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## **Fiscal Dominance and Monetary Policy Transmission in a Debt-Distressed Small Open Economy: Evidence from The Gambia (1983–2022)**

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### **ABSTRACT**

*The fast build-up of the sovereign debt in low-income economies has brought up yet again the issue of fiscal sustainability and monetary policy autonomy. This paper focuses on the question of whether the increasing foreign government debt results in the dynamics of fiscal dominance that may affect the transmission of monetary policy in The Gambia during the timeframe 1983-2022. With annual time-series data and a multivariate econometric model, such as the Johansen cointegration, Vector Error Correction Modelling (VECM), impulse response functions, and forecast error variance decomposition, the analysis reflects both the long-run equilibrium relations and short-run adjustment relationships between foreign debt and important monetary variables (money supply, interest rates, inflation and exchange rate). The findings show that there is indeed a long run stable relationship between monetary variables and foreign public debt which proves structural fiscal-monetary interdependence. The exchange rate portrays the most and quickest adjustment response and it puts right about 42% of disequilibrium in a year. Foreign debt shocks are estimated to be 42% of the exchange rate volatility at a five-year horizon, which is lower than interest rates (31%), and inflation (23%). The reaction of inflation to exchange rate pass-through is lagging whereas the reaction of money supply is on the smaller side. These results imply that the external sector is the main means of transmitting fiscal pressures in The Gambia, which is in line with the tendencies of fiscal dominance in the small open economies that are exposed to foreign-currency borrowing. The fact that monetary policy has the ability to operate does not mean that the increment in the level of external debt is not influential in the macro economic environment in which the stabilization policies are to be implemented. The paper adds to the fiscal dominance body of literature by offering infrequent system-specific evidence of time-series using a debt-distressed economy in Africa and policy implications of fiscal-monetary coordination in structurally fragile contexts.*

**Keywords:** *Fiscal dominance; Foreign public debt; Monetary policy transmission; Exchange rate dynamics; Small open economy; The Gambia.*

### **Introduction**

#### **1. Introduction**

The unprecedented increase in the level of sovereign debt in the emerging and low-income economies has brought back the debate about the sustainability of the fiscal policy and macroeconomic stability. The International Monetary Fund (IMF, 2023) notes that the world population debt was at all-time highs after the COVID-19 pandemic, and the developing economies were disproportionately exposed to external debt growth. Although fiscal

expansion funded by debt can be used to stabilize the situation in the short term, the continued use of external debt can cause the dynamic between fiscal and monetary powers to be profoundly changed. The fiscal imbalance may limit the capacity of the monetary policy in such places, what is often referred to as fiscal dominance (Sargent and Wallace, 1981; Leeper, 2018).

Theoretical basis of fiscal dominance can be traced back to the groundbreaking book by Sargent and Wallace (1981), who show that in case the fiscal authorities are unable to create enough primary surpluses in order to stabilize the public debt, the fiscal demands are ultimately met through the monetary policy. Through this perspective, unless fiscal policy is sustainable, efforts by the central banks to curb inflation using contractionary policy can actually cause an increase in the long-run inflation. Modern developments of this model underline the significance of expectations and intertemporal budgetary constraints in the establishment of a price stability (Woodford, 2001; Bianchi and Melosi, 2019). According to the fiscal theory of the price level, the rate of inflation does not depend only on the monetary aggregates but on the plausibility of fiscal support of government obligations (Cochrane, 2023).

Small open economies with high rates of foreign borrowing are prone especially to the dangers of fiscal dominance. Exchange rate risk, rollover risk, and the exposure to worldwide financial conditions is created by the external foreign-denominated public debt (Eaton and Gersovitz, 1981). Depreciation in terms of currency has the effect of devaluing foreign debts, thereby leading to an augmentation in the national worth of the domestic debt, causing fiscal tension and consequently leading to fiscal answers in an attempt to stabilize the fluctuating exchange rates. Therefore, the growth of external debt can be conveyed in a variety of macroeconomic directions such as an increase in money supply, changes in interest rates, inflation expectations, and depreciation of the exchange rate (Hur, Kondo, and Perri, 2018).

The Gambia offers a good example of analyzing such dynamics. Being a small open economy that lacks export diversification and has shallow domestic capital markets, The Gambia, in the past, has been dependent on concessional and non-concessional external borrowing to fund fiscal deficits and development spending. The last forty years were associated with the periods of fiscal imbalance, political transitions, and global shocks and high levels of public debt, as well as exchange rate volatility. Nonetheless, these macroeconomic vulnerabilities, in turn, do not imply that the available empirical studies on The Gambia have paid substantial attention to the fiscal-monetary transmission nexus; instead, their attention has been directed at debt sustainability and growth rates (Djinkpo, 2019; Jarju, 2021).

