Fiscal and Monetary Policy Interactions in Malawi: Evidence from Backward-Looking and Forward-Looking Approaches

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Abstract

The accommodation of fiscal profligacy by the Reserve Bank of Malawi (RBM) has long been an issue of concern among advocates for central bank independence in the country. This concern has over the years fuelled suspicions of fiscal dominance in the Malawian economy. Empirically, two traditional approaches have been used to distinguish between a fiscally-dominant regime and a monetary-dominant regime: the backward-looking and forward-looking approaches. Both approaches use the dynamic interrelation between public liabilities and primary surpluses to unearth this dominance relationship. Accordingly, this study employed the two approaches, using time series quarterly data spanning 2013:01-2024:01, to show that suspicions of fiscal dominance in Malawi are empirically exaggerated. On the contrary, the study found that the Malawian economy is predominantly characterised by a monetary-dominant regime – albeit with probable regime shifts to fiscal dominance at times. Such findings affirm the independence of the RBM and highlight its important role in working with the Ministry of Finance and Economic Affairs to create a conducive macroeconomic environment as emphasized in the national development vision – Malawi 2063. Particularly, the RBM is key in anchoring inflation expectations, promoting confidence in the currency, and fostering sustainable economic growth over the long term.

Key Words: Fiscally-Dominant Regime; Monetary-Dominant Regime; Fiscal Policy, Monetary Policy, Backward-Looking Approach; Forward-Looking Approach.

JEL Classification Codes: E52, E58, E61, E62, E63

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1. Introduction

Malawi's new long-term development agenda, Malawi 2063 (MW2063), which seeks to create an inclusively wealthy and self-reliant nation by 2063, has, among other things, emphasised the strategic creation and maintenance of a conducive macroeconomic environment through the exercise of prudent fiscal and monetary policy (Government of Malawi, 2021a). However, the exercise of fiscal and monetary policy is the respective prerogative of the fiscal and monetary authority. Specifically, the fiscal authority is primarily concerned with achieving full employment in the economy through taxation, public spending, and borrowing. Whereas the monetary authority aims to maintain price stability by managing and regulating money supply, interest rates, and credit conditions in the economy (Hilbers, 2005).

However, even though the conduct of fiscal and monetary policy remains the prerogative of independent authorities, the two objectives are not always mutually exclusive. That is, the conduct of one by its respective authority affects the efficacy and, ultimately, the objectives of the other. This predicament raises several concerns over the issue of dominance in the fiscal-monetary policy mix. Definitionally, fiscal dominance relates to a situation where fiscal policy exerts a greater influence over monetary policy, such that decisions by the fiscal authority, including government spending, taxation, and borrowing, drive economic outcomes and dictate the conduct of monetary policy. Alternatively, monetary dominance occurs when monetary policy takes precedence over fiscal policy in shaping economic outcomes, such that the monetary authority has the autonomy to set interest rates, control money supply, and pursue its objectives independently of fiscal considerations (Canzoneri *et al*., 2001).

Notably, under fiscal dominance, the fiscal authority can set the government budget independently of public sector liabilities, such that a fiscal expansion may eventually require monetization by the monetary authority, and hence result in high inflationary pressures, currency depreciation, and financial instability. However, when monetary policy is dominant, the fiscal authority's ability to influence the economy through fiscal measures is constrained by the central bank's commitment to price stability and other macroeconomic objectives. In such a case, fiscal policy decisions align with monetary policy goals to avoid conflicting outcomes. Thus, by maintaining the independence of monetary authority, monetary dominance contributes to macroeconomic stability by anchoring inflation expectations, promoting confidence in the currency, and fostering sustainable economic growth over the long term (Obinyeluaku & Viegi, 2009).

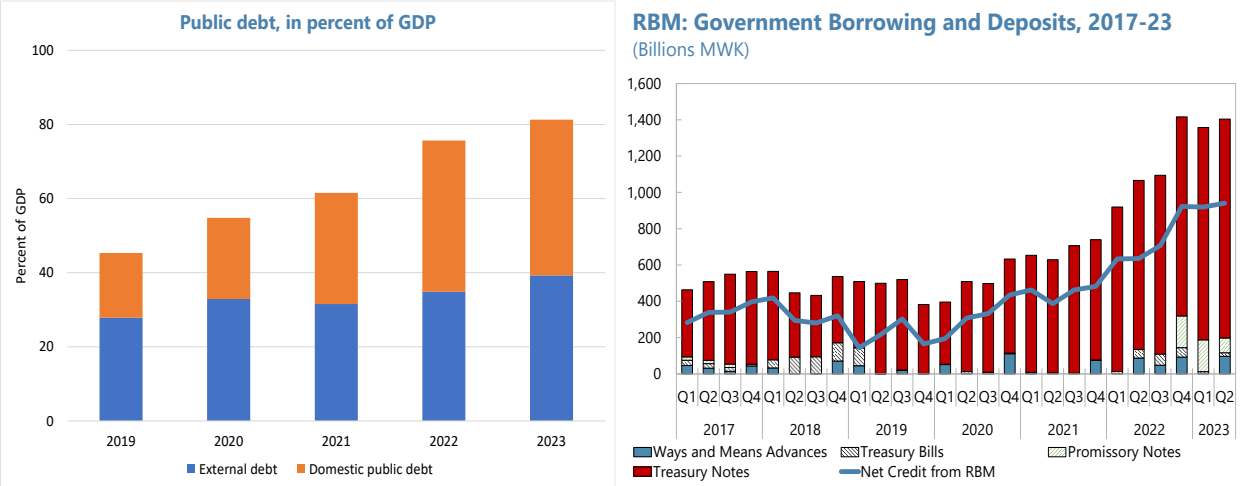
Ideally, every country expects that monetary policy should be able to operate on relevant macroeconomic variables to achieve the price stability objective. However, the literature for developing countries such as Malawi suggests that monetary policy is usually ineffective in meeting this objective due to several factors that characterize such economies (Ngalawa, 2009; Ng'ang'a *et al*., 2019). Particularly, for Malawi, Mangani (2012) notes that irrespective of the Reserve Bank of Malawi's (RBM) commitment to control money supply to affect price levels, there is still a potential for this to be radically influenced by factors outside the control of the monetary authority such as market imperfections, external shocks, and the influence of the executive arm of the government.

