question. These hypotheses are:

Hypotheses 1

Definition 1	Null	:	Government debt proxying fiscal dominance has no significant effect on inflation in South Africa
	Alt	:	Government debt proxying fiscal dominance has significant effect on inflation in South Africa

Hypotheses 1

Definition 2	Null	:	Government deficit has no significant effect on inflation in South Africa
	Alt	:	Government deficit has significant effect on inflation in South Africa

The remainder of the paper is organized as follows: Section 2 discusses the literature review; Section 3 is the methodology Section 4 is the results discussion and Section 5 is the conclusion.

2. Literature review

The intricate interplay between fiscal and monetary policies, particularly in the context of fiscal dominance, inflation, and debt management, has been extensively examined in contemporary economic literature. da Silva and Vieira (2017), Lehmann *et al.* (2020), and Sanusi (2020) have contributed significantly to understanding these dynamics. They underscore the consistency in monetary policy response across crises, indicating a robust framework in managing inflationary pressures. Lehmann *et al.* (2020) advocate for fiscal support within the Euro area, a perspective that gained prominence amidst the COVID-19 pandemic, which led to unprecedented fiscal stimulus measures. Utilizing descriptive statistics, the study highlights the critical role of fiscal stimulus in mitigating the economic impact of the pandemic and underscores the need for coordinated fiscal support within the Euro area. While the study provides valuable insights, it could benefit from a more detailed analysis of the long-term effects of such measures and the incorporation of empirical data beyond descriptive statistics to enhance the robustness of its conclusions. Sanusi (2020) provides empirical evidence of fiscal dominance in the Nigerian and South African economies, emphasizing the interdependence between fiscal and monetary policies. Using a Dynamic Stochastic General Equilibrium (DSGE) model, the study analyzes the interplay between fiscal and monetary policies over an extended period. The findings indicate that fiscal dominance significantly influences monetary policy outcomes in both economies, leading to challenges in maintaining price stability and economic growth. Although the use of a DSGE model offers a robust analytical framework, the study could be improved by incorporating more recent data and considering the potential impact of external factors, such as global economic conditions. Additionally, the exploration of policy recommendations could further enhance the practical relevance of the research. Barrie and Jackson (2022), employing a DSGE model, outline that high domestic borrowing and monetary financing reduce private investment, growth, and government revenue. Their findings underscore the adverse effects of fiscal dominance on economic performance. De Grauwe and Foresti (2023), using the heterogeneous-agent New Keynesian model, reveal that fiscal dominance leads to volatility in output and has negative effects on economic stability. These studies collectively highlight the detrimental impact of fiscal dominance on economic outcomes and stress the importance of effective fiscal and monetary policies to mitigate these effects. Ascari *et al.* (2023), utilizing a DSGE model, demonstrate that fiscal dominance results in negative demand shocks that increase inflation. Their analysis supports the notion that fiscal dominance poses significant challenges for monetary policy, particularly in controlling inflation. Cochrane (2019), using decompositions of government debt, discovers that fiscal dominance contributes to 40% of inflation variations, highlighting the substantial impact of fiscal policy on inflation dynamics. Innovative approaches, such as the "interest-rate twisting" method proposed by Leeper and Zhou (2021), examine the role of inflation in optimal monetary-fiscal policy using a DSGE model. Their findings offer strategic avenues for debt management, leveraging real interest rate tools to restore public debt sustainability. Woodford and Xie (2022) analyze the consequences of limited foresight in fiscal and monetary stabilization policy at the zero lower bound using a DSGE model. They find that fiscal dominance, particularly during economic downturns, necessitates unconventional monetary responses, further accentuating the prevalence of fiscal dominance in initiating expansionary policies. These studies collectively underscore the complex interplay between fiscal and monetary policies and the critical need for innovative and coordinated approaches to ensure economic stability.

Contrasting perspectives emerge in studies by of Jia (2020), Liu *et al.* (2021), and Barbier-Gauchard and Betti (2021), which delve into the effectiveness of monetary policy in reducing fiscal dominance and addressing spillover effects. Jia (2020) employs the New Keynesian model with sticky prices to explore the macroeconomic impact of monetary-fiscal policy in a "fiscal dominance" world. The study highlights the crucial role of monetary policy in mitigating the adverse effects of fiscal dominance. Jia's approach underscores the effectiveness of monetary policy tools in controlling inflation and stabilizing the economy despite fiscal pressures. However, the reliance on a New Keynesian model with sticky prices might oversimplify some real-world complexities, and the study could benefit from incorporating additional factors such as financial market responses and global economic conditions. Liu *et al.* (2021) examine the monetary-fiscal policy regime and macroeconomic dynamics in China using the DSGE model. Their findings emphasize the significant challenges faced by monetary policy in curbing fiscal dominance, especially during periods of heightened fiscal stress. This study provides valuable insights into the limitations of monetary policy in the face of substantial fiscal pressures. Nonetheless, the focus on China may limit the generalizability of the results to other economies with different fiscal and monetary structures. Barbier-Gauchard and Betti (2021) investigate the spillover effects of fiscal policy within a monetary union using the DSGE model. Their study finds that the impact of fiscal instruments varies widely, with most fiscal instruments producing positive spillover effects on foreign GDP, except for increased government consumption. The study also notes that different fiscal shocks trigger varying effects on foreign inflation and trade terms, suggesting the presence of heterogeneous interest-rate and trade channels. While the study provides a nuanced understanding of fiscal policy spillovers, it could benefit from a more detailed exploration of the underlying mechanisms driving these effects and the potential role of international financial markets.

The discussion of fiscal dominance amidst the COVID-19 pandemic by Blanchard (2020), Benigno *et al.* (2023) and Ikram and Si Mohammed (2023). These studies highlight the challenges to central bank independence and inflation management posed by fiscal dominance, uniquely during crises like COVID-19. The reviewed studies offer a nuanced understanding of fiscal dominance and its implications for monetary policy across different contexts and methodologies. Collectively, these studies enrich the literature by exploring various aspects of fiscal dominance and its impact on economic stability. Mangani (2021), Moreira and Zambon Monte (2021), Heinemann and Kemper (2021), Havlik *et al.* (2022) utilize a range of methodologies, including ARDL, SVAR, and qualitative analysis, to investigate fiscal dominance. These studies highlight how fiscal dominance affects monetary policy across different economies. For instance, Havlik *et al.* (2022) focus on the Euro area during the COVID-19 pandemic, using OLS regressions and SVAR to find that fiscal dominance can impose significant intergenerational burdens through debt financing. While their findings are valuable, the focus on specific periods or regions, such as the pandemic or the Euro area, may limit the generalizability of the results to other economic contexts. Kamila (2022) examines fiscal dominance in India using the Vector Error Correction Model (VECM). The study finds that fiscal dominance can improve fiscal deficit management and economic growth. This provides a contrasting view to other studies, suggesting that fiscal dominance does not always have negative consequences. However, the focus on India may not fully capture the broader dynamics of fiscal dominance in other developing or developed economies. Batool *et al.* (2024) investigate the dynamic interactions between fiscal limits and monetary-fiscal policy using the DSGE model. Their findings indicate that inflation is significantly influenced by fiscally driven monetary policies. This study supports the view that fiscal policy plays a crucial role in shaping inflationary pressures. Yet, the DSGE model's assumptions and the specific focus on dynamic fiscal limits might oversimplify complex real-world interactions. Similar to Mangani (2021), investigated the fiscal

dominance in Malawi using autoregressive distributed lag model (ARDL). It was found that fiscal dominance hypothesis is divided in developing economies. Afonso and Sousa (2024) use the Generalized Method of Moments (GMM) model to explore the interplay between monetary and fiscal policies within the European Union. Their study finds that inflation rates have a significant impact on central banks' decision-making processes. This aligns with the broader understanding of fiscal dominance but might not address how varying fiscal policies influence monetary policy in different economic conditions. Many studies, including those by Mangani (2021) and Kamila (2022), focus on specific countries or regions. While this provides detailed insights into particular contexts, it limits the generalizability of findings. Comparative studies across different economic contexts could enhance the understanding of fiscal dominance. The reliance on various methodologies, such as ARDL, SVAR, and DSGE models, provides valuable perspectives but also introduces limitations. For instance, DSGE models, as used by Batool *et al.* (2024), may oversimplify real-world complexities due to their assumptions. Incorporating alternative methodologies or mixed-method approaches could offer a more comprehensive analysis. Several studies focus on specific periods or crises, such as the COVID-19 pandemic or economic downturns. While these studies are relevant, they may not fully capture the long-term dynamics of fiscal and monetary interactions. Longitudinal studies examining fiscal dominance over extended periods could provide deeper insights. While many studies discuss the implications of fiscal dominance for monetary policy, there is a need for more detailed exploration of policy interventions and their effectiveness. Research that examines the practical implementation of fiscal and monetary policies in mitigating fiscal dominance could offer valuable guidance for policymakers.

There are studies that provide a diverse range of perspectives on the interplay between monetary and fiscal policies, their impacts on economic stability, and the challenges associated with fiscal dominance. Orji *et al.* (2022) examine the channels through which monetary policy affects sectoral outputs and sustainable growth in the ECOWAS region using the Driscoll–Kraay fixed-effects OLS estimator. Their study highlights the heterogeneous and largely inelastic nature of monetary policy's impact on sectoral value added. This nuanced understanding of monetary policy transmission mechanisms contributes valuable insights into how different sectors respond to monetary policy changes. However, the focus on the ECOWAS region may limit the applicability of the findings to other regions with different economic structures and monetary policy frameworks. Nwagu *et al.* (2022) explore the nexus between fiscal policy, monetary policy, and trade balance in Nigeria using OLS regression. They find a long-term interconnection between monetary and fiscal policies, emphasizing the integrated nature of these policies. While their findings underscore the importance of considering both policy domains simultaneously, the reliance on OLS regression may not fully capture the dynamic interactions and feedback effects between fiscal and monetary policies over time. Subbarao (2022) investigate the implications of passive monetary and fiscal policies across different economic regimes. There was a focuses on the evolving challenges faced by central banks, from inflation restraint to inflation management, while (Subbarao, 2022; Mogaji, 2023) discusses the trade-offs between short-term growth and the crowding-out effect. Both studies offer valuable insights into the challenges of managing monetary and fiscal policies. However, a more detailed examination of the effectiveness of specific policy interventions and their outcomes would further enrich the discussion. Shvets (2023) highlights the trade-offs between short-term growth and the crowding-out effect, emphasizing the need to mitigate excessive macroeconomic volatility for sustainable development. This study contributes to understanding the balance between growth and stability but may benefit from a more comprehensive analysis of how different policy combinations can address these trade-offs effectively. Buthelezi (2023a, b, c, d) examines the significant impact of fiscal policy

on macroeconomic variables, including inflation. This study reinforces the importance of considering fiscal policy's broader effects on the economy. However, further research could explore the mechanisms through which fiscal policy impacts inflation and other macroeconomic variables in greater detail. Omo-Ikirodah and Afolabi (2022) report a multiplier of 0.77, indicating a high degree of fiscal dominance in their study. They also provide insights into how monetary authorities react to inflationary pressures before and after financial crises. This study underscores the significant role of fiscal dominance but could be complemented by a deeper analysis of the specific policy responses and their effectiveness in different economic contexts.

Many studies, including those by Orji *et al.* (2022) and Nwagu *et al.* (2022), focus on specific regions or countries (e.g. ECOWAS, Nigeria). While these studies offer valuable insights into localized economic contexts, there is a need for broader comparative studies to enhance the generalizability of findings across different economic environments. The studies utilize various methodologies, including OLS regression and fixed-effects models. While these methods provide important insights, they may have limitations in capturing dynamic and complex interactions between fiscal and monetary policies. Advanced methodologies such as SVAR, DSGE, or mixed-method approaches could offer a more comprehensive understanding of these interactions. Several studies highlight the challenges and trade-offs associated with monetary and fiscal policies but provide limited analysis of specific policy interventions and their outcomes. Future research could focus on evaluating the effectiveness of different policy strategies in mitigating fiscal dominance and achieving economic stability. Many studies focus on specific periods or economic regimes. Longitudinal studies that examine fiscal and monetary policy interactions over extended timeframes could provide deeper insights into the long run. However, there is a notable gap in understanding how these dynamics specifically apply to South Africa, particularly in relation to fiscal consolidation and government debt. Recent studies by (Buthelezi and Nyatanga, 2018; Buthelezi, 2023a, b, c, d; Buthelezi and Nyatanga, 2023a, b; Buthelezi, 2024) provide a critical examination of fiscal consolidation in South Africa, highlighting that efforts to consolidate fiscal policy have had limited success in reducing government debt. These studies argue that fiscal consolidation measures have not effectively mitigated the increase in government debt, suggesting a potential disconnect between policy intentions and outcomes. This situation indicates that fiscal consolidation, rather than alleviating debt burdens, may have inadvertently contributed to their escalation. The findings point to a need for further investigation into the specific mechanisms through which fiscal consolidation impacts government debt and inflation in South Africa.

The complex relationship between fiscal and monetary policies, especially in the context of fiscal dominance, inflation, and debt management, has been extensively explored in economic literature. Key contributions include the studies by da Silva and Vieira (2017), Lehmann *et al.* (2020), and Sanusi (2020). da Silva and Vieira (2017) highlight the stability of monetary policy responses during economic crises, emphasizing the resilience of policy frameworks in controlling inflation. Lehmann *et al.* (2020) stress the importance of fiscal support within the Euro area, particularly during the COVID-19 pandemic, and their findings underscore the role of fiscal stimulus in mitigating economic impacts. Sanusi (2020) uses a DSGE model to reveal the significant influence of fiscal dominance on monetary policy outcomes in Nigeria and South Africa, indicating challenges in maintaining price stability and economic growth. Additional studies, such as those by Barrie and Jackson (2022), De Grauwe and Foresti (2023), and Ascari *et al.* (2023), further elucidate the adverse effects of fiscal dominance on economic stability, output volatility, and inflation dynamics. Cochrane (2019) and Leeper and Zhou (2021) explore innovative approaches to managing fiscal policy impacts, offering strategic insights for debt management and public debt sustainability.

Despite these valuable insights, gaps remain in the literature, particularly concerning the applicability of findings to South Africa's unique economic context. Many studies focus on specific regions or time periods, limiting the generalizability of their results. There is a notable absence of detailed exploration into policy interventions and their effectiveness in addressing fiscal dominance. This study aims to address these gaps by focusing on South Africa's distinctive economic challenges, including high public debt, inflationary pressures, and fiscal deficits. By applying theoretical frameworks such as the FTPL and Government Budget Constraint, the study seeks to provide a tailored analysis of fiscal dominance and its impact on inflation and economic stability. The proposed research will contribute to a deeper understanding of the interplay between fiscal dominance and monetary policy, offering evidence-based recommendations for effective economic management in South Africa.