Such observations raise suspicions of fiscal dominance in the Malawian economy, even though other factors can be at play in this predicament (Mangani, 2012). However, suspicions about the

presence of fiscal dominance in the Malawian economy can be corroborated, if not substantiated, by considering the trends of public debt and government borrowing, and the actions of the RBM to accommodate fiscal profligacy. Figure 1 presents a visual illustration of this point.

Figure 1: Public Debt and RBM Financing (Directly and Indirectly)

Source: International Monetary Fund (IMF) Country Reports



It is evident from Figure 1 that Malawi's public debts (both domestic and foreign) have been on an upward trajectory in recent years. Interestingly, Figure 1 also shows that these increases in public debt incurred by the fiscal authority, the Ministry of Finance and Economic Affairs (MoFEA), are being financed by the RBM, either directly or indirectly through commercial banks. This would suggest that the fiscus might be exerting an undue burden on the conduct of monetary policy in the country – a scenario typical of an economy inundated by fiscal dominance.

Consequently, this study interrogates the nature of the interaction between fiscal and monetary policy in Malawi. Specifically, the study employs the backward-looking and forward-looking approaches to show that fears of fiscal dominance in Malawi are overplayed. The evidence predominantly points towards a monetary-dominant regime with some hints of regime shifts towards fiscal dominance. However, a more advanced methodological approach is needed to determine this empirically. This is one of the limitations of this study. Beyond contributing to the academic debate, this study also informs the policy discourse on how the RBM and the MoFEA should work together to create and maintain a conducive macroeconomic environment in Malawi.

The rest of the paper has been structured as follows. Section 2 presents the theoretical framework that grounds the methodological approaches adopted for the study. Section 3 provides a review of relevant empirical literature to motivate the choice of methodological approaches further. Section 4 presents the methodological approaches and data used. The estimation results and discussion are presented in Section 4, and Section 5 concludes.

2. Theoretical Framework

2.1. Some Unpleasant Monetarist Arithmetic

Modern analysis of the nature of the interaction between fiscal and monetary policy has its central point of reference in the seminal works of Sargent and Wallace (1981) entitled ***"Some Unpleasant Monetarist Arithmetic".*** This influential study was one of the first attempts at demonstrating the probable difficulties of undertaking monetary policy in a situation where the fiscal authority dominates the monetary authority (Andlib *et al*, 2012).

Primarily, Sargent and Wallace (1981) posited that under a monetary-dominant regime, the monetary authority gets to decide how much seigniorage revenue it can raise since it is the *first mover*.[1] in the policy game against the fiscal authority. The actions of such a monetary authority, by implication, instils a sense of discipline in the fiscal authority such that it selects primary surplus (public debt) sequences that are consistent with the sequence of money supplied by the monetary authority to satisfy the government's intertemporal budget constraint. This suggests that fiscal variables are somewhat inconsequential for price level determination, and monetary authorities need not worry about them when delivering on the price stability objective (Andlib *et al*., 2012).

On the other hand, Sargent and Wallace (1981) noted that under a fiscally-dominant regime, the fiscal authority is the first mover in the policy game, and it dictates the path of primary surpluses. As such, any adjustments made by the fiscal authority to avoid explosive debt paths are covered by seigniorage revenues (Andlib *et al*., 2012). Given this predetermined primary surplus path, a strict monetary policy stance may lead to higher inflation rather than lower. As noted by Andlib *et al*. (2012), standard monetary policy measures taken in response to inflationary shocks in such a situation can produce counterproductive outcomes: monetary tightening today raises interest rates, increases interest payments on government debt, and necessitates future expansionary monetary policy to create additional seigniorage revenue. This phenomenon is what is referred to as "Some Unpleasant Monetarist Arithmetic".

Arguably, one of the most notable contributions of Sargent and Wallace (1981) is that the policy conflict that exists between fiscal and monetary policy can be reconciled by assigning policy leadership to the monetary authority (Obinyeluaku and Viegi, 2009). The implication of this with regards to the policy game is that the monetary authority becomes the first mover, thereby constraining the amount of revenue from seigniorage that the fiscal authority has at its disposal. This makes a case for the independence of central banks (Fratianni and Spinelli, 2001).

2.2. Fiscal Theory of Price Levels

A new wave of research has modified the theoretical underpinnings behind the analysis of the nature of the interaction between fiscal and monetary policy. More recent theories like the ***"Fiscal Theory of Price Level (FTPL)"*** have questioned the conclusions derived by Sargent and Wallace (1981) in Some Unpleasant Monetary Arithmetic. The FTPL offers a rather controversial and strongly unorthodox body of analysis that was primarily developed by Leeper (1991), Sims (1994), and Woodford (1994, 1995, and 2001). The theory states that a government can exogenously set its real expenditure and revenue strategies, and that inflation accordingly takes on the required

[1] In a sequential game (as opposed to a simultaneous game), the *first mover* goes first and sets the scenes.

value to adjust the real value of the contractual nominal debt obligations to ensure the solvency of the government (Woodford, 2001).

So, in the FTPL framework, long-term inflation is determined by primary surpluses and public liabilities rather than the money supply. This occurs because fiscal authorities have a privileged position and can set primary surpluses through an arbitrary process that doesn't necessarily ensure solvency. In other words, primary surpluses are considered exogenous, necessitating an endogenous adjustment of the price level to achieve fiscal solvency. Therefore, it is the government's intertemporal budget constraint that dictates price levels. In this scenario, exemplary of fiscal dominance, the monetary authority can only influence the timing of inflation (Matola and Leon-Gonzalez, 2019; Obinyeluaku and Viegi, 2009).

The interesting contrast here, compared to Sargent and Wallace's (1981) *Some Unpleasant Monetary Arithmetic*, is that fiscal variables, as opposed to monetary variables, are the primary determinants of price levels. Importantly, the FTPL identifies another channel through which the central bank can lose control of inflation, even in the case of an independent central bank that need not accept seigniorage targets dictated by the fiscal authority (Afonso, 2002; Bihan and Creel, 2006).

2.3. A Consideration of the Intertemporal Budget Constraint

We can reconcile the two possibilities of achieving fiscal sustainability by considering the intertemporal budget constraint presented in Equation 1):

$$b_t = \sum_{j=0}^{\infty} \left(\frac{1+x}{1+r}\right)^{j+1} E_t s_{t+j+1} + \lim_{j\to\infty} \left(\frac{1+x}{1+r}\right)^{j+1} E_t b_{t+j+1} \quad (1)$$

Where b and s, respectively, represent the public debt and primary surplus expressed as ratios of gross domestic product (GDP). E is the expectations operator; and x and r denote, respectively, the rate of growth of real GDP and the real interest rate, and for simplicity are assumed to be constant (Bajo-Rubio *et al*., 2014).

The condition for fiscal sustainability requires:

$$\lim_{j\to\infty} \left(\frac{1+x}{1+r}\right)^{j+1} E_t b_{t+j+1} = 0 \quad (2)$$

i.e., the transversality condition; or equivalently:

$$b_t = \sum_{j=0}^{\infty} \left(\frac{1+x}{1+r}\right)^{j+1} E_t s_{t+j+1} \quad (3)$$

Since fiscal solvency requires that the government must run expected future budget surpluses equal, in present-value terms, to the current value of its outstanding debt. In equilibrium, the fiscal solvency condition holds under both a fiscally-dominant regime and a monetary-dominant regime since the difference between the two regimes lies in how solvency is achieved.

For a monetary-dominant regime, price levels are determined in the money market, following the Quantity Theory of Money (QTM), and primary surpluses adjust endogenously to satisfy the intertemporal budget constraint. Looking at equation 3), *s* is set to meet a given *b*, independently

of price levels. Alternatively, under a fiscally-dominant regime, primary surpluses are set exogenously by the government regardless of the level of public debt. Here, price levels will adjust to ensure the fulfillment of the intertemporal budget constraint. Accordingly, the main implication for fiscal policy is that government solvency becomes a sufficient condition for price stability. We can therefore rewrite equation 3) as:

$$\frac{B_t}{P_t y_t} = \sum_{j=0}^{\infty} \left(\frac{1+x}{1+r}\right)^{j+1} E_t s_{t+j+1} \quad (4)$$

Where *B*, *P*, and *y* stand for nominal values of public debt, price level, and real GDP, respectively. Given *B*, *y*, and *s*, *P* would adjust to satisfy equation 4). More specifically, if the market takes cue from the government's commitment in setting *s*, a value of *P* will emerge so that *B* is not excessive and equation 4) is satisfied.

Under the assumption that there is interaction in the fiscal-monetary policy mix, it is plausible to deduce whether an economy is characterized by a fiscally-dominant regime or a monetary-dominant regime. However, this depends on the role that is played by either the fiscal authority or the monetary authority (Carlstrom and Fuerst, 2000). As such, the determination of which policy influences price changes involves an understanding of which authority moves first in the policy game. The answer to this question from a game theory approach is given by the leader-follower scenario but in real life this must be empirically verified (Bajo-Rubio *et al*., 2014).

3. Relevant Empirical Literature

Various empirical attempts have been made to examine the nature of the interaction between fiscal and monetary policy in different countries around the world. Interestingly, the empirical works on the subject matter can be broadly classified into three themes depending on the empirical focus of the studies.

Firstly, there is a classification of empirical studies that have focused on the issue of *policy coordination* in the fiscal-monetary policy mix (Chuku, 2010; Jawadi *et al*., 2016; Qayyum & Shahid, 2016). Buti *et al*. (2001) expound on this and distinguish between two fiscal and monetary policy coordination types: strategic complements and strategic substitutes. In the former, the two policies are seen to move in the same direction; thus, a monetary expansion follows a fiscal expansion. In the latter, the two policies tend to move in opposite directions such that a fiscal expansion occurs when there is a monetary contraction.

The second classification of empirical works on the nature of the interaction of fiscal and monetary policy follows what Leeper (1991) termed *active and passive regimes*. Here, an active monetary authority is seen to make its policy decisions with no regard for government budgets. Likewise, a passive monetary authority finds itself accommodating to changes in public debt (Leeper, 1991; Gilksberg, 2016).

The third, and last, classification of empirical works focuses on the issue of *policy dominance*, that is, on examining the existence of fiscally-dominant regimes or monetary-dominant regimes (Ornellas and Portugal, 2011; Janku and Kappel, 2014). These studies are closely related to those that focus on the active-passive interactive nature of fiscal and monetary policy. Importantly, the

present study falls within this classification and takes a particular interest in the appropriate methodological approaches for distinguishing between the two regimes.

That being established, Bohn (1998) and Canzoneri *et al*. (2001) were the pioneers of the two main approaches used to distinguish between a fiscally-dominant regime and a monetary-dominant regime: the *backward-looking approach* and the *forward-looking approach*, respectively. The two studies were based on the United States (US) economy and focused on the dynamic interrelation between primary surpluses and public liabilities. Bohn (1998) making use of cointegration analysis showed that lagged public liabilities elicited a positive response in primary surpluses in the economy. Alternatively, Canzoneri *et al*. (2001) used vector autoregressive (VAR) analysis to show that positive innovations in primary surplus caused a fall in public liabilities in the economy. The results of both studies supported the existence of monetary dominance in the US economy.

Over the years, several other studies have also made use of these two approaches to ascertain the existence of either a fiscally-dominant regime or a monetary-dominant regime in various other countries around the world. For example, Fialho and Portugal (2005) adopted the forward-looking approach proposed by Canzoneri *et al*. (2001) and established the existence of a monetary-dominant regime in Brazil. Alternatively, Bajo-Rubio *et al*. (2014) employed the Bohn (1998) backward-looking approach and found that the Spanish economy was characterized by a fiscally-dominant regime. Other studies have also utilized variants of these two approaches and have found varying findings based on the country under investigation and the period under consideration (Zoli, 2005; Obinyeluaku and Viegi, 2009; Arora, 2017)

Interestingly, and to the best of my knowledge, only three studies have been done to explicitly examine the nature of the interaction between fiscal and monetary policy in Malawi to unearth the dominance relationship between them (Obinyeluaku and Viegi, 2009; Matola & Leon-Gonzalez, 2019; Mangani, 2019). The empirical position on this subject matter is, however, inconclusive with one asserting that the Malawian economy is characterised by a fiscally-dominant regime (Obinyeluaku and Viegi, 2009) and others suggesting that there is no evidence for this (Mangani, 2019) or rather that the economy is characterised by a monetary dominant regime (Matola & Leon-Gonzalez, 2019). Granted, and as has been the case elsewhere, these contradicting findings might be attributed to the choice of methodological approach adopted.