3. Methodology

In the effort to investigate fiscal dominance and monetary policy in South Africa, this study uses data from 1960 to 2023. The economic variables are outlined in Table 1. The economic variables for fiscal dominance include *crb*, *gdcy* and *gd*. The *crb* provides insights into the government's reliance on borrowing from the reserve bank, which is indicative of fiscal dominance. On the other hand, *gdcy* reflects the government's fiscal stance, while *gd* indicates the level of government debt relative to the size of the economy, which is crucial in understanding fiscal sustainability and potential fiscal dominance. On the monetary policy side, economic variables used are *intr*, *m*3, *infl*, and *m_p*. The *intr* monetary policy interest rates can influence borrowing costs for the government, affecting its fiscal decisions and potentially indicating the presence of fiscal dominance. While *m*3 changes in the money supply reflect the effectiveness of monetary policy in managing economic stability and its interaction with fiscal policy. Moreover, *infl* inflation is influenced by both fiscal and monetary policies and reflects the interaction of the policies. Lastly, *m_p* similar to consumer price inflation, GDP deflator inflation reflects broader price changes in the economy and can be influenced by fiscal and monetary policy actions.

These economic variables are informed by the FTPL and the Government Budget Constraint. This is contra to Barrie and Jackson (2022), De Grauwe and Foresti (2023) and Ascari *et al.* (2023) among other that used DSGE model simulation of variables. On the other hand, other scholar follow other this is evident to Nwagu *et al.* (2022), Shvets (2023) and Omo-Ikirodah and Afolabi (2022) among others.

The study seeks to examine whether the accumulation of government debt and deficits leads to inflation which will reflect fiscal dominance. On the other hand, the government budget constraint theoretical framework emphasizes the relationship between government spending, taxation, borrowing, and monetary policy (Robinson and Torvik, 2009). The study extends the theoretical framework with monetary policy variables to assess reserve bank

Table 1. Economic variables used

Variables	Description	Source
crb_t	Claims on reserve bank government	IMF (2023)
$intr_t$	Lending Rate Monetary aggregates	IMF (2023)
$m3_t$	Money supply: M3	IMF (2023)
$infl_t$	Inflation, consumer prices (annual %)	SARB (2024)
m_p_t	Inflation, GDP deflator (annual %)	IMF (2023)
$gdcy_t$	National government deficit or surplus as % of GDP	IMF (2023)
gd_t	Total gross loan debt as a percentage of GDP	SARB (2024)

Source(s): Table computed by the author

tools reduction to fiscal dominance. This study uses the SVAR allows for the identification of structural shocks and their effects on the variables of interest without imposing strong *a priori* assumptions about the causal relationships (Gottschalk, 2001). In contrast, Vector Error Correction (VEC) imposes long-run equilibrium relationships but may not provide insights into the underlying structural dynamics (Lütkepohl, 2004).

3.1 Theoretical framework

3.1.1 Fiscal theory of the price level. The Fiscal theory of the price level outlines that the price level depends on expectations about future fiscal policy actions, such as changes in government spending or taxation (Sezavar and Eslamiyan, 2022). This is the theorical framework is provides a comprehensive understanding of how fiscal policy decisions, particularly government debt and deficits, influence the price level and inflation dynamics [3]. The FTPL can be presented in Equation (1).

$$P_t = E[P_{t-1}] + E\left[\sum\left(\frac{m_t}{p_t}\right) + \Delta e\_g_t \; - \; \Delta e\_tgr_t\right] \tag{1}$$

where $P_t = infl_t$ is price level or inflation rate, $E[P_t] = infl_{t-1}$ is the expected inflation, $E[\,]$ is the expectation operator, $\sum\left(\frac{m_t}{p_t}\right)$ is the sum of the real balances, $\left(\frac{m_t}{p_t}\right) = m\_p_t$ held by agents, Δe_g_t is the expected change in government spending, Δe_tgr_t is the expected change in taxes, and $\Delta e\_g_t - \Delta e\_tgr_t = gdcy$ reflecting government deficit (Sezavar and Eslamiyan, 2022). Therefore Equation (1) is simplified into Equation (2).

$$infl_t = infl_{t-1} + m\_p_t + gdcy_t \tag{2}$$

In this study we expand the theoretical framework with the inclusion of other economic variables of interest as reflected in Equation (3).

$$\underbrace{\underbrace{\underbrace{infl_t}_{\text{monetary policy}} = infl_{t-1} + m\_p_t}_{\text{theoretical framework}} + \underbrace{gdcy_t + gd_t}_{\text{fiscal dominance}}}_{\text{extended theoretical framework}} \tag{3}$$

where gd_t government debt, the economic variables, $gdcy_t + gd_t$ reflecting the fiscal dominance. This theoretical framework follows definition 1 of fiscal dominance.

3.1.2 Government budget constraint. Government budget constraint [4] reflects the intertemporal trade-offs between government spending, taxation, and debt accumulation as represented by Equation (4).

$$gd_t = (1 + r_t)gd_{t-1} + g_t - tgr_t \tag{4}$$

where gd_t represents government debt at time t, r_t represents the interest rate on government debt, g_t represents government spending, and tgr_t represents tax revenue. Following definition 2 of fiscal dominance, gd_t is government debt, $\Delta gd_t = crb$ which represents claims on reserve bank government percentage share GDP. Therefore, Equation (4) is simplified by Equation (5)

$$crb_t = (1 + r_t)crb_{t-1} + gdcy_t \tag{5}$$

Equation (5) is expanded with the other economic variables as outlined in Equation (6)

$$\underbrace{crb_t}_{\text{fiscal dominance}} = (1+r_t)crb_{t-1} + gdcy_t + \underbrace{intr_t + m3_t + infl_t}_{\text{monetary policy}} \tag{6}$$

$\underbrace{\qquad\qquad}_{\text{theoretical framework}}$

$\underbrace{\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad}_{\text{extended theoretical framework}}$

All economic variables are defined in Table 1.

3.2 Model specification of SVAR

The SVAR starts from the VAR which reflects the data generation process with endogeneity for each variable as reflected in Equation (7).

$$x_t = A_t x_{t-1} + \ldots + A_p x_{t-p} + \varepsilon_t \tag{7}$$

where variables of N number: $x_t = (x_t, \ldots, x_{kt})'$ while, x_t is the $Nx1$ vector containing the model variables, f_t is a matrix containing, NxN autoregression coefficients, and $\varepsilon_t = (u_t, \ldots, u_{kt})$ is the unobserved error term [5] which is a vector with $Nx1$ Gaussian distribution containing a discrete representation white noise process, and $\varepsilon_t(0, E(u_t, u_t'))$ is a positive definite covariance matrix. In formulating Equation (7), with various limitations on the parameters, the study employs Cholesky's approach for the short-term constrain which depict shocks (Higham, 2009). To achieve this, the reduced form VAR in Equation (7) is multiplied by A^{-1} an inverse to formulate the SVAR model in Equation (8).

$$Ax_t = A_t^s x_{t-1} + \ldots + A_p^s x_{t-p} + bu_t \tag{8}$$

where $\varepsilon_t = A^{-1}bu_t$, and $s = A^{-1}b$. Cholesky's short-run shocks are reflected in the matrix 8 to 9.

$$\varepsilon_t = su_t = \begin{bmatrix} infl_{t_{11}} & 0 & 0 & 0 & 0 \\ infl_{t_{21}} & infl_{t-1_{22}} & 0 & 0 & 0 \\ infl_{t_{31}} & infl_{t-1_{32}} & m\_p_{t_{33}} & 0 & 0 \\ infl_{t_{41}} & infl_{t-1_{42}} & m\_p_{t_{43}} & gdcy_{t_{44}} & 0 \\ infl_{t_{51}} & infl_{t-1_{52}} & m\_p_{t_{53}} & gdcy_{t_{54}} & gd_{t_{55}} \end{bmatrix} \begin{bmatrix} u_t^{infl_t} \\ u_t^{infl_{t-1}} \\ u_t^{m\_p_t} \\ u_t^{gdcy_t} \\ u_t^{gd_t} \end{bmatrix} \tag{8}$$

$$\varepsilon_t = su_t = \begin{bmatrix} crb_{t_{11}} & 0 & 0 & 0 & 0 & 0 \\ crb_{t_{21}} & crb_{t-1_{22}} & 0 & 0 & 0 & 0 \\ crb_{t_{31}} & crb_{t-1_{32}} & gdcy_{t_{33}} & 0 & 0 & 0 \\ crb_{t_{41}} & crb_{t-1_{42}} & gdcy_{t_{43}} & intr_{t_{44}} & 0 & 0 \\ crb_{t_{51}} & crb_{t-1_{52}} & gdcy_{t_{53}} & intr_{t_{54}} & m3_{t_{55}} & 0 \\ crb_{t_{61}} & crb_{t-1_{62}} & gdcy_{t_{63}} & intr_{t_{64}} & m3_{t_{65}} & infl_{t_{66}} \end{bmatrix} \begin{bmatrix} u_t^{crb_t} \\ u_t^{crb_{t-1}} \\ u_t^{gdcy_t} \\ u_t^{intr_t} \\ u_t^{m3_t} \\ u_t^{infl_t} \end{bmatrix} \tag{9}$$

The long-term restriction of Blanchard and Quah (1989), the shock is searched for only in the row of the $f - matrix$, the long-term effect of the shock is zero, and Ψ the long-term multiplier, $\varepsilon_t = \Psi\varepsilon_t = fu_t$ as reflected in matrices 10 to 11.

$$\varepsilon_t = \Psi\varepsilon_t = fu_t = \begin{bmatrix} infl_{t_{11}} & 0 & 0 & 0 & 0 \\ infl_{t_{21}} & infl_{t-1_{22}} & 0 & 0 & 0 \\ infl_{t_{31}} & infl_{t-1_{32}} & m\_p_{t_{33}} & 0 & 0 \\ infl_{t_{41}} & infl_{t-1_{42}} & m\_p_{t_{43}} & gdcy_{t_{44}} & 0 \\ infl_{t_{51}} & infl_{t-1_{52}} & m\_p_{t_{53}} & gdcy_{t_{54}} & gd_{t_{55}} \end{bmatrix} \begin{bmatrix} u_t^{infl_t} \\ u_t^{infl_{t-1}} \\ u_t^{m\_p_t} \\ u_t^{gdcy_t} \\ u_t^{gd_t} \end{bmatrix} \tag{10}$$

$$\varepsilon_t = \Psi\varepsilon_t = fu_t = \begin{bmatrix} crb_{t_{11}} & 0 & 0 & 0 & 0 & 0 \\ crb_{t_{21}} & crb_{t-1_{22}} & 0 & 0 & 0 & 0 \\ crb_{t_{31}} & crb_{t-1_{32}} & gdcy_{t_{33}} & 0 & 0 & 0 \\ crb_{t_{41}} & crb_{t-1_{42}} & gdcy_{t_{43}} & intr_{t_{44}} & 0 & 0 \\ crb_{t_{51}} & crb_{t-1_{52}} & gdcy_{t_{53}} & intr_{t_{54}} & m3_{t_{55}} & 0 \\ crb_{t_{61}} & crb_{t-1_{62}} & gdcy_{t_{63}} & intr_{t_{64}} & m3_{t_{65}} & infl_{t_{66}} \end{bmatrix} \begin{bmatrix} u_t^{crb_t} \\ u_t^{crb_{t-1}} \\ u_t^{gdcy_t} \\ u_t^{intr_t} \\ u_t^{m3_t} \\ u_t^{infl_t} \end{bmatrix} \tag{11}$$

Impulse response functions are the effect of a unit shock on a given model variable, where the shock of variable i to variable j ceteris paribus as $c_t = \frac{\partial x_t}{\partial \varepsilon_{t-k}}$ matrix. The variance decomposition identification for both short- and long-term changes, quantifies the extent of uncertainty for variable i attributable to the j shock at period h reflected by $\frac{\sum_{k=0}^{h} (kc_{t,j})^2}{\sum_{k=0}^{h} \sum_{t-1}^{n} (kc_{t,j})^2}$.

3.2.1 Model specification for robustness of TVP-VAR. Time-Varying Parameter-VAR (TVP-VAR) model is used as rebuses. The model provides coefficients that are time-varying (Koop and Korobilis, 2018). Sims (1980) developed the basic VAR model that was extended by Primiceri (2005), which incorporates time-varying parameters. Nakajima (2011) while further improving the framework. The TVP-VAR vector autoregressive (VAR) model structural shocks are given by $E(e_t = 0)$ reflecting a $n * 1$ in the matrix 12.

$$E(\mathrm{e_t}, \mathrm{e_t'}) \sum_{e} = \begin{bmatrix} \sigma_{e_{t1}}^2 & 0 & \cdots & 0 \\ 0 & \sigma_{e_{t2}}^2 & \cdots & \vdots \\ \vdots & \vdots & \ddots & 0 \\ 0 & 0 & \cdots & \sigma_{e_{tn}}^2 \end{bmatrix} \tag{12}$$

where σ is the standard deviation, and it is assumed that structural shocks follow a recursive identification pattern with A taking on a lower triangular matrix 13.

$$A = \begin{bmatrix} 1 & 0 & \cdots & 0 \\ a_{2,1} & \ddots & \ddots & \vdots \\ \vdots & \ddots & \ddots & 0 \\ a_{n,1} & \cdots & a_{n,p-1} & 1 \end{bmatrix} \tag{13}$$

The study used the rationale of Primiceri (2005) by describing $X_t = I_s \otimes (0, y'_{t-1}, y'_{t-2,} \ldots, y'_{t-p})$, $\beta = (F_0, F_1, F_2, F_3 \ldots .F_p)$, where $\otimes$ denotes the Kronecker product as well as the reduced form VAR is reflected in Equation (7). The dynamic characteristics TVP-VAR follow the parameters in Equations (14)–(16)

$$\beta_t = \Phi\beta_{t-1} + v_t \tag{14}$$

$$a_t = a_{t-1} + \varsigma_t \tag{15}$$

$$h_t = h_{t-1} + \xi_t \tag{16}$$

where β_t, a_t, and h_t*is the* are the evolution of time-varying parameters following the first-order random walk process as proposed by Primiceri (2005) and Koop and Korobilis (2018) [6]. On the other hand, $v_t \sim N(0, \Omega_\beta)$, $\varsigma_t \sim N(0, \Omega_a)$ and $\xi_t \sim N(0, \Omega_h)$ denote a new error term note correlated with the matrix 17.

$$V = Var = \begin{bmatrix} t \\ v_t \\ \varsigma_t \\ \xi_t \end{bmatrix} = \begin{bmatrix} I_n & 0 & 0 & 0 \\ 0 & \Omega_\beta & 0 & 0 \\ 0 & 0 & \Omega_a & 0 \\ 0 & 0 & 0 & \Omega_h \end{bmatrix} \tag{17}$$

This study builds upon the methodological approaches established by Primiceri (2005) and Koop and Korobilis (2018) by employing ordinary least squares (OLS) regression to determine initial prior information for model estimation. Primiceri (2005) introduced a Bayesian approach to estimating time-varying parameters in macroeconomic models, which provides a foundation for understanding how economic parameters evolve over time. Koop and Korobilis (2018) expanded on this by refining the methodology for Bayesian model averaging and updating, which is essential for capturing the dynamic nature of economic relationships. To operationalize these concepts, the study first uses OLS regression to estimate initial parameters, which serve as prior information for subsequent analysis. This initial step is crucial for establishing a baseline understanding of the model's coefficients before applying more sophisticated methods. The Monte Carlo Markov Chain (MCMC) technique is then employed to explore the time-varying nature of the parameters, allowing for the analysis of how these parameters evolve over different time periods. Specifically, the Gibbs sampling algorithm within the MCMC framework is used to handle the high-dimensional nature of the model. Gibbs sampling is particularly effective for drawing samples from complex posterior distributions, which are difficult to estimate directly. By iteratively sampling from the conditional distributions of each parameter, Gibbs sampling facilitates the estimation of time-varying parameters while managing computational challenges associated with high dimensionality. This approach ensures that the model can capture dynamic changes in economic relationships, providing a robust analysis of how fiscal and monetary policies interact over time.