For instance, Obinyeluaku and Viegi (2009) examined how fiscal policy affects monetary policy in the Southern Africa Development Community (SADC) using an unrestricted VAR model to replicate the forward-looking approach proposed by Canzoneri *et al*. (2001). The study found that five out of the 10 countries that were chosen were characterized by a fiscally-dominant regime – Malawi inclusive. The other five exhibited a monetary-dominant regime. Alternatively, Matola and Leon-Gonzalez (2019) utilized a structural VAR framework and found that the Malawian economy was characterized by a monetary-dominant regime as opposed to a fiscally-dominant regime. Yet still, Mangani (2019) employed an autoregressive distributed lag (ARDL) model and least squares estimation methods[2] to show that there is no evidence of fiscal dominance in Malawi. However, Mangani (2019) made no explicit effort to ascertain the existence of the alternative – a monetary-dominant regime.

[2] The study employed a two-stage least squares estimation method alongside ordinary least squares estimation.

The methodological departure, particularly that of Matola and Leon-Gonzalez (2019) and Mangani (2019), from the backward-looking and forward-looking approaches extends to the choice of variables that were used in the identification process for fiscal and monetary dominance in the Malawian economy. For example, Matola and Leon-Gonzalez (2019) estimated the structural VAR model using government spending and revenue[3] to capture fiscal policy and money supply and the policy rate to capture monetary policy. Meanwhile, the ARDL model estimated by Mangani (2019) included inflation, fiscal deficit, net domestic credit, money growth (M1G), gross domestic product (GDP) per capita, trade openness, oil price inflation, exchange rate, and agricultural output growth. In contrast, Bohn (1998) and Canzoneri *et al*. (2001) simply made use of the relationship between primary surpluses and public liabilities as derived from the intertemporal budget constraint considered in the theoretical framework.

4. Methodology and Data

4.1. Methodological Approach

Following the theoretical framework and relevant empirical literature, we see that the conventional empirical determination for the existence of fiscal dominance or monetary dominance mainly utilises two approaches:

i) the *backward-looking approach* developed by Bohn (1998) where, in a monetary-dominant regime, an increase in the past value of public debt (or liability) results in a greater increase in primary surplus i.e., $\Delta b_{t-1} \rightarrow \Delta s_t$; and

ii) the *forward-looking approach* proposed by Canzoneri *et al*. (2001) where, in a monetary-dominant regime, a greater increase in primary surplus results in a decrease in future public debt (or liability) i.e., $\Delta s_t \rightarrow \nabla b_{t+1}$.

Therefore, this study has employed both approaches to provide a robust verification of the existence of either a fiscally-dominant regime or a monetary-dominant regime in the Malawian economy.

4.1.1. Backward-Looking Approach

As previously alluded to, the backward-looking approach suggests that the estimation should be of the cointegration relationship between primary surplus and lagged values of public debt, both expressed as ratios of GDP:

$$s_t = \partial + \beta b_{t-1} + v_t \qquad (5)$$

where v_t represents the error term. Looking at equation 5), a positive and significant estimate of the coefficient β is a sufficient condition for fiscal solvency and indicates that the government has satisfied the present-value budget constraint. In terms of the transversality condition, this implies that *s* has been set to meet a given *b* independently of price levels. As such, for the backward-looking approach, an estimated coefficient $\beta > 0$ means that there is monetary dominance and an estimated coefficient $\beta \leq 0$ means that there is fiscal dominance (Bohn, 1998).

[3] These were proxied by total government expenditures and total domestic revenue collected by the Government of Malawi's Ministry of Finance and Economic Affairs.

According to Bohn (1998), beyond testing if $\beta > 0$ in equation 5), another conventional approach for ascertaining the sustainability of public finance is to test if $\beta' = 1$ from the estimation of the cointegration relationship below:

$$rev_t = \emptyset' + \beta' exp_t + \varepsilon_t \quad (6)$$

Where rev_t and exp_t, respectively, represent the ratios of total government expenditure and revenue to GDP; and ε_t is the error term.

Bohn (2007), nonetheless, later criticised his earlier methods for establishing fiscal sustainability based on unit root and cointegration tests, citing that they were incapable of rejecting sustainability. Alternatively, Bohn (2007) suggested three propositions that consider the order of integration to determine what satisfies the transversality condition and the intertemporal budget constraint:

i) Given that b_t is I (m) and that m is positive, then b_t satisfies the transversality condition. Likewise, b_t and s_t satisfy the intertemporal budget constraint.

ii) Given that exp_t and rev_t are I (m_{exp}) and I (m_{rev}), respectively, and $\Delta b_t = exp_t - rev_t$; then b_t is I (m) with $m \leq \max(m_{exp} m_{rev}) + 1$, such that the transversality condition and the intertemporal budget constraint hold.

iii) Given that b_t and s_t follow an error-correction specification of the form $s_t - \rho b_{t-1} = z_t$, and z_t is I (m) for some $\rho < 0$ such that $|\rho| \in (01 + r]$ where r is a constant interest rate, then b_t satisfies the transversality condition and the intertemporal budget condition holds.

Specifically, the confirmation of the third Bohn (2007) proposition is based on the error correction specification below that is analogous to Equation 5:

$$\Delta s_t = \omega + \delta(L)\Delta b_{t-1} + \rho(s_{t-1} - \alpha - \beta b_{t-2}) + \eta_t \quad (7)$$

where η_t is the error term.

This study has undertaken to verify all three Bohn (2007) propositions as well as estimate the alternative conventional specification presented in Equation 5 for establishing the presence of fiscal dominance or monetary dominance.

4.1.2. Forward-Looking Approach

The forward-looking approach developed by Canzoneri *et al*. (2007) uses VAR analysis to check for evidence of either fiscal or monetary dominance. The major attribute of a VAR model is that it treats each variable as an endogenous variable. Accordingly, in the two-variable system suggested by the forward-looking approach, there is a sequence of S_t , primary surplus, which is affected by current and past values of B_t, public debt, which is in turn also affected by current and past values of S_t . Thus, the bivariate system is expressed as

$$S_t = \varphi_{10} - \varphi_{12} B_t + \gamma_{11} S_{t-1} + \gamma_{12} B_{t-1} + \mu_{St} \quad (8)$$

$$B_t = \varphi_{20} - \varphi_{21} S_t + \gamma_{21} S_{t-1} + \gamma_{22} B_{t-1} + \mu_{Bt} \quad (9)$$

With the following assumptions: i) both variables (S_t and B_t) are stationary, ii) μ_{St} and μ_{Bt} are white noise disturbances with standard deviations σ_{St} and σ_{Bt}, and iii) μ_{St} and μ_{Bt} are uncorrelated (Fialho and Portugal, 2005).

Equation (7) and (8) is the first-order VAR with the longest lag equal to one. The system structure includes the restorations of S_t and B_t which interact with each other i.e., $-\varphi_{12}$ is the contemporaneous effect of the change in a unit B_t on S_t and γ_{21} is the effect of a change in a unit of S_{t-1} on B_t. Additionally, the residual terms μ_{St} and μ_{Bt} are shocks in S_t and B_t. Intuitively, if φ_{21} is not equal to zero, μ_{St} will have an indirect contemporaneous effect on B_t and if φ_{21} is not equal to zero, μ_{Bt} will have an indirect contemporaneous effect on S_t .

As in all VAR models, each variable can be expressed as a linear combination of their lagged terms and the lagged terms of all other variables in the system. The VAR may also be expanded to include deterministic time trends and other exogenous variables. After some matrix manipulation of equations (8) and (9), the VAR can be re-expressed as follows:

$$S_t = a_{10} + a_{11}S_{t-1} + a_{12}B_{t-1} + \mu_{St} \quad (10)$$

$$B_t = a_{20} + a_{21}S_{t-1} + a_{22}B_{t-1} + \mu_{St} \quad (11)$$

The first system is usually presented as a structural VAR or a primitive system in the literature, and the second one as a standard VAR (Fialho and Portugal, 2005). More importantly, the identification of fiscal dominance or monetary dominance is based on impulse response decision criteria outlined in Table 1 below.

Table 1: Identification Criteria for Fiscal Dominance & Monetary Dominance

Criteria	Response of Future *b* to Current *s*		Response of Future *s* to Current *s*	Regime
	1st Order	2nd order		
C1	Negative (-)	Negative (-)	Positive (+)	MD
C2	Nonnegative (0, +)	Nonnegative (0, +)	Nonnegative (0)	FD
C3	Negative (-)	Negative (-)	Negative (-)	Unidentified

Note: 1st VAR ordering is *b* ➔ *s*, which is consistent with a monetary-dominant regime; 2nd VAR ordering is *s* ➔ *b*, which is consistent with a fiscally-dominant regime; and fiscal dominance and monetary dominance are denoted FD and MD, respectively.

4.2. Data

The analysis is based on quarterly time series data spanning from 2013:01 to 2024:01 after adjusting for endpoints, making up a total of 40 usable observations. The major data sources were the RBM and the World Bank (WB) World Development Indicators (WDI). Specifically, data on public liability and primary surplus were obtained from the RBM while data on government expenditure and government revenue was sourced from the WB WDI. The WB WDI data was converted from annual to quarterly data using the EViews statistical package. The same statistical package was used for the analysis.

Public liability *(b)* is measured as the government's total debt after aggregating both domestic and foreign debt obligations whereas primary surplus (*s)* is calculated by subtracting interest payments for the borrowings from the current budget balance. Government expenditure *(exp)* comprises

recurrent and development expenditures while government revenue *(rev)* constitutes all tax and non-tax revenues. All variables are expressed as a ratio of GDP.

5. Results and Discussion

5.1. General Stationarity Properties

Before performing estimations using the two approaches, the study utilized the Augmented Dickey-Fuller (ADF) and Philips Perron (PP) tests to determine the general stationarity properties of the time series data under investigation. Within this framework, the null hypothesis assumes the existence of a unit root, while the alternative hypothesis suggests the absence of a unit root. If the absolute value of the test statistic is greater than the critical values, the null hypothesis is rejected with a certain level of confidence.

The results of the ADF and PP in Table 2 reveal that public liability, government revenue, and government expenditure are integrated of I (1) after taking the first difference. Whereas public surplus is integrated of I (0), indicating level-stationarity.

Table 2: Augmented Dickey-Fuller and Philip Perron Stationarity Test Results

	Augmented Dickey-Fuller		Philips-Perron (PP)		Order of Integration
	Level	1st difference	Level	1st difference	
Public Liabilities $(\boldsymbol{b_t})$	-2.352	-11.240***	-3.388*	-16.644***	I (1) ADF
Primary Surplus $(\boldsymbol{s_t})$	-10.246***	-6.146***	-10.246***	-23.565***	I (0)
Govt Revenue($\boldsymbol{rev_t}$)	-1.697	-4.359***	-1.282	-12.388***	I (1)
Govt Expenditure ($\boldsymbol{exp_t}$)	-1.394	-4.197***	-1.503	-12.322***	I (1)

*Note: *** p<0.01 statistically significant at 1%, ** p<0.05 statistically significant at 5%, * p<0.1 statistically significant at 10%. Ln denotes the natural log of the variable.*

5.2. Backward-Looking Approach Results

To examine if the three Bohn (2007) propositions hold, we start by considering the stationarity properties of variables *b*, *rev*, and *exp* to see if they are integrated of I (1). The results of the ADF and PP in Table 2 confirm that they are all I (1). As such, the first two propositions of Bohn (2007) hold. However, to confirm the third Bohn (2007) proposition, we consider the estimation results of Equation 7[4]. For robustness, this consideration has been coupled with the estimation of Equation 5[5].

Since the backward-looking approach is based on the cointegration relationship between primary surplus and the lagged values of public debt, the study undertook the Engel-Granger and Phillips-Ouliaris cointegration tests for verification. The decision criteria for both tests are based on the null hypothesis that there is no cointegration between the two series. Based on the p-values presented in Table 3, we reject the null hypothesis of no cointegration and conclude that primary surpluses and the lagged values of public debt are cointegrated.

[4] This has been expressed as follows: $\Delta s_t = \omega + \delta(L)\Delta b_{t-1} + \rho(s_{t-1} - \alpha - \beta b_{t-2}) + \mathfrak{y}_t$

[5] This has been expressed as follows: $s_t = \partial + \beta b_{t-1} + v_t$

Table 3: Cointegration Test Results

	Value	Probability	Order of Integration
Engel-Granger Tau-Statistic	-9.9538	0.0000***	I (0)
Phillips-Ouliaris Tau-Statistic	-10.0173	0.0000***	I (0)

*Note: *** p<0.01 statistically significant at 1 %, ** p<0.05 statistically significant at 5 %, * p<0.1 statistically significant at 10*

5.2.1. Short- and Long-Run Model Estimations

The simultaneous estimation of a cointegrating vector and an error-correction mechanism is done using the non-linear least squares (NLS) methods to provide estimates that are asymptotically consistent, normally distributed, and efficient (Phillips and Loretan, 1991). As such, we estimated both the short- and long-run model using one-step NLS.