4. Result

Table 2 presents descriptive statistics, skewness, kurtosis, and Shapiro–Francia W′ test.

It is found that *crb* has an average of 14.491% and a standard deviation of 4.941. There reflects no skewness or kurtosis, indicating a symmetric distribution around the mean. The Shapiro-Francia W's test result of 0.875 suggests that the distribution is not significantly different from normal, indicating consistent borrowing patterns over time. On the other hand, *ntr*, *m*3, *infl*, and *m_p* are found to have the mean value of 12.335%, 970,087, 7.721%

and 8.897% respectively. This result reflects that expansionary monetary policy measures may lead to higher government borrowing and liquidity injection into the economy, potentially exacerbating fiscal dominance. The last economic variables of *gdcy* show a mean of −3.08% and *gd* has an of 36.489%. This result notes that fiscal deficits may contribute to higher government borrowing and debt accumulation.

Table 3 shows the correlation matrix between the economic variables utilized. It was found that a moderate positive correlation between *crb* and *m*3 of 0.505, *gd* and *crb* with the value of 0.117. These results imply a reliance on central bank financing to fund government expenditures, that government borrowing may contribute to liquidity expansion and potentially indicate fiscal dominance. On the other hand, *gd* and *crb* the correlation is 0.305. This suggests that government borrowing may contribute to liquidity expansion and fiscal dominance. Monetary policy variables reflected a weak correlation between *intr* and other variables suggesting limited direct relationships with monetary policy or fiscal dominance. The slight negative correlation with *m*3 with a value of −0.289 implies that lower lending rates may coincide with increased liquidity in the economy. On the other hand, a moderate positive correlation between *m*3 and claims on reserve bank government *crb* with the value of 0.505 suggests that expansionary monetary policy measures, such as quantitative easing, may contribute to increased liquidity and government borrowing.

Table 4 lists the conventional unit roots. The Dickey–Fuller and Phillips–Perron tests for unit roots indicate that all variables are stationary at first difference *d.crb*, *d.intr*, *d.m*3, *d.infl*, *d.m_p*, *d.gd* expect *m*3 and *gdcy* which is station at $I(0)$. The variables identified as stationary at first difference *d* exhibit a stable behavior over time, suggesting they are not influenced by long-term trends. This indicates that changes in these variables have a short-term impact on the system.

Table 5 presents the results of the lag order selection criteria applied in this study. To determine the appropriate lag length for each variable, three widely recognized information criteria were utilized: the Akaike Information Criterion (AIC), the Hannan-Quinn Information

Variables	Obs	Mean	Std. dev	Min	Max	Skewness	Kurtosis	W' test
crb_t	64	14.491	4.941	8.543	30.823	0.000	0.025	0.875
$intr_t$	64	12.335	4.638	5.5	22.33	0.043	0.115	0.939
$m3_t$	64	970,087	1,396,280	4,999	4,727,557	0.000	0.190	0.728
$infl_t$	64	7.721	4.611	−0.692	18.655	0.118	0.075	0.957
m_p_t	63	8.897	4.822	0.184	23.046	0.039	0.882	0.948
$gdcy_t$	64	−3.08	1.776	−9.5	0.7	0.122	0.055	0.960
gd_t	64	36.489	10.115	23.6	70.9	0.000	0.001	0.840

Source(s): Table computed by the author

Table 2. Descriptive statistics, skewness, Kurtosis and Shapiro–Francia W's test

Variables	*crb*	*intr*	*m*3	*infl*	*m_p*	*gdcy*	*gd*
crb_t	1.000						
$intr_t$	−0.011	1.000					
$m3_t$	0.505	−0.289	1.000				
$infl_t$	−0.300	0.611	−0.356	1.000			
m_p_t	−0.223	0.561	−0.408	0.875	1.000		
$gdcy_t$	−0.060	0.111	−0.382	−0.015	0.117	1.000	
gd_t	0.305	−0.327	0.679	−0.437	−0.454	0.437	1.000

Source(s): Table computed by the author

Table 3. Correlation matrix

Test Variables		Dickey-Fuller Test stat	Dickey-Fuller 5% critical value	Phillips-Perron Test stat	Phillips-Perron 5% critical value
$d.crb_t$	Z(t)	−6.484	−2.920	−6.408	−2.920
$d.intr_t$	Z(t)	−6.266	−2.920	−6.091	−2.920
$m3_t$	Z(t)	9.425	−2.920	7.629	−2.920
$d.infl_t$	Z(t)	−7.063	−2.920	−7.051	−2.920
$d.m\_p_t$	Z(t)	−10.744	−2.921	−11.387	−2.921
$gdcy_t$	Z(t)	−3.605	−2.874	−3.542	−2.874
$d.gd_t$	Z(t)	−5.328	−2.920	−5.448	−2.920

Source(s): Table computed by the author

Table 4. Conventional unit root

Criterion (HQIC), and the Schwarz Bayesian Information Criterion (SBIC). These criteria help in assessing the balance between model fit and complexity, ensuring that the chosen model neither overfits nor underfits the data. The analysis reveals that both lag orders of one and two are optimal selections, as they produced the lowest values across all three criteria – AIC, HQIC, and SBIC. This outcome suggests that these lag lengths provide a favorable compromise between capturing sufficient historical information and avoiding excessive model complexity. By selecting lag orders that minimize these criteria, the study aims to enhance the robustness and reliability of the model's estimates, thereby improving the overall accuracy of the analysis.

Figure 2 illustrates the short-term shocks of *nlgdcy* and *lngd* on economic variables, as defined in the study. In Graph a, shocks in *lngdcy* lead to an initial increase in *lninfl* over the first two years, with a marginal rise of 0.01% observed in the short run. Subsequently, there is a decline in *lninfl*, operating below equilibrium in years 3 and 4, before gradually returning to equilibrium. Conversely, in Graph b, shocks in *lngd* result in a notable increase in *lninfl*, peaking at 0.9% in year 3. Thereafter, inflation falls back to equilibrium by year 7. This inflationary surge is attributed to heightened government borrowing to finance deficits. These findings provide evidence of fiscal dominance aligning with (Dorn, 2021). On the other hand, the results are similar to those of da Silva and Vieira (2017) and Lehmann *et al.* (2020) advocated inflationary pressure to reflect fiscal dominance.

Figure 3 depicts the long-term effects of *nlgdcy* and *lngd* shocks on economic variables, as defined in the study. In Graph a, a shock to *lninfl* initially triggers an increase in inflation over the first two years, with a magnitude of 0.04%. However, the adjustment process towards equilibrium unfolds slowly in the long run, indicating a degree of inelasticity in the downward movement of inflation. These results are different to that of Sanusi (2020), Jia (2020), and Leeper and Zhou (2021), which have an average effect of 0.67%. In Graph b, shocks in *lngd* are observed to transition the economy from a period of deflation to inflation

Lag	LL	LR	df	*p*	FPE	AIC	HQIC	SBIC
Lag selection from model 1 in the first theoretical framework								
0	−72.85	00.000	3.13	3.19	3.291			
1	1650.47	3446.6*	16	00.000	1.534*	−66.54*	−66.2567*	−65.77*
Lag selection from model 2 in the second theoretical framework								
0	−147.21	00.000	6.25	6.34	6.48	56.74	56.77	56.81
1	00.000	00.000	36	00.000	00.000	00.000	00.000	00.000
2	1844.67	00.000	36	00.000	00.000	−72.35*	−71.29*	−69.57*

Source(s): Table computed by the author

Table 5. Lag-order selection criteria

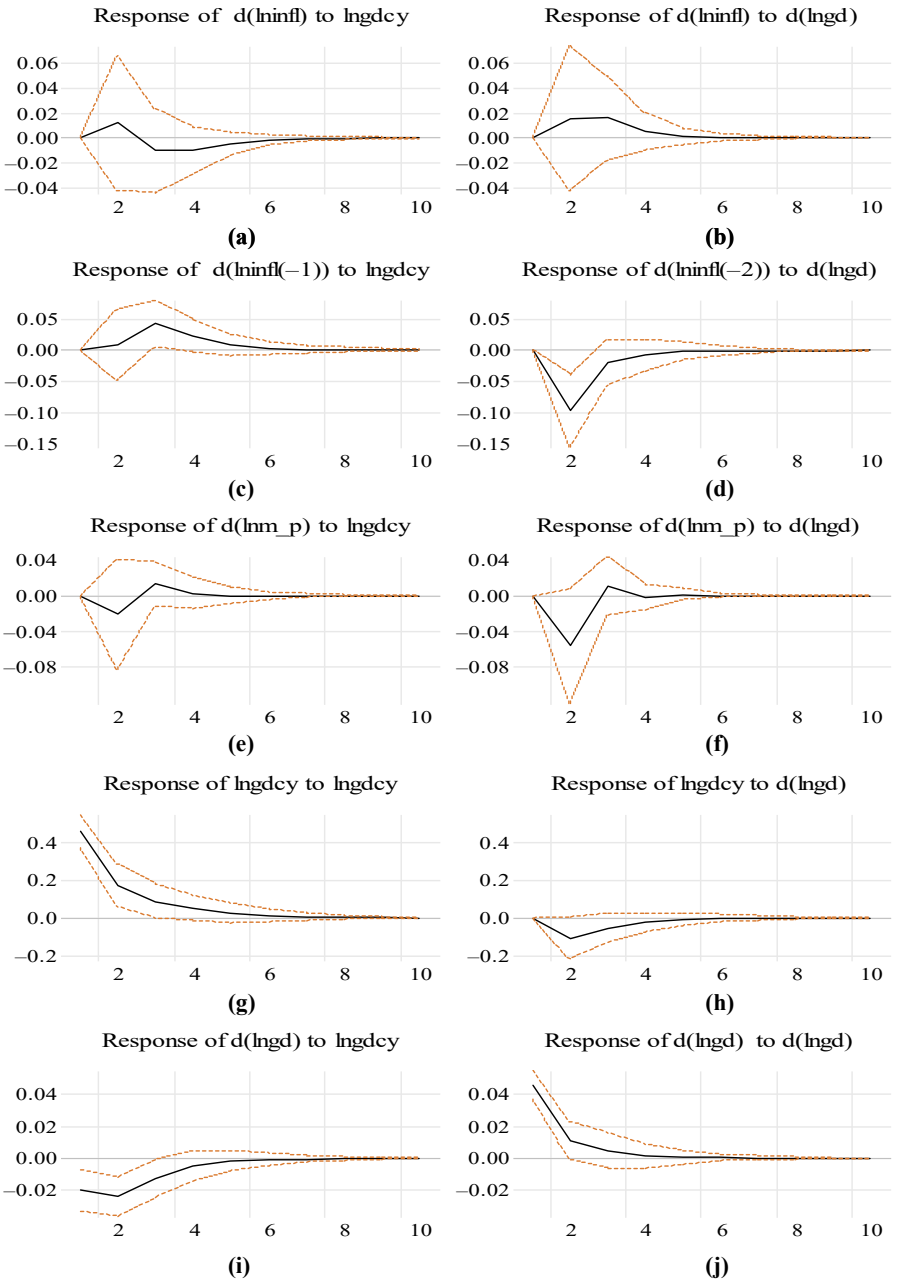


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Figure 2.
Short-term shocks of *nlgdcy* and *lngd* on economic variables from definition 1

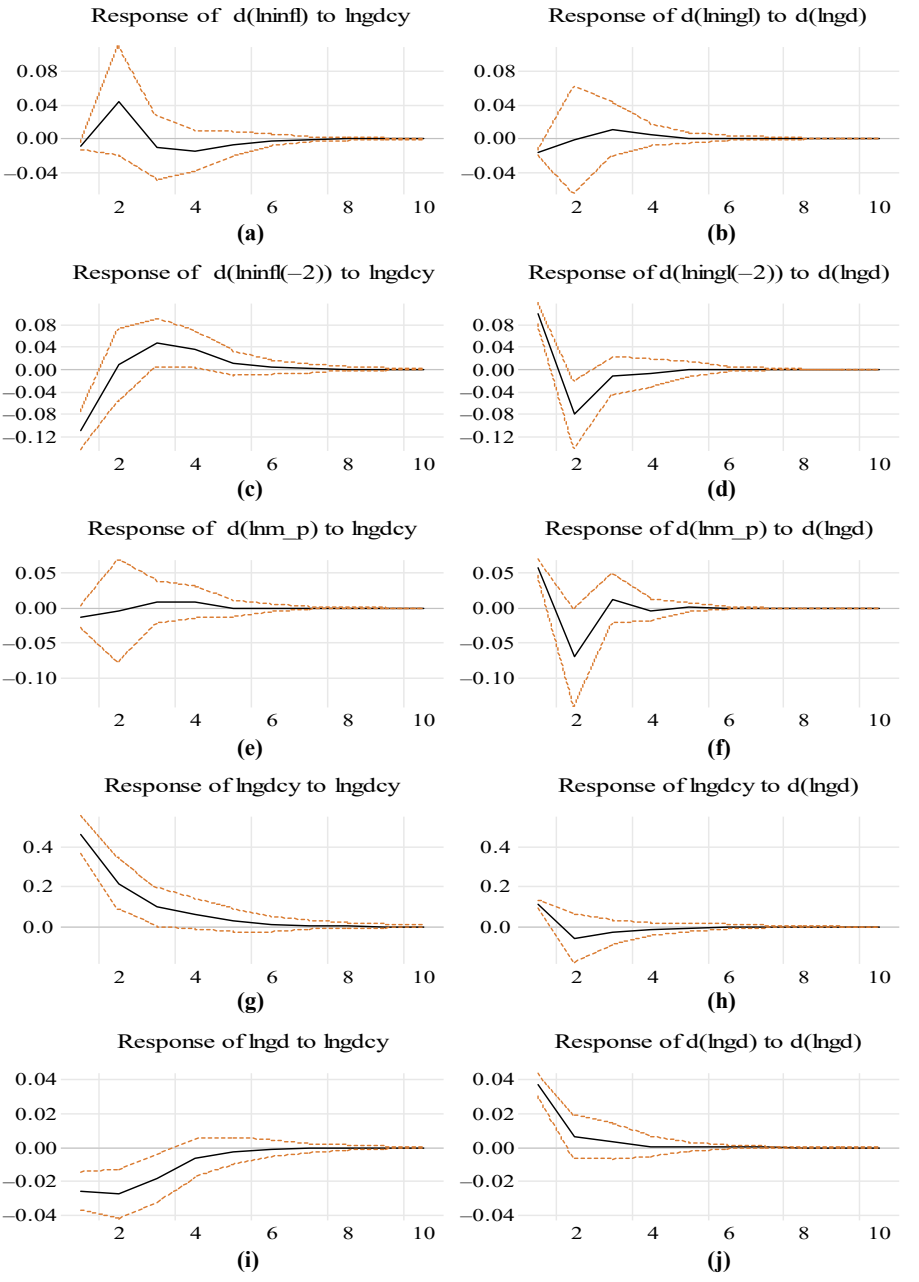

Figure 3.
Long-term shocks of *nlgdcy* and *lngd* on economic variables from definition 1

Source(s): Figure computed by the author

within a two-year span, culminating in a peak of 0.02%. These findings imply the persistence of inflationary pressures over the long-term aftershocks in *lninfl* and *lngd*, providing that government borrowing and deficits impact inflation, overriding central bank efforts [7].

Figures 4 and 5 show short as well as long-term shock variance decomposition on economic variables from definitions 1 and 2. In Figure 4, Graph a, reflects 1% and 1.5%

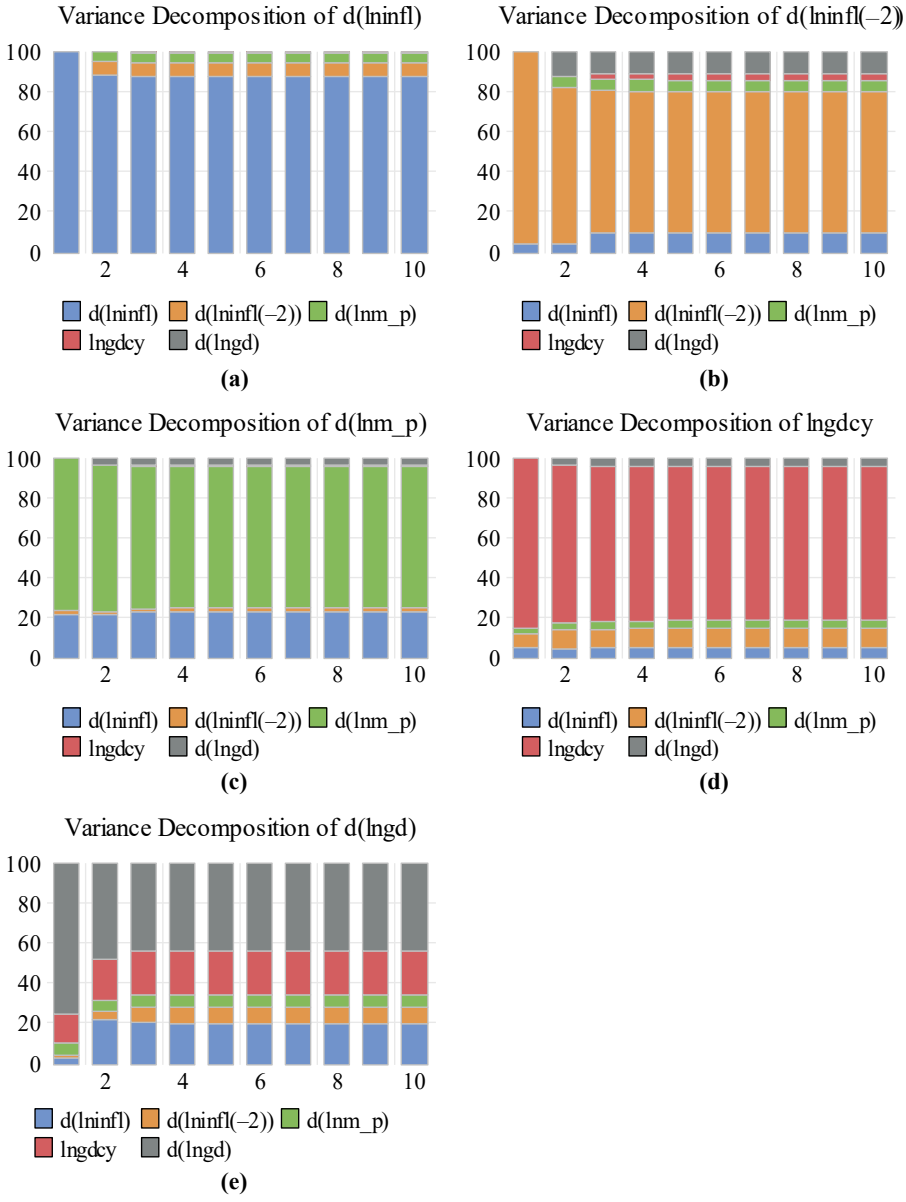

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Figure 4.
Short-term shocks variance decomposition on economic variables from definition 1

across the years of the variance in *infl* is explained by *lngdcy* and *lngd*, respectively, in the short run. On the other hand, lag *infl* variance in Graph b, is found to be *lngdcy* and *lngd* 3.6% and 10.2% after one year going forward. The variance decomposition highlights the persistence of inflationary pressures stemming from fiscal dominance, as evidenced by the substantial contribution of fiscal policy shocks in the short-run inflation variability. Nevertheless, this variation is low to that of Cochrane (2019) who found a 40% variation.

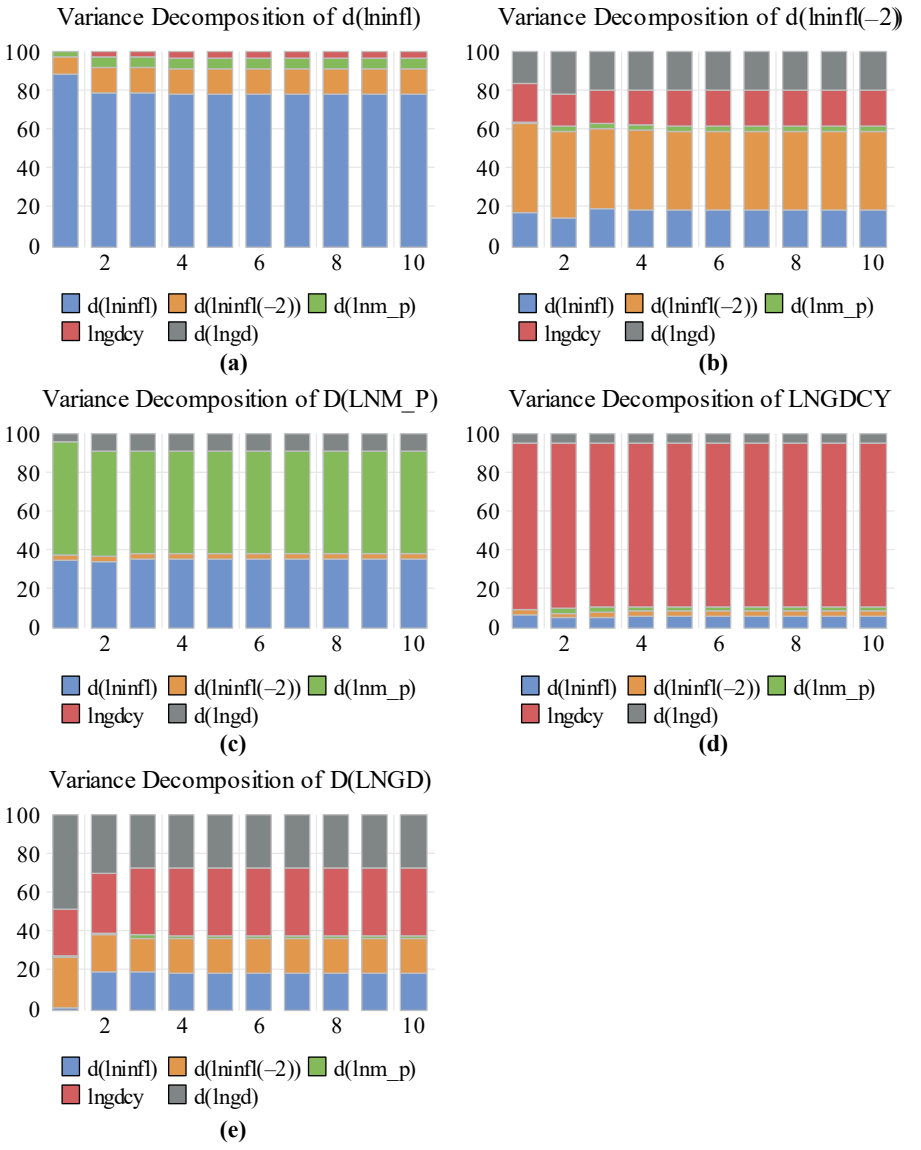

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Figure 5.
Long-term shocks variance decomposition on economic variables from definition 1

Figure 8 shows the short-term shocks of *lnintr*, *lnm*3 and *lninfl* on economic variables from definition 2. In Graph a, it was observed that the *lncrb* is sensitive to increases in *lnintr* shocks. It reflects a slight increase of 0.01% in year 2, followed by a gradual return to equilibrium by year 5. On the contrary, Graph d, illustrates those shocks to *lnintr* result in a decline in lagged *lncrb*. This suggests that monetary policy has a significant effect on reducing fiscal dominance over time. These results are similar to those of Barbier-Gauchard and Betti (2021), Barrie and Jackson (2022) and De Grauwe and Foresti (2023) as they outlined that accommodative monetary policy reduces fiscal dominance. Conversely, in Graph b, shocks of the *lnm*3 are found to reduce lncrb in year 1 and reach the maximum reduction in year 2 at a rate of 0.03%. Thereafter, there is an increase in *lncrb* until returning to equilibrium by year 9. However, in Graph e, the *lnm*3 shock results to an increase in lag of *lncrb* in the first 2 years. Considering the Reserve Bank's mandate to stabilize inflation, in Graph c, it is observed that shocks of *lninfl* lead to an increase in *lncrb* for a period of 3 years. Subsequently, *lncrb* begins to decline until reaching equilibrium. In Graph f, the magnitude of the increase due to *lninfl* shocks is higher in the lagged *lncrb* during the first 2 years. Across lnintr, *lnm*3, and *lninfl*, it is noted that the effect of *lnm*3 results in a decrease in *lncrb*, reflecting a reduction in fiscal dominance. Figures 6 and 7 show the short as well as the long-term shocks historical decomposition on economic variables from definition 1. For robustness, the TVP-VAR model is estimated, as shown in Figure 14, depicting short-term shocks of *lnintr*, *lnm*3, and *lninfl* on economic variables from definition 1 and TVP-VAR. The TVP-VAR model exhibits different variations compared to Figure 8. However, the results align with the initial shock in the first 3 years; thereafter, differences emerge in magnitude and direction. The differences in magnitude and direction of the shocks between the two models imply that policymakers should consider the uncertainty inherent in economic modeling. This highlights the need for flexibility in policy responses to short-term shocks, as their precise effects may vary depending on the modeling framework used.

Figure 9 shows the long-term shocks of *lnintr*, *lnm*3 and *lninfl* on economic variables from definition 2. In Graph a, like the short run, it is found that *lncrb* is insensitive to increases in *lnintr* shocks in the long term. It reflects a slight increase of 0.01% in year 2, followed by a gradual return to equilibrium by year 7. Conversely, Graph d illustrates those shocks to *lnintr* result in a decline in lagged *lncrb*. The results indicate that *lnintr* shocks lead to a decrease in lagged *lncrb* during the first 2 years. In Graph b, shocks of the *lnm*3 are found to reduce *lncrb* in year 1 and reach the maximum reduction in year 2 at a rate of 0.04%. Thereafter, there is an increase in *lncrb* until returning to equilibrium by year 9. However, in Graph e, the shock to *lnm*3 results in an increase in the lag of *lncrb*, transitioning from below equilibrium to above equilibrium at a rate of 0.1% in the first 2 years. In Graph c, it is observed that shocks to *lninfl* lead to cyclical movements in *lncrb* for the first 5 years. Conversely, in Graph f, the magnitude of the increase resulting from *lninfl* shocks is higher in the lagged *lncrb* during the first 2 years. The result suggests that that while there may be short-term responsiveness to interest rate shocks, particularly in Graph d where there's a decline in lagged *lncrb*, this effect diminishes in the long term. This indicates the limited effectiveness of interest rate shocks in consistently reducing fiscal dominance over extended periods. On the other hand, Graphs b and e indicate a more complex relationship between money supply shocks and *lncrb*. While there's an initial reduction in *lncrb* in response to money supply shocks, as seen in Graph b, this effect is reversed in the long term, as depicted in Graph e, where *lncrb* transitions from below equilibrium to above equilibrium. This suggests that the impact of money supply shocks on reducing fiscal dominance may be temporary and subject to reversal over time. For robustness, the TVP-VAR is estimated, as shown in Figure 15, depicting long-term shocks of *lnintr*, *lnm*3, and *lninfl* on economic variables from definition 2 and TVP-VAR. It is noted that the results align with those of the SVAR, but the implications differ, with the TVP-VAR reflecting more variation [8].