As can be seen in the estimation results presented in Table 4, the short-run model error-correction coefficient is estimated at -0.87, and the short-run coefficient of the lagged values of public liability is positive (0.012). Both estimates are significant at all levels of significance. Likewise, the results of the long-run model show that the coefficient of the lagged values of public liability is positive (0.014) and significant at 5% level of significance. Therefore, the third Bohn (2007) proposition also holds, and public finances are shown to be sustainable both in the short- and long-run in Malawi.

Importantly, in addition to fiscal solvency, a positive and significant estimate of the lagged values of public liability indicates, according to the backward-looking approach, the presence of a monetary-dominant regime in Malawi. Such results confirm what Matola and Leon-Gonzalez (2019) and Mangani (2019) also found using different methodological approaches.

Table 4: Backward-Looking Approach Estimation Results

	Short-Run Model (Δs_t)		Long-Run Model (s_t)	
Independent Variable	**Coefficient**	**Probability**	**Coefficient**	**Probability**
Constant	6.23E-05	0.8864	-0.002158***	0.0000
Δb_{t-1}	0.011857***	0.0027	0.013459**	0.0414
ECT	-0.865504***	0.0000	N/A	N/A
R-squared	0.480999		0.031839	
D-Watson Statistic	2.005696		1.700441	

*Note: *** p<0.01 statistically significant at 1%, ** p<0.05 statistically significant at 5%, * p<0.1 statistically significant at 10%. (-1) denotes first lag of the variable.*

It is worth pointing out that Canzoneri *et al*. (2001) raised caution over potential ambiguities that might persist in making conclusions based on just a positive estimate of the lagged values of public liability since this might be compatible with both fiscal and monetary dominance. This is so because the one equation backward-looking approach can at times fail to distinguish between ex-post adjustments of primary surpluses to public liabilities (consistent with a monetary-dominant

regime) and ex-ante adjustments of public liabilities to primary surpluses (consistent with a fiscally-dominant regime and the FTPL) (Ramos and Tanner, 2002). This motivates further analysis of the fiscal adjustment in a forward-looking manner for robustness in the verification.

5.3. Forward-Looking Approach Results

The forward-looking approach proposed by Canzoneri *et al*. (2001) notes that there might be discrepancies in results if we order the VAR model differently. As such, we estimated the VAR model under the ordination in which primary surplus comes first and allows for a contemporaneous effect on public liability. This is consistent with fiscal dominance. We also estimated the VAR model under the ordination where public liability comes first but does not allow for a contemporaneous effect on public liability. This is consistent with monetary dominance. The diagnostic test results under both ordinations are the same. As such, they have been presented and discussed jointly in this study.

Despite the stationarity tests (ADF and PP) indicating that public liability is I (1) and primary surplus is I (0), the VAR models were estimated in levels to avoid losing information surrounding possible long-run relationships among the variables. This decision is supported by Sims *et al*. (1990) and Nampewo *et al*. (2013).

The choice of lag length is very important when estimating a VAR model because long lags eat away at degrees of freedom while short lags can lead to model misspecification. Consequently, Table 5 below presents a series of tests that the study utilised to determine an optimal lag length of 2 quarters for both VAR specifications.[6].

Table 5: Lag Length Determination

Lag	LL	LR	FPE	AIC	SC	HQ
0	629.9894	NA	2.03E-07	-9.736269	-9.691931	-9.718254
1	682.8928	103.3463	9.49E-08	-10.49446	-10.36145*	-10.44042
2	690.0717	13.80128*	9.04E-08*	-10.54375*	-10.32206	-10.45367*

** Optimal lag length*

The study also conducted a series of post-estimation diagnostic tests to ensure that the residuals of the VAR model are white noise—that is, they do not suffer from heteroscedasticity or serial correlation—and that the model is stable. In particular, White's test was applied to examine the presence of heteroscedasticity in the residuals. The null hypothesis of White's test is that all residuals have constant variance (are homoscedastic). Consequently, even though the lag determination tests recommended an optimal lag length of 2 quarters, the study, using the findings presented in Table 6, opted for 4 lags to address the issue of heteroscedasticity.

To determine whether the residuals of the 4-lag VAR specification suffer from autocorrelation, we conducted an LM serial correlation test under the null hypothesis that there is no serial correlation at a specific lag *h*. Based on the p-values displayed in Table 7, we fail to reject the null hypothesis and conclude that there is no serial correlation among the residuals.

[6] The lag length determination tests employed in the study included the sequential modified Likelihood Ratio (LR) test statistic, Final Prediction Error (FPE) criterion, Akaike Information Criterion (AIC), Schwartz Information Criterion (SIC), and the Hannan–Quinn information criterion (HQIC) test.

Table 6: White's Joint Test for Residual Heteroskedasticity

Lag	Chi-Square	Degrees of Freedom (d.f)	Probability
2	53.71731	24	0.0005
4	60.16041	48	0.1119*

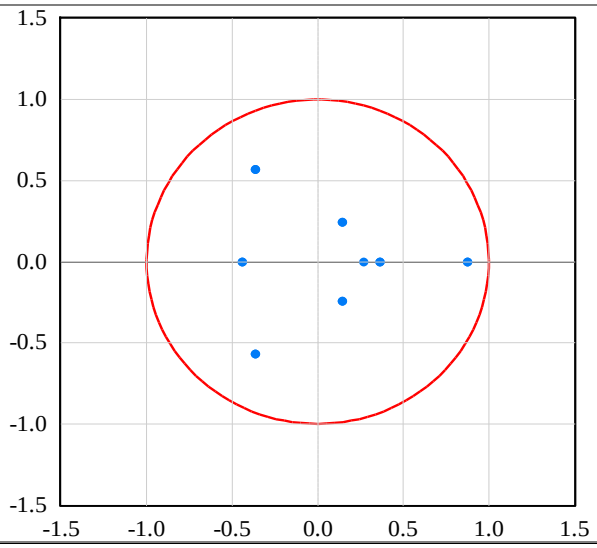
**Lag length without heteroskedasticity*

Table 7: Model diagnostics for the VAR

Lag (h)	LRE*stat	Probability	Rao F-stat	Probability
1	3.926580	0.4160	0.985714	0.4160
2	6.615661	0.1576	1.670419	0.1577
3	1.905748	0.7531	0.476338	0.7531
4	2.647484	0.6184	0.662789	0.6184
5	0.621901	0.9606	0.155015	0.9606

Furthermore, a VAR model is considered to be stable only if the roots of the characteristic polynomial have a modulus that is less than one and lie within the radius of the circle. The results of the stability test presented in Figure 2 confirm the stability of the VAR model under analysis.