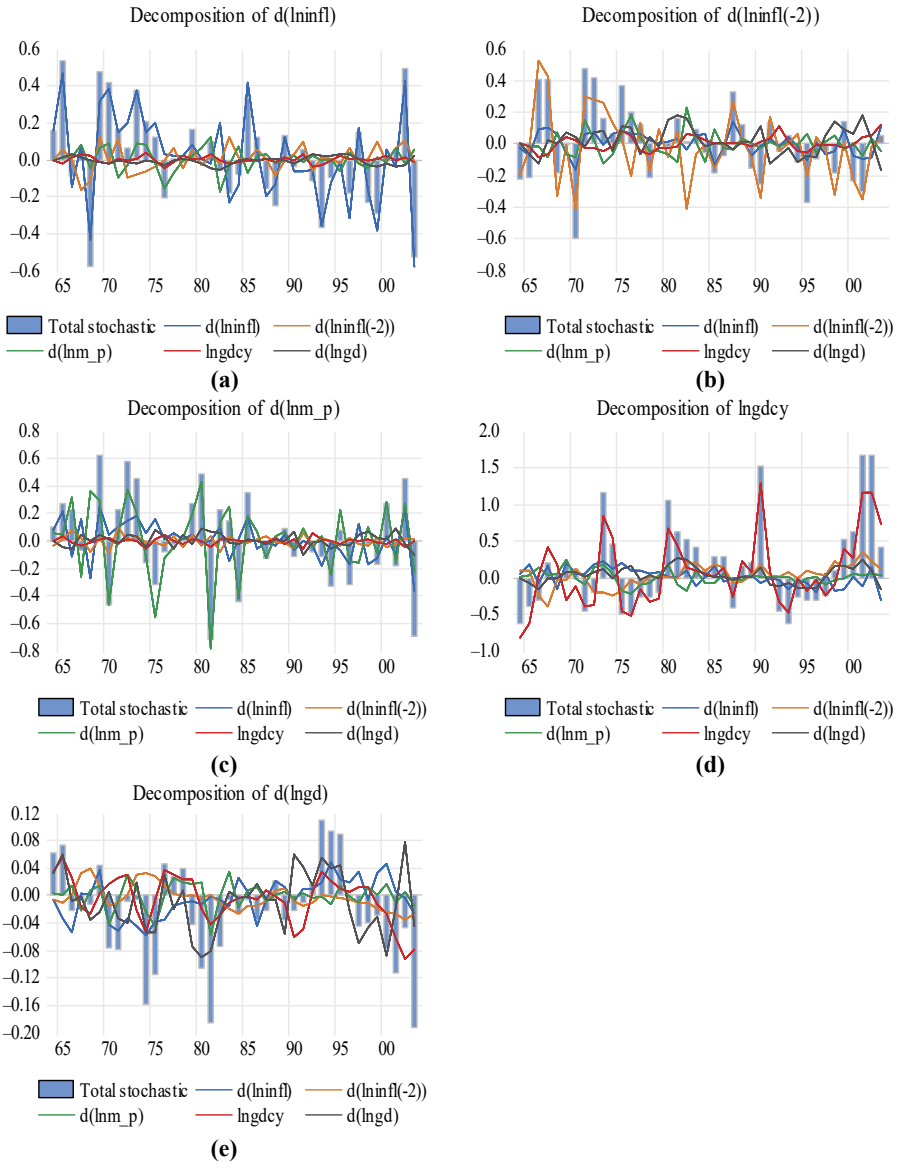

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Figure 6.
Short-term shocks historical decomposition on economic variables from definition 1

Figure 10 depicts the short-term shock variance decomposition on economic variables from definition 2. In the short run, Graph a, shows that *lnm3* explains 4.5% of the variation in *lncrb*. However, in Graph b, it is evident that 3.2% of the variation in the lag of *lncrb* is explained by inflation in the short run. This suggests that both money supply and inflation shocks have a modest impact on *lncrb* in the short term, indicating some effectiveness of monetary policy in influencing lending rates and potentially mitigating fiscal dominance. Figure 11 illustrates

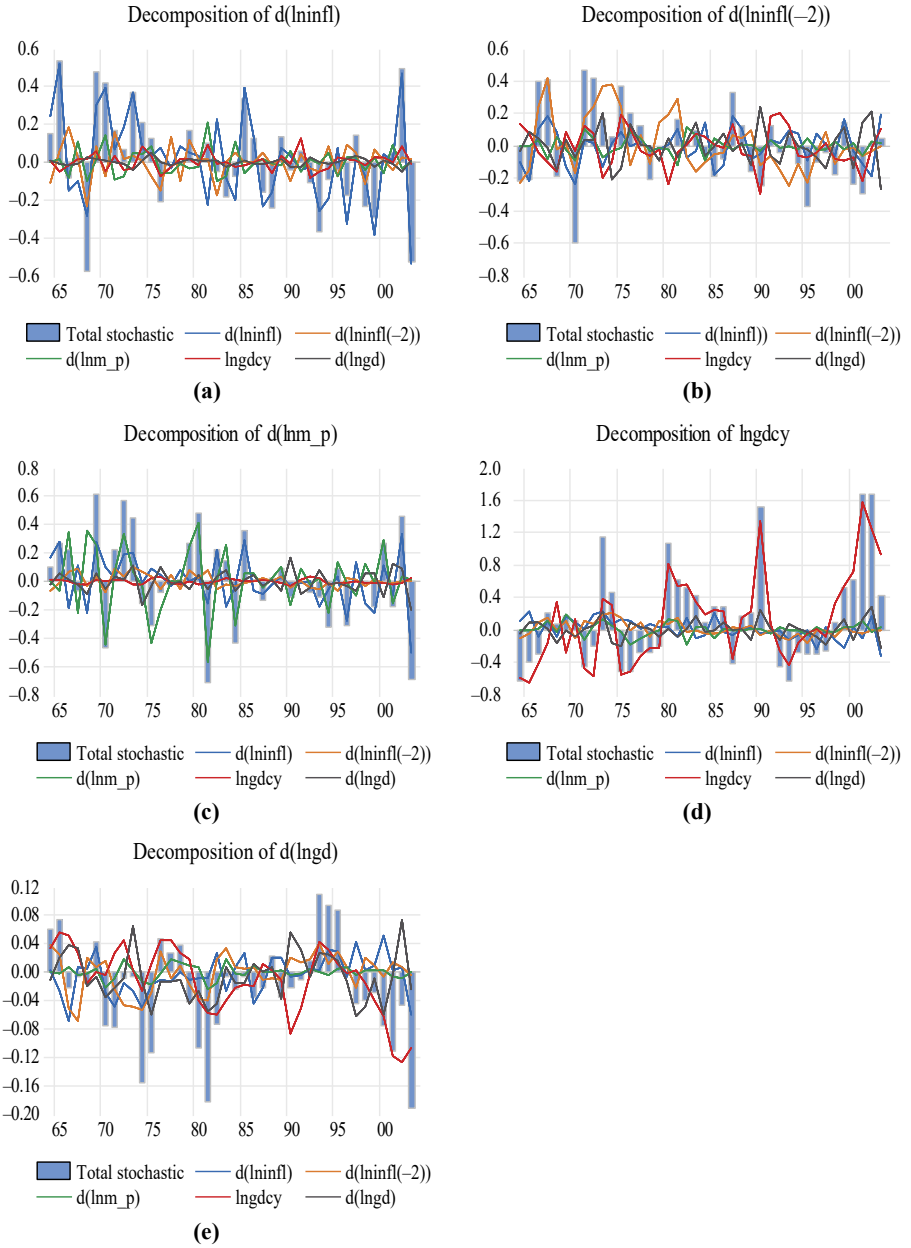

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Figure 7.
Long-term shocks historical decomposition on economic variables from definition 1

the long-term shock variance decomposition on economic variables from definition 2. In Graph a, it is revealed that *lnm*3 explains 15% of the variation in *lncrb* in the first year. Subsequently, lnm3 explains 20.3% of the variation in *lncrb* in the long run. On the other

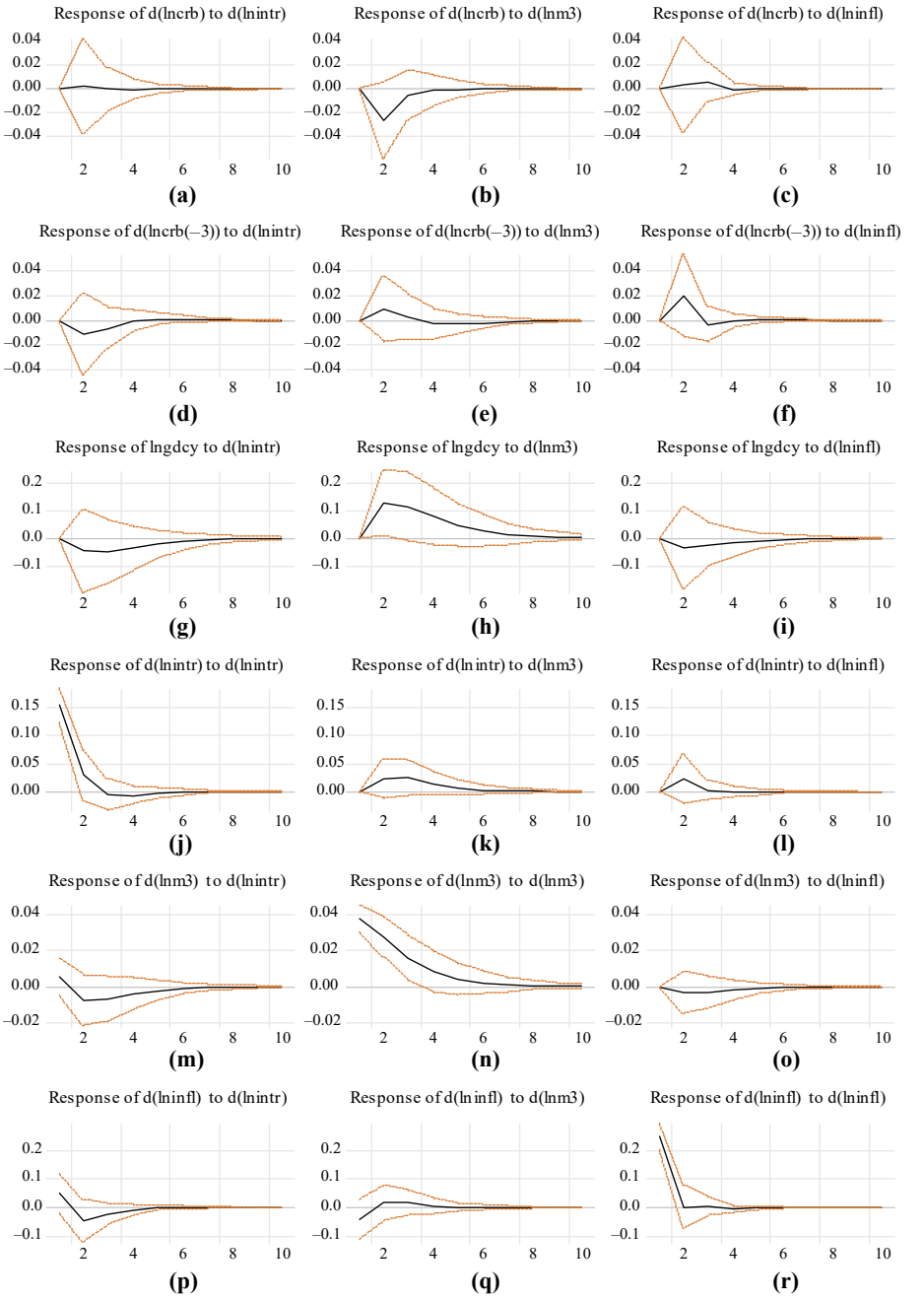

Figure 8.
Short-term shocks of *lnintr*, *lnm3* and *lninfl* on economic variables from definition 1

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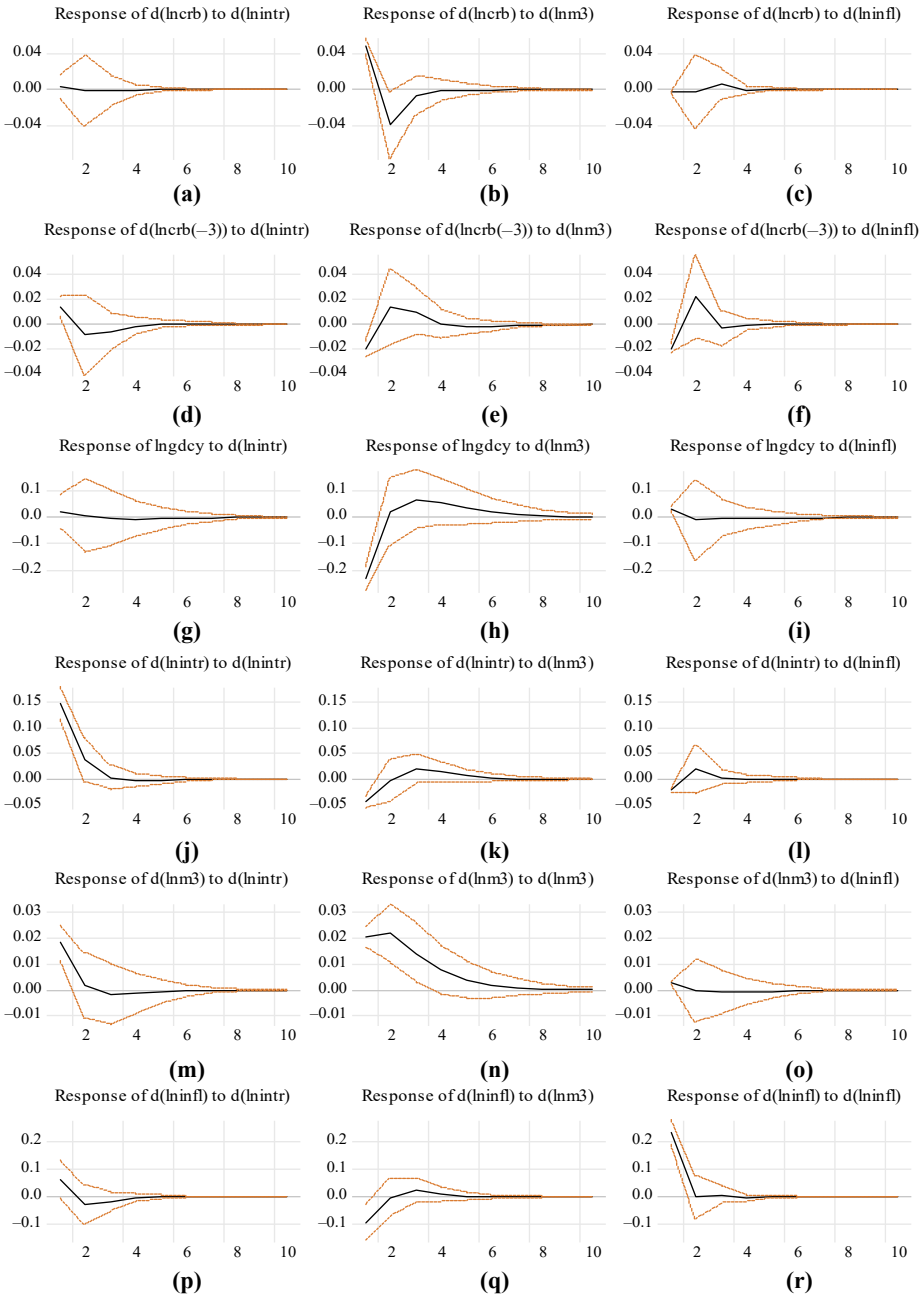

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Figure 9.
Long-term shocks of *lnintr*, *lnm3* and *lninfl* on economic variables from definition 2

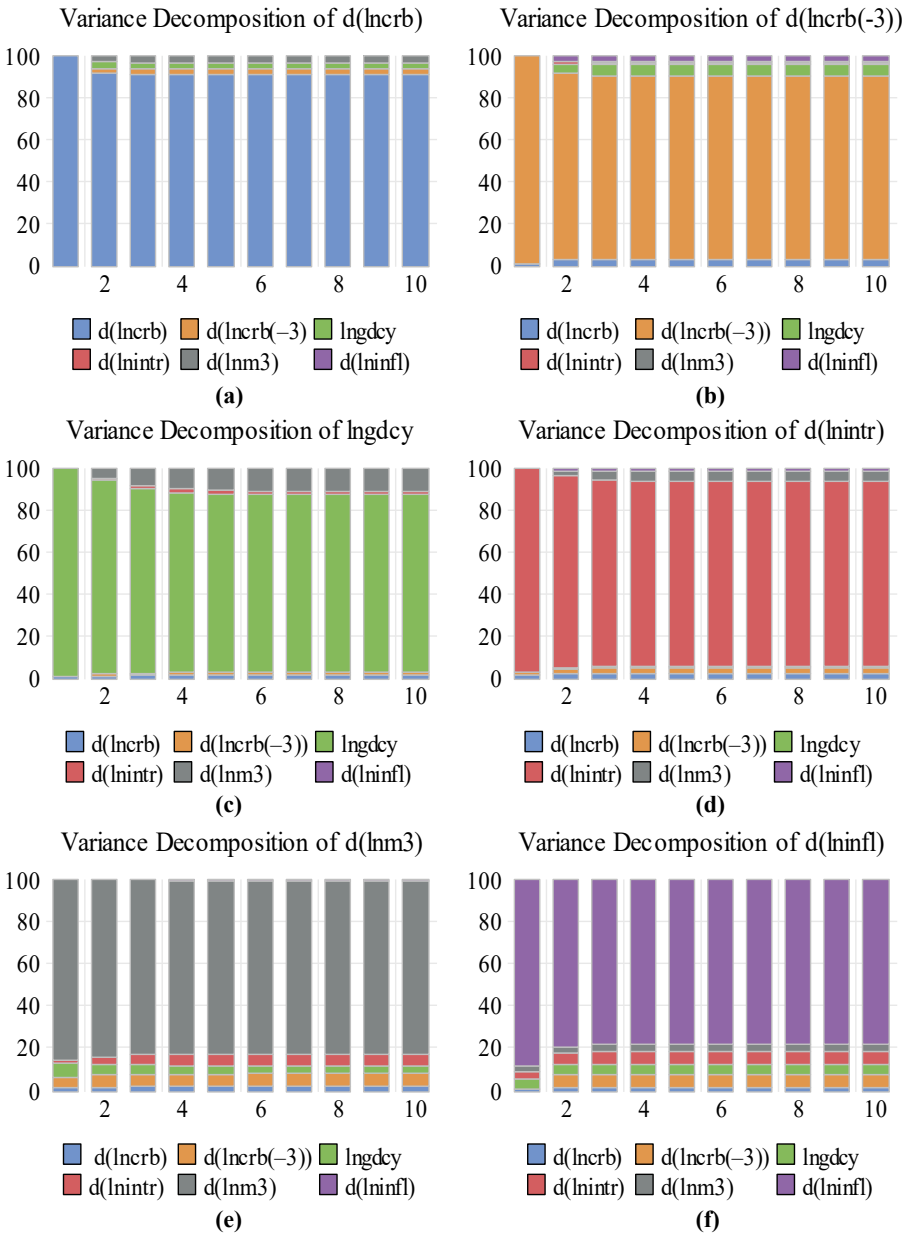

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Figure 10.
Short-term shocks variance decomposition on economic variables from definition 2

hand, Graph b, it is shown that *lnintr* explains 1.3%, *lnm3* explains 5.2%, and *lninfl* explains 4.9% of the variation in *lncrb*, respectively. This suggests that while interest rate and inflation shocks play a role, money supply shocks have a more dominant and lasting effect on

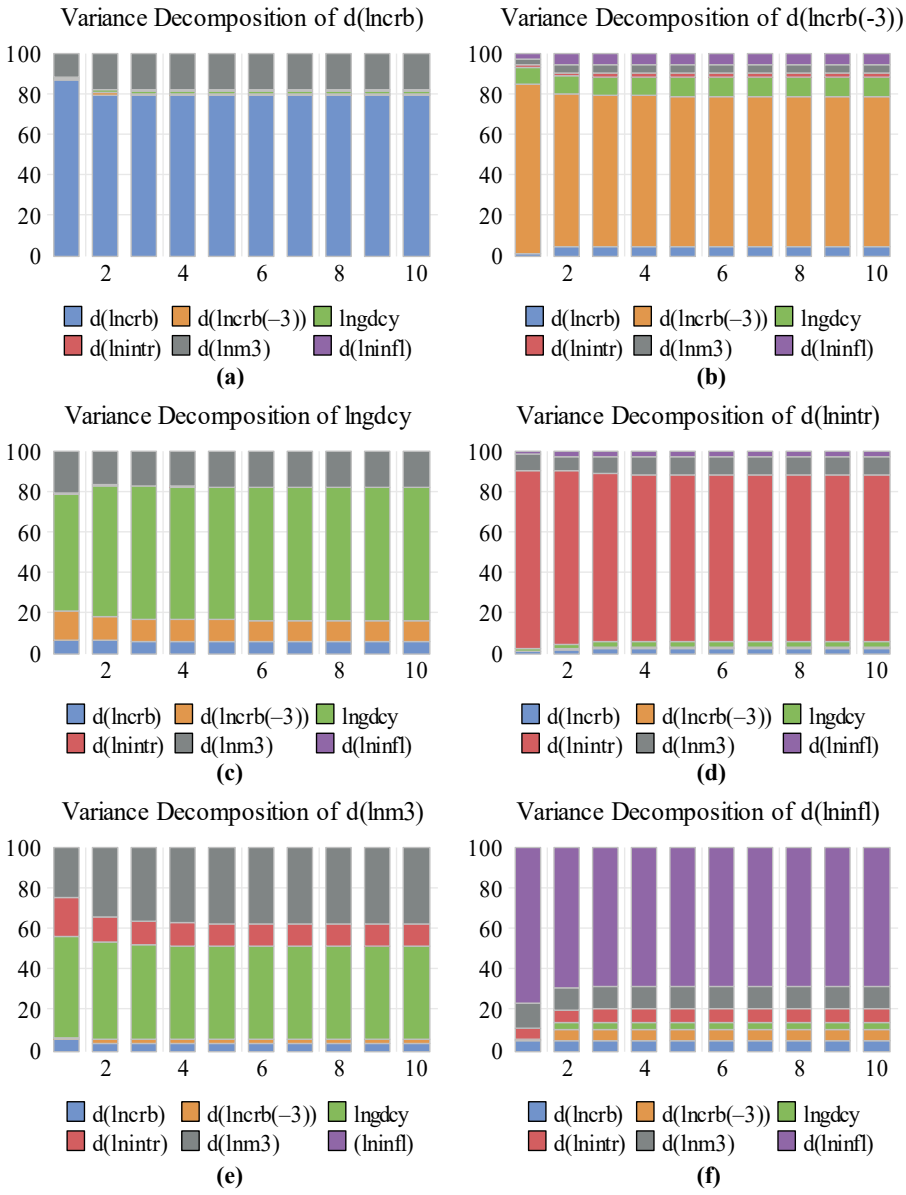

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Figure 11.
Long-term shocks variance decomposition on economic variables from definition 2

banking lending rates, highlighting the potential effectiveness of monetary policy measures targeting money supply in reducing fiscal dominance over the long term. Figures 12 and 13 show the short and long-term shocks' historical decomposition on economic variables from definition 2 (see Figures 14 and 15).

5. Conclusion

This study investigates into the intricate interplay between fiscal dominance and monetary policy in South Africa, spanning from 1960 to 2023, employing SVAR analysis. The findings shed light on the persistent nature of fiscal dominance, wherein government borrowing, and deficits exert significant and enduring influence on inflation, despite the efforts of monetary policy to maintain price stability. The short-term shocks of government borrowing lead to

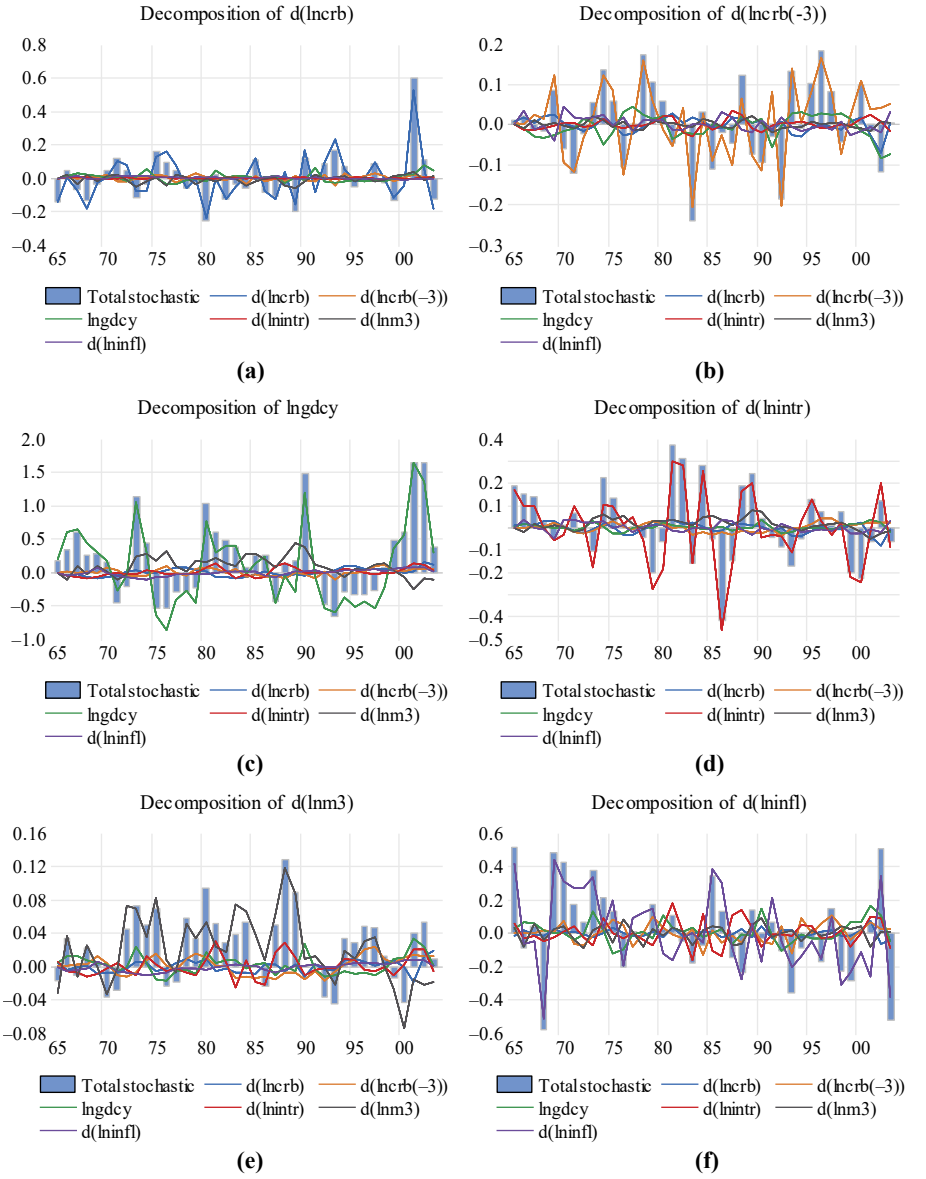

Figure 12.
Short term shocks historical decomposition on economic variables from definition 2