Figure 2: (Inverse) Roots of (AR) Characteristics Polynomial



Root	Modulus
0.875218	0.875218
-0.265452 - 0.570681i	0.677666
-0.365452 + 0.570681i	0.677666
-0.441361	0.441361
0.364333	0.364333
0.145129 - 0.243557i	0.282518
0.145129 + 0.243557i	0.283518
0.267249	0.267249

** No root lies outside the unit circle. VAR satisfies the stability condition.*

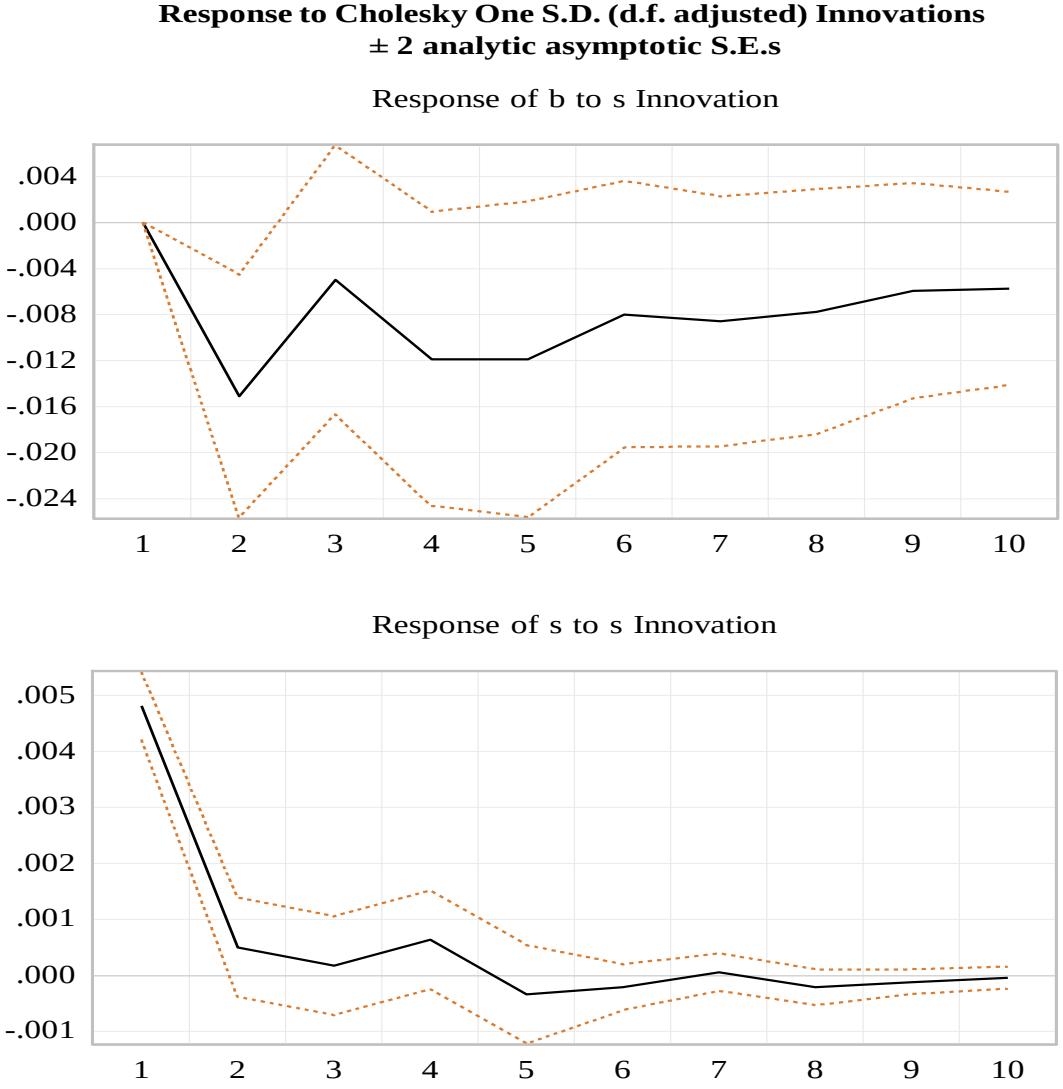
5.3.1. Impulse Response Functions

In accordance with the identification criteria presented in Table 1, impulse response analysis was conducted on both VAR ordinations, one consistent with monetary dominance and the other with

fiscal dominance. Specifically, positive innovations were undertaken in current primary surpluses to see the response in future public liabilities and future primary surpluses.

Figure 3 presents findings of the monetary dominance VAR ordination. Specifically, it shows that a positive innovation in current primary surpluses elicits a negative response in future public liabilities, and that a positive innovation in current primary surpluses elicits a positive response in future primary surpluses that dissipates after 4 quarters. These findings are similar to those of the backward-looking approach and confirm the presence of a monetary-dominant regime in Malawi.