Source(s): Figure computed by the author

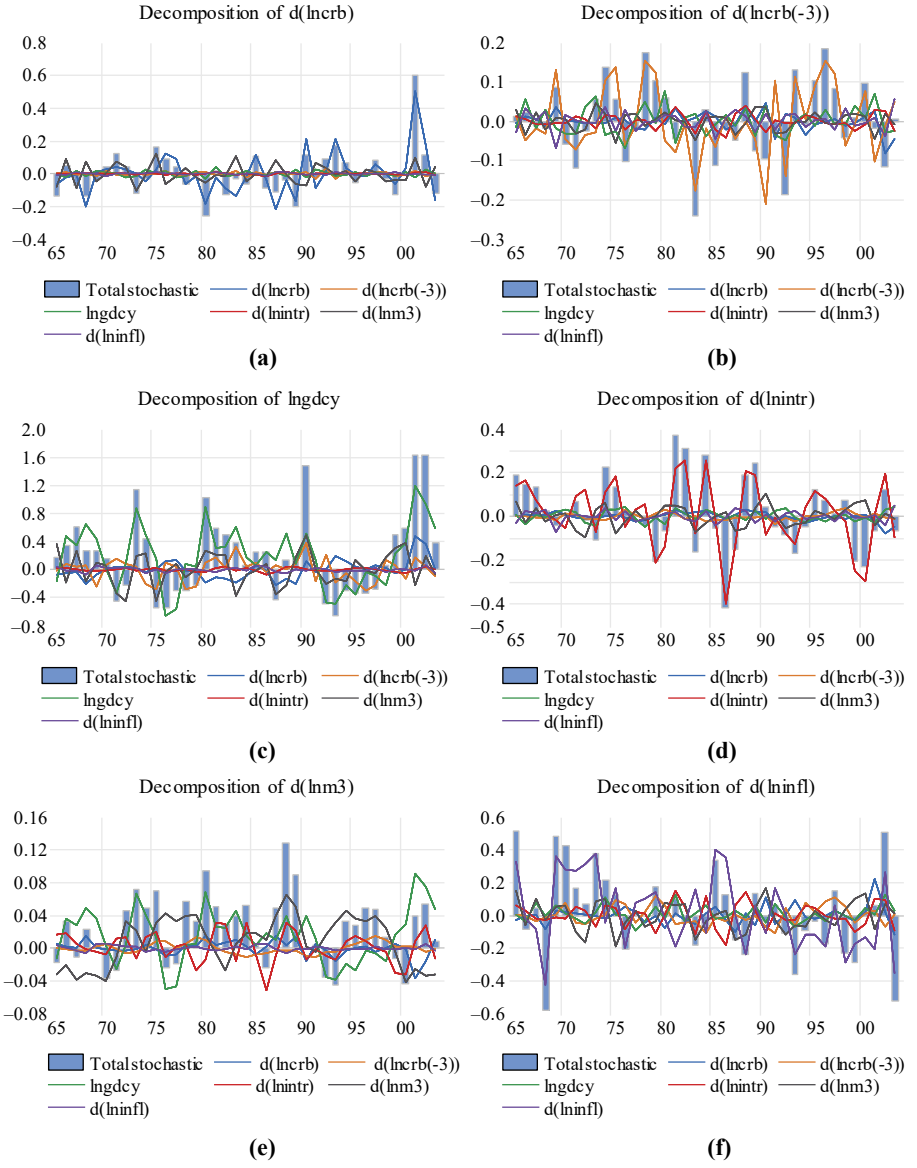

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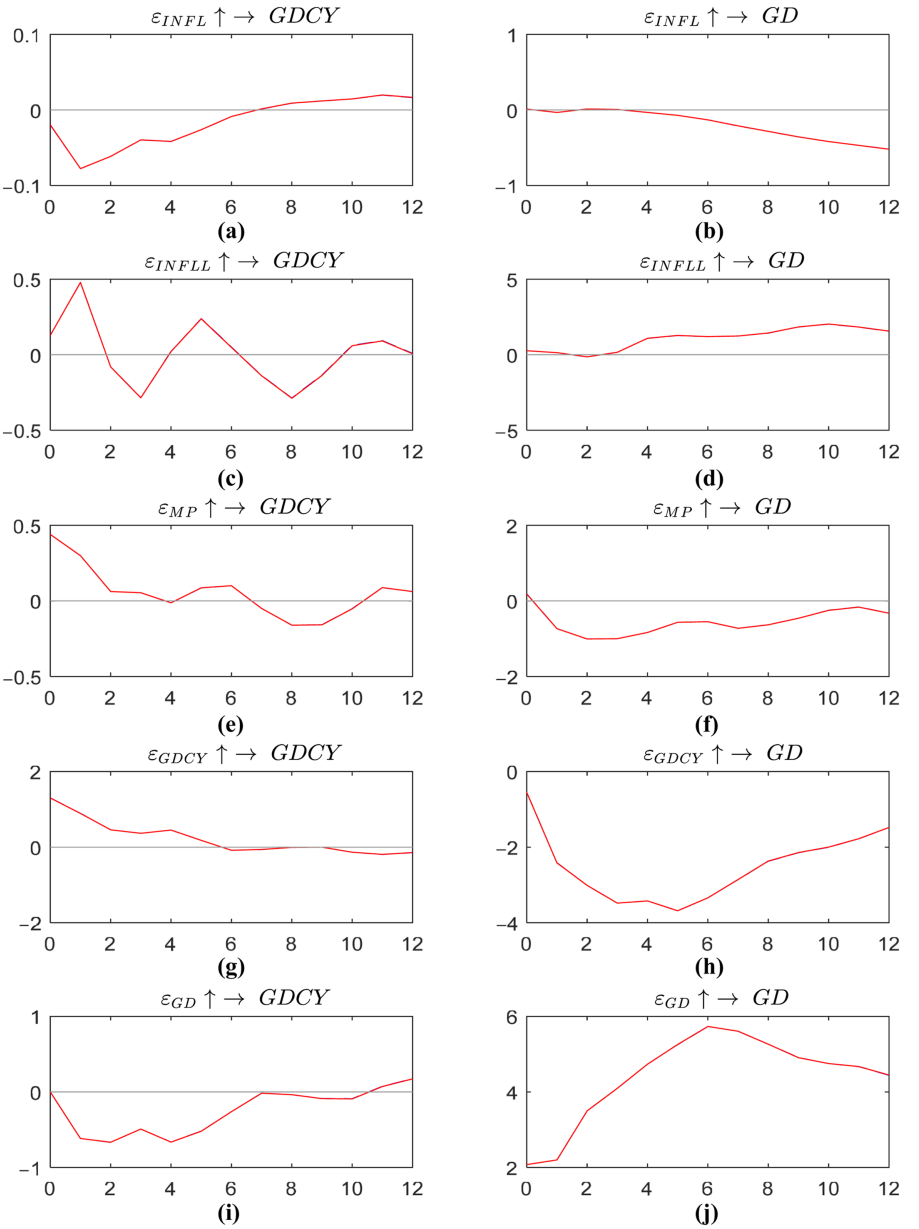
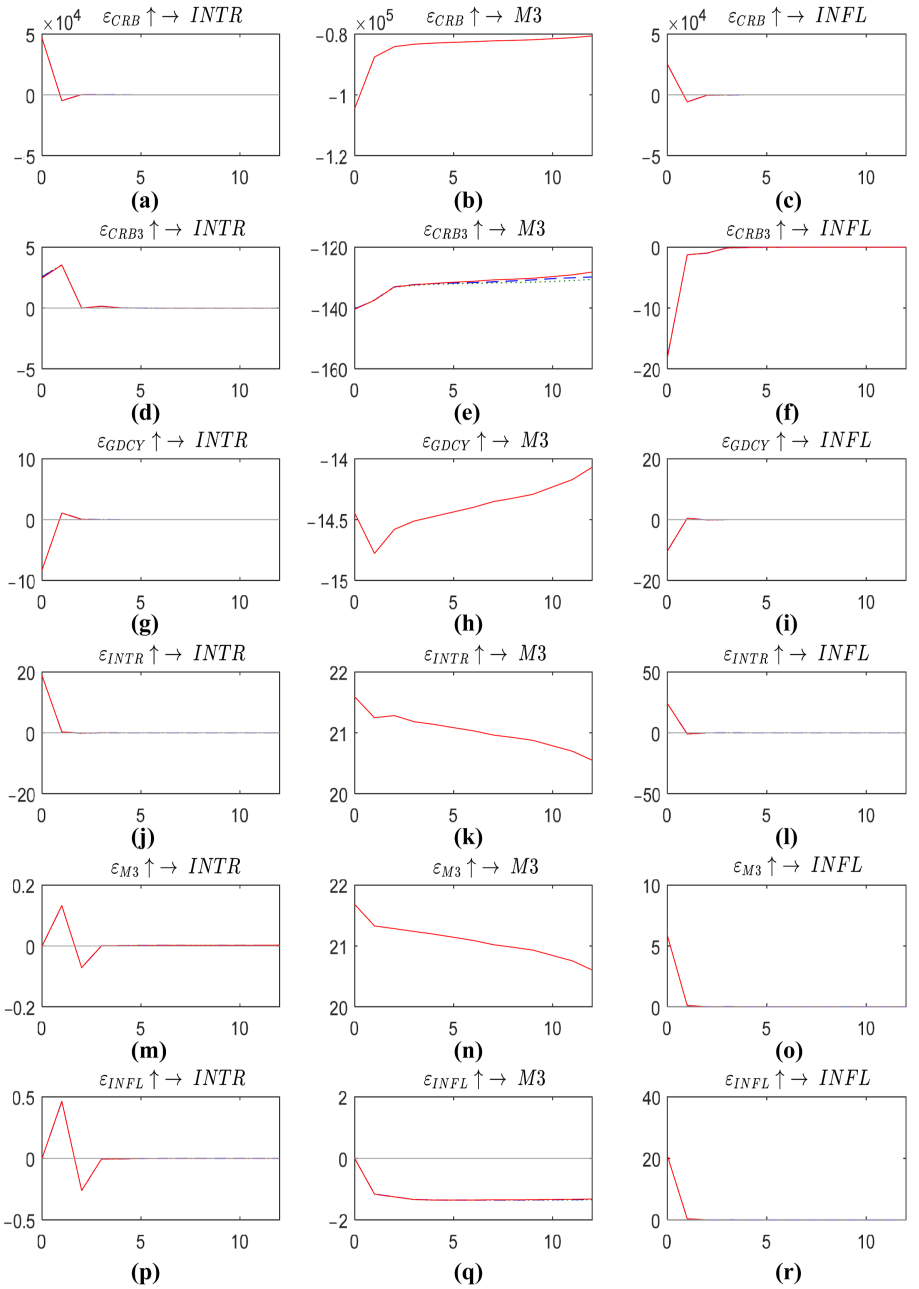
Figure 13.
Long-term shocks historical decomposition on economic variables from definition 2



Source(s): Figure computed by the author

Figure 14.
Short-term shocks of *lnintr*, *lnm3* and *lninfl* on economic variables from definition 1 and TVP-VAR



Source(s): Figure computed by the author

Figure 15.
Long-term shocks of *lnintr*, *lnm3* and *lninfl* on economic variables from definition 2 and TVP-VAR

inflationary pressures, emphasizing the phenomenon of fiscal dominance. This aligns with the predictions of the FTPL and echoes similar findings in previous studies da Silva and Vieira (2017) and Lehmann *et al.* (2020). Conversely, the long-term analysis depicts a slower adjustment process towards equilibrium, indicating the inelasticity in the downward movement of inflation. These findings contribute to the existing literature by providing empirical evidence of fiscal dominance in South Africa, corroborating previous Leeper and Zhou (2021), Mangani (2021), Moreira and Zambon Monte (2021), Heinemann and Kemper (2021), Havlik *et al.* (2022), Barrie and Jackson (2022), De Grauwe and Foresti (2023) and Ascari *et al.* (2023). This study deepens our understanding of fiscal dominance and its significant implications for monetary policy and economic stability in South Africa. The insights provided can guide policymakers in formulating strategies to address the challenges posed by fiscal dominance and ensure sustainable economic growth.

5.1 Recommendations

The results of this study emphasize the critical need for fiscal discipline to mitigate the persistent inflationary pressures associated with fiscal dominance. Based on these findings, it is recommended that fiscal authorize need to strengthen fiscal discipline. Therefore, policymakers should prioritize reducing government deficits and managing debt levels to lessen the inflationary impact of fiscal dominance. The study's results indicate that government borrowing, and deficits significantly contribute to inflation, suggesting that effective fiscal discipline can play a vital role in maintaining economic stability. There is a need the reduction of government deficits. This is because this study shows that government deficits are a major driver of inflationary pressures. Policymakers should implement measures to reduce budget deficits, such as cutting unnecessary expenditures and improving public spending efficiency. There is a need to manage debt levels. High levels of government debt exacerbate fiscal dominance and lead to higher inflation. Strategies to manage and reduce public debt, such as debt restructuring and prioritizing debt repayments, can help mitigate these effects. On the other hand, fiscal authorities, may need to investigate enhancing revenue generation. Boosting government revenue through tax reforms and broadening the tax base can help reduce the need for excessive borrowing. By increasing revenue, the government can finance its expenditures without resorting to high levels of debt, thereby reducing the inflationary pressures from fiscal dominance. Implementing comprehensive tax reforms to ensure a more equitable and efficient tax system can increase government revenue. This includes measures to close tax loopholes, enhance tax compliance, and ensure that all sectors of the economy contribute their fair share. Expanding the tax base by incorporating informal sectors and improving the administration of existing taxes can significantly boost government revenue, reducing reliance on borrowing. There is a need of effective coordination between fiscal and monetary policies is essential to ensure that fiscal policies do not undermine the efforts of the central bank to control inflation. The study's findings underscore the importance of aligning fiscal and monetary objectives to maintain price stability and economic stability. Establishing a formal framework for coordination between the Ministry of Finance and the South African Reserve Bank can help ensure that fiscal and monetary policies are aligned and mutually reinforcing. Regular consultations and information sharing between fiscal and monetary authorities can enhance policy coherence and effectiveness, helping to address inflationary pressures more effectively. The study reveals that money supply shocks are more effective in reducing fiscal dominance compared to interest rate shocks. Therefore, the central bank should consider focusing on managing money supply as a key tool for mitigating the inflationary effects of fiscal dominance. Utilizing monetary policy tools such as open market operations, reserve requirements, and direct interventions in the money market can help control the

money supply and reduce fiscal dominance. Adopting a clear and transparent inflation targeting framework can help anchor inflation expectations and enhance the credibility of monetary policy.

5.2 Limitations of the study

While this study provides valuable insights, it is not without limitations, the analysis is based on historical data from 1960 to 2023, which may not fully capture recent economic dynamics or structural changes in the South African economy. Structural changes in the economy over the long study period may not be fully accounted for, potentially influencing the results. The SVAR methodology relies on certain assumptions that may not hold in all contexts, potentially affecting the robustness of the results. The validity of the SVAR model assumptions, such as the exogeneity of shocks and linear relationships, may not fully reflect the complexities of the real-world economic environment. The limitations inherent in the SVAR approach, such as the inability to capture nonlinear dynamics, could influence the accuracy of the findings. The findings are specific to South Africa and may not be generalizable to other countries with different economic structures and fiscal policies. The unique economic, political, and institutional context of South Africa may limit the applicability of the findings to other settings. A comparative analysis with other countries could help validate the findings and identify broader patterns.