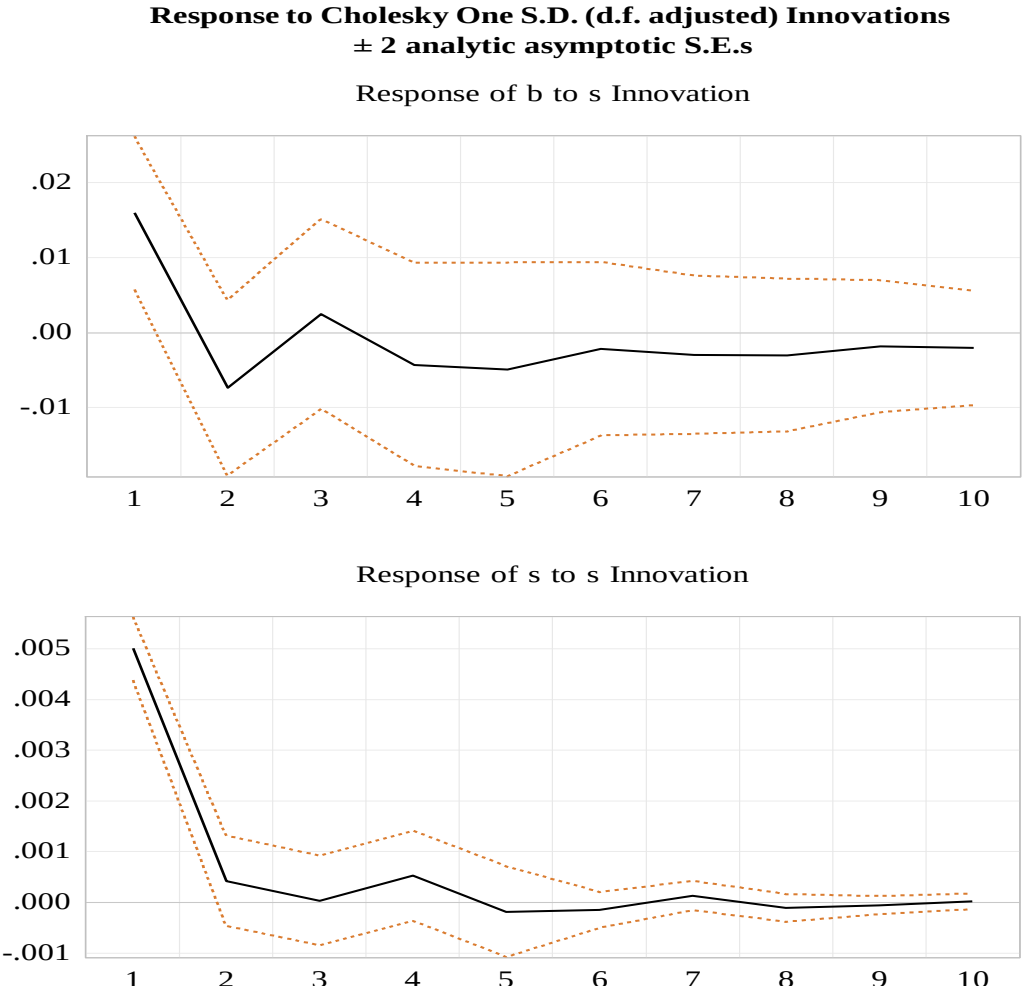
Figure 3: Monetary Dominance Ordination: Primary Liability ➔ Primary Surplus



Likewise, Figure 4 presents the findings of the impulse response analysis under the fiscal dominance VAR ordination. Interestingly, here we see that a positive innovation in the current primary surplus elicits a positive response in future public liabilities that dissipates after 2 quarters. Furthermore, a positive innovation in current primary surpluses also elicits a positive response in future primary surpluses until the fifth quarter. This is consistent with a "fiscally-dominant regime" and corroborates the findings of Obinyeluaku and Viegi (2009).

However, weighed against the evidence from the backward-looking approach and those of the forward-looking monetary dominance VAR ordination, it is plausible to conclude with a strong degree of certainty that the Malawian economy was predominantly characterised by a monetary-dominant regime over the period under study.

Figure 4: Fiscal Dominance Ordination: Primary Surplus ➔ Public Liability



6. Conclusion and Recommendation

In conclusion, despite strong fears of perpetual fiscal dominance in the Malawian economy, evidence from both backward-looking and forward-looking approaches point to the prevalence of a monetary-dominant regime. This finding aligns with recent empirical studies that have reached the same conclusion (Matola and Leon-Gonzalez, 2019; Mangani, 2019). Nonetheless, as shown in this study, the results of a forward-looking 'fiscal dominance' VAR ordination lend some credence to empirical works that have arrived at a contrary conclusion—that is, evidence of some fiscal dominance in Malawi (Obinyeluaku and Viegi, 2009)

However, it is prudent to consider this seemingly contradictory finding in light of the overwhelming evidence pointing toward a monetary-dominant regime. In this study, we draw from the results of the backward-looking approach, the forward-looking 'monetary-dominance' VAR ordination, and the findings of Matola and Leon-Gonzalez (2019) and Mangani (2019). If anything, it would be empirically reasonable to propose, as others have done (Ng'Ang'a *et al*., 2019), that although the Malawian economy is predominantly characterized by a monetary-dominant regime, there may be instances when regimes shift—from a monetary to a fiscally-dominant one

This raises two issues for consideration: one methodological and the other for policymakers to address. First, this warrants further empirical analysis of fiscal and monetary policy interactions in Malawi using more advanced methodological approaches that can detect regime switches over time. Second, this reinforces the conventional economic understanding that the best outcomes are achievable only when fiscal and monetary authorities coordinate their operations toward a common goal—macroeconomic stability.

By extension, this reemphasises the importance of an independent RBM that is empowered, through legislation and other means, to tame fiscal excesses and support prudent macroeconomic policy toward full employment. Equally, this entails having an MoFEA that works hand-in-hand with the RBM to stabilize interest rates, exchange rates, and inflation. This coordinated and complementary approach to macroeconomic stabilisation has also been recommended in the prevailing national development vision – MW2063 (Government of Malawi, 2021a).

Specifically, to strengthen sustainable national public liabilities, MW2063 First 10-year Implementation Plan (MIP-1) recommends the establishment of a Debt Retirement Fund and a high-level multi-stakeholder Debt Policy Committee with joint oversight from the MoFEA and RBM. Additionally, MIP-1 recommends the promotion of interbank trading to smoothen monetary policy operations and government debt management practices. The two authorities are also encouraged to work together to ensure a gradual shift to zero-deficit budgets for recurrent expenditure (Government of Malawi, 2021b).

Other recommendations in MIP-1 focus on the issue of broadening tax and non-tax revenue bases by formalizing the informal sector largely through monetary and fiscal incentives, as well as digitization of trading systems. There is also an emphasis on ensuring that government borrowing is limited to investments with high socioeconomic returns. This can be done by ringfencing allocations to the development budget at an annual minimum of 25 percent of the national budget (Government of Malawi, 2021b).

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