5.3 Future research directions

Future research can build upon this study by addressing its limitations and exploring new avenues. This can be achieved by including more recent data and considering structural breaks in the analysis could provide a more accurate picture of current economic conditions. Utilizing the most recent economic data can help capture current trends and dynamics, providing a more timely and relevant analysis. Employing alternative econometric models, such as Time-Varying Parameter VAR (TVP-VAR) or Dynamic Stochastic General Equilibrium (DSGE) models, could offer additional insights into the dynamic interactions between fiscal and monetary policies. Using advanced econometric models can help capture the complexities and nonlinearities in the relationship between fiscal and monetary policies. Comparing the results of different methodologies can enhance the robustness and validity of the findings. Conducting comparative studies across different countries or regions could help identify common patterns and unique factors influencing the interplay between fiscal dominance and monetary policy. A cross-country analysis can help identify the factors that influence fiscal dominance and monetary policy effectiveness in different economic contexts. Investigating the role of political institutions and external factors, such as global economic conditions, could provide a more comprehensive understanding of the factors driving fiscal dominance and its impact on monetary policy effectiveness. Analyzing the role of political institutions, governance, and policy frameworks can help understand how institutional factors influence fiscal and monetary policy interactions. Examining the impact of global economic conditions, such as trade dynamics, capital flows, and international financial markets, can provide insights into external influences on fiscal dominance and monetary policy.

Notes

1. The argument warns against assuming universal applicability of findings on fiscal dominance. South Africa's unique context requires tailored research for accurate policymaking.
2. The study examines how government debt and deficits affect inflation, suggesting fiscal dominance. It then assesses if monetary policy can mitigate this dominance.

3. This framework sees fiscal stance as vital for long-term inflation trends, especially in South Africa. The FTPL underscores government finance's impact, crucial for understanding fiscal dominance and monetary policy effectiveness amidst rising debt and deficits.
4. The government budget constraint framework analyzes fiscal and monetary policies interplay, aiding understanding of their impact on stability. It assesses constraints and trade-offs in managing fiscal dominance for stability.
5. The unobserved error term (also known as the error term, disturbance term, or residual) represents the component of the dependent variable that cannot be explained by the explanatory variables included in the model. It captures all other factors that influence the dependent variable but are not explicitly included in the model.
6. Note the β_t is the time-varying coefficient, Φ is phi, a_t is the evolution sequence of structural information and h_t is the evolution sequence of stochastic volatility.
7. It is imperative for this study to examine the effectiveness of monetary policy in mitigating fiscal dominance by assessing the impact of interest rates and other liquidity tools. This analysis will be reflected in Figures 8 and 9.
8. The TVP-VAR model reflecting more variation underscores the importance of considering dynamic and evolving economic conditions in policymaking and financial decision-making processes.

References

Afonso, A. and Sousa, A. (2024), "Monetary and fiscal interplay: does it work both ways?", *Economic Systems*, Vol. 48 No. 2, 101188, doi: 10.1016/j.ecosys.2024.101188.

Ascari, G., Florio, A. and Gobbi, A. (2023), "Price level targeting under fiscal dominance", *Journal of International Money and Finance*, Vol. 137, 102876, doi: 10.1016/j.jimonfin.2023.102876.

Barbier-Gauchard, A. and Betti, T. (2021), "Spillover effects of fiscal policy in a monetary union: why do fiscal instruments matter?", *Bulletin of Economic Research*, Vol. 73 No. 1, pp. 1-33, doi: 10.1111/boer.12231.

Barrie, M.S. and Jackson, E.A. (2022), "The impact of fiscal dominance on macroeconomic performance in Sierra Leone: a DSGE simulation approach", *West African Journal of Monetary and Economic Integration*, Vol. 22 No. 1, pp. 1-33.

Batool, I., Chandia, K.E., Sarwar, B. and Iqbal, M.B. (2024), "Fiscal dominance and the inflation dynamics in Pakistan: an empirical analysis", *Millennial Asia*, Vol. 15 No. 1, pp. 51-71, doi: 10.1177/09763996221103003.

Benigno, P., Canofari, P., Di Bartolomeo, G. and Messori, M. (2023), "The spectre of financial dominance in the eurozone", *Italian Economic Journal*, Vol. 10, pp. 1-22, doi: 10.1007/s40797-023-00225-7.

Blanchard, O. (2020), "Is there deflation or inflation in our future?", *VOX*.

Blanchard, O.J. and Quah, D. (1989), "The dynamic effects of aggregate demand and supply disturbances", *The American Economic Review*, Vol. 79 No. 4, pp. 655-673.

Buthelezi, E.M. (2023a), "Dynamics of macroeconomic uncertainty on economic growth in the presence of fiscal consolidation in South Africa from 1994 to 2022", *Economies*, Vol. 11 No. 4, p. 119, doi: 10.3390/economies11040119.

Buthelezi, E.M. (2023b), "Examining the dynamic nexus of monetary and fiscal policy in South Africa: evidence from key macroeconomic economic indicators", *Journal of Economics and Financial Analysis*, Vol. 7 No. 1, pp. 13-42.

Buthelezi, E.M. (2023c), "Impact of government expenditure on economic growth in different states in South Africa", *Cogent Economics and Finance*, Vol. 11 No. 1, 2209959, doi: 10.1080/23322039.2023.2209959.

Buthelezi, E.M. (2023d), "Impact of inflation in different states of unemployment: evidence with the Phillips curve in South Africa from 2008 to 2022", *Economies*, Vol. 11 No. 1, p. 29, doi: 10.3390/economies11010029.

Buthelezi, E.M. (2024), "Impact of fiscal consolidation on government debt in South Africa: evidence to structural and cyclical effect", *Journal of Economics and Financial Analysis*, Vol. 7 No. 2, pp. 1-23.

Buthelezi, E.M. and Nyatanga, P. (2018), "Government debt and economic growth: evidence from ECOWAS and SADC", *African Journal of Business and Economic Research*, Vol. 13 No. 3, pp. 7-25, doi: 10.31920/1750-4562/2018/v13n3a1.

Buthelezi, E.M. and Nyatanga, P. (2023a), "The dynamic relationship between government debt, fiscal consolidation, and economic growth in South Africa: a threshold analysis", *Cogent Economics and Finance*, Vol. 11 No. 2, 2261329, doi: 10.1080/23322039.2023.2261329.

Buthelezi, E.M. and Nyatanga, P. (2023b), "Impact of fiscal consolidation in different states of domestic government debt in South Africa 1979 to 2022", *Cogent Economics and Finance*, Vol. 11 No. 2, 2280326, doi: 10.1080/23322039.2023.2280326.

Calomiris, C.W. (2023), "Fiscal dominance and the return of zero-interest bank reserve requirements", *Federal Reserve Bank of St. Louis Review*, Vol. 105 No. 4, pp. 1-11, doi: 10.20955/r.105.223-33.

Cochrane, J.H. (2019), *The Value of Government Debt*, National Bureau of Economic Research.

da Silva, C.G. and Vieira, F.V. (2017), "Monetary and fiscal policy in advanced and developing countries: an analysis before and after the financial crisis", *The Quarterly Review of Economics and Finance*, Vol. 63, pp. 13-20, doi: 10.1016/j.qref.2016.04.013.

De Grauwe, P. and Foresti, P. (2023), "Interactions of fiscal and monetary policies under waves of optimism and pessimism", *Journal of Economic Behavior and Organization*, Vol. 212, pp. 466-481, doi: 10.1016/j.jebo.2023.05.024.

Dorn, J.A. (2021), "Fiscal dominance and fed complacency", *Cato Institute*.

Gottschalk, J. (2001), "An introduction into the SVAR methodology: identification, interpretation and limitations of SVAR models", Kiel Working Paper.

Havlik, A., Heinemann, F., Helbig, S. and Nover, J. (2022), "Dispelling the shadow of fiscal dominance? Fiscal and monetary announcement effects for euro area sovereign spreads in the corona pandemic", *Journal of International Money and Finance*, Vol. 122, 102578, doi: 10.1016/j.jimonfin.2021.102578.

Heinemann, F. and Kemper, J. (2021), "The ECB under the threat of fiscal dominance–the individual central banker dimension", *The Economists' Voice*, Vol. 18 No. 1, pp. 5-30, doi: 10.1515/ev-2021-0014.

Higham, N.J. (2009), "Cholesky factorization", *Wiley interdisciplinary reviews: Computational Statistics*, Vol. 1 No. 2, pp. 251-254, doi: 10.1002/wics.18.

Ikram, B. and Si Mohammed, K. (2023), "The effects of fiscal dominance on monetary policies in Algeria amidst COVID-19", *Zagreb International Review of Economics and Business*, Vol. 26 No. 2, pp. 77-95, doi: 10.2478/zireb-2023-0015.

IMF (2023), "Global debt database", available at: https://www.imf.org/external/datamapper/datasets/GDD (accessed 28 March 2023).

Jia, P. (2020), "The macroeconomic impact of monetary-fiscal policy in a "fiscal dominance" world", *Macroeconomic Dynamics*, Vol. 24 No. 3, pp. 670-707, doi: 10.1017/s1365100518000408.

Kamila, A. (2022), "Fiscal dominance in India: an empirical estimation", *Indian Economic Review*, Vol. 57 No. 1, pp. 113-132, doi: 10.1007/s41775-022-00133-0.

Koop, G. and Korobilis, D. (2018), "Variational Bayes inference in high-dimensional time-varying parameter models", Working Paper No. 35, Essex Finance Centre.

Leeper, E.M. and Zhou, X. (2021), "Inflation's role in optimal monetary-fiscal policy", *Journal of Monetary Economics*, Vol. 124, pp. 1-18, doi: 10.1016/j.jmoneco.2021.10.006.

Lehmann, K., Nagy, O., Szalai, Z. and Váradi, B.H. (2020), "Coordination (?) between branches of economic policy across euro area", *Financial and Economic Review*, Vol. 19 No. 1, pp. 37-64, doi: 10.33893/fer.19.1.3764.

Liu, D., Sun, W. and Chang, L. (2021), "Monetary–fiscal policy regime and macroeconomic dynamics in China", *Economic Modelling*, Vol. 95, pp. 121-135, doi: 10.1016/j.econmod.2020.12.007.

Lütkepohl, H. (2004), *Vector Autoregressive and Vector Error Correction Models*, Cambridge University Press, Cambridge, MA.

Mangani, R. (2021), "On fiscal dominance in Malawi", *African Review of Economics and Finance*, Vol. 13 No. 1, pp. 29-53.

Mlangeni, T. and Buthelezi, E.M. (2024), "Monetary policy and inflation expectations: impact and causal analysis of heterogeneous economic agents' expectations in South Africa", *Journal of Applied Economics*, Vol. 27 No. 1, 2289724, doi: 10.1080/15140326.2023.2289724.

Mogaji, P.K. (2023), "Monetary-fiscal policy interactions in Africa: fiscal dominance or monetary dominance?", *Munich Personal RePEc Archive*, available at: http://sure.sunderland.ac.uk/id/eprint/17391

Moreira, R. and Zambon Monte, E. (2021), "Monetary and fiscal policies interaction in a large emerging economy: which is the leader policy", *International Journal of Economics and Finance*, Vol. 13 No. 11, pp. 81-91, doi: 10.5539/ijef.v13n11p77.

Nakajima, J. (2011), "Time-varying parameter VAR model with stochastic volatility: an overview of methodology and empirical applications", *Monetary and Economic Studies*, available at: https://EconPapers.repec.org/RePEc:ime:imemes:v:29:y:2011:p:107-142

Nwagu, G., Orji, A., Jude, I.O., Ogbuabor, J.E., Anthony-Orji, O.I. and Nwufo, L.C. (2022), "Fiscal policy, monetary policy, and trade balance nexus in Nigeria: a new empirical evidence", *Unisia*, Vol. 18, pp. 129-146, doi: 10.20885/unisia.vol40.iss1.art6.

Omo-Ikirodah, B.O. and Afolabi, J.O. (2022), "Determining the degree of fiscal dominance and its implication on the conduct of monetary policy in Nigeria", *Olsztyn Economic Journal*, Vol. 17 No. 2, pp. 265-279, doi: 10.31648/oej.9043.

Orji, A., Ekeocha, D.O., Ogbuabor, J.E. and Anthony-Orji, O.I. (2022), "Monetary policy channels, sectoral outputs and sustainable growth in the ECOWAS region: a rigorous analysis and implications for policy", *Economia*, Vol. 23 No. 1, pp. 105-122, doi: 10.1108/econ-06-2022-0048.

Primiceri, G.E. (2005), "Time varying structural vector autoregressions and monetary policy", *The Review of Economic Studies*, Vol. 72 No. 3, pp. 821-852, doi: 10.1111/j.1467-937x.2005.00353.x.

Robinson, J.A. and Torvik, R. (2009), "A political economy theory of the soft budget constraint", *European Economic Review*, Vol. 53 No. 7, pp. 786-798, doi: 10.1016/j.euroecorev.2009.02.006.

Sanusi, K.A. (2020), "Fiscal dominance and inflation: evidence from Nigerian and South African's experiences", *Cogent Economics and Finance*, Vol. 8 No. 1, 1814508, doi: 10.1080/23322039.2020.1814508.

SARB (2024), "Online statistical query (historical macroeconomic timeseries information)", available at: https://www.resbank.co.za/Research/Statistics/Pages/OnlineDownloadFacility.aspx (accessed 27 February).

Sezavar, M.R. and Eslamiyan, M. (2022), "Investigating the dominance of fiscal policy over monetary policy in Iran's economy with fiscal theory of the price level (FTPL)", *Macroeconomics*, Vol. 17 No. 33.

Shvets, S. (2023), "Dominance score in the fiscal-monetary interaction", *National Accounting Review*, Vol. 5 No. 2, pp. 186-207, doi: 10.3934/nar.2023012.

Sims, C.A. (1980), *Martingale-like Behavior of Prices*, National Bureau of Economic Research, Cambridge, MA.

Subbarao, D. (2022), "Fiscal dominance of monetary policy: global and Indian experience", in *Perspectives on Inclusive Policies for Development in India: in Honour of Prof. R. Radhakrishna*, Springer, pp. 31-50.

Woodford, M. and Xie, Y. (2022), "Fiscal and monetary stabilization policy at the zero lower bound: consequences of limited foresight", *Journal of Monetary Economics*, Vol. 125, pp. 18-35, doi: 10.1016/j.jmoneco.2021.11.003.

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