In a wider sense, the African macroeconomic literature has focused on the debt-growth relationship and debt sustainability levels (Akanbi, Uwaleke, and Ibrahim, 2022), whereas the effects of increasing external debt as a constraint on the effectiveness of the monetary policy have received little attention. This disconnect is especially vital taking into consideration the structural nature of low-income economies, in-which institutional constraint and external vulnerability can increase the impacts of fiscal-monetary feedback.

This paper examines the hypothesis of whether the increase in foreign public debt creates fiscal dominance relationships, which affect the monetary policy transmission in The Gambia between the year 1983 and 2022. In particular, it studies the impact of the external shock to

debt on the major monetary indicators, which include money supply, interest rates, inflation, and the exchange rates, in a dynamic multivariate model. The analysis using Johansen cointegration and a Vector Error Correction Model (VECM) is able to obtain a long-run relationship between the fiscal and monetary variables and short-run adjustment in response to changes in the variables. Additional techniques are impulse response functions and variance decomposition techniques that are employed to trace dynamic propagation of debt shocks through the monetary system.

This study has three-fold contribution. First, it presents the literature of fiscal dominance to a low-income, debt-stricken African economy, which expands the range of empirical studies on fiscal-monetary interaction research. Second, it uses a system-based approach to econometrics to estimate the various channels of transmission at the same time, and not single equations as in the other method. Third, it offers the policy-relevant information on the fiscal-monetary coordination in the small open economies that experience increasing vulnerabilities of their sovereign debt.

## **2. LITERATURE REVIEW**

Fiscal policy interaction with the monetary policy has been a major macroeconomic study over the decades. Although classical theories view fiscal and monetary authorities as distinct entities in an institutional sense, current macroeconomic theory has confirmed that these can fail in situations where the debt of the population is too high. This section discusses the theoretical basis of fiscal dominance, the presence of external debt in small open economies and a synthesis of empirical support on the fiscal monetary transmission mechanisms, especially in the developing economies.

### **2.1 Fiscal Dominance and the Monetary–Fiscal Nexus**

The idea of fiscal dominance can be traced to Sargent and Wallace (1981). Unpleasant monetarist arithmetic which indicated that in cases where governments operate on a continuing fiscal deficit with no believable future primary surpluses, tightening of monetary policy could work to boost inflation and not to cut it. Through their model, the fiscal policy sets the long-run direction of inflation as the intertemporal government constraint on the budget should be met. Failure to stabilize debt by the fiscal authorities results in the central bank having to eventually monetize deficits which destroys price stability.

Leeper (1991, 2018) formalizes such an interaction by separating the monetary dominance regime and fiscal dominance regime. When monetarism takes place, fiscal authorities can respond to accumulations of debt, manipulating primary surpluses in order to ensure that the price level does not change. Fiscal policy fails to appropriately respond, and monetary authorities have to adapt to the forces of debt under fiscal dominance. In this instance, the fiscal shocks may produce long-lasting inflationary impacts and jeopardize the credibility of the monetary policy.

This is based on the further argument of the fiscal theory of the price level (Woodford, 2001; Cochrane, 2023) which connects inflation with the real value of government obligations compared to the future primary surpluses which is expected. In the event that fiscal support is low, the inflation starts adjusting fiscal solvency. This model suggests that the monetary policy cannot stabilise prices without the fiscal behaviour.

The current empirical studies affirm the applicability of fiscal dominance within the contemporary macroeconomic set ups. As Bianchi and Melosi (2019) demonstrate, macroeconomic volatility is increased in mature economies by a lack of fiscal monetary coordination. They show that fiscal uncertainty can disarm the inflation expectations even in the situation where the monetary policy seems credible. These results indicate that sustainability of debt and fiscal credibility are the key to successful monetary stabilization.

### **2.2 External Public Debt in Small Open Economies**

Although the concept of fiscal dominance was initially formulated within the framework of advanced economies, the concept can have a greater impact in small open economies that are dependent on foreign borrowing. The external public debt gives rise to additional channels of transmission as opposed to the closed economies.

Eaton and Gersovitz (1981) play up the sovereign risk in the decision to do external borrowing and prove that the default risk does affect the interest rate spreads and borrowing capacity. The increase in external debt in emerging markets can raise the sovereign risk premia, which results in the upsurge in domestic interest rates and stiffer financial conditions (Hur, Kondo, and Perri, 2018). The impacts of these effects can limit the autonomy of monetary policy.

Exchange rate of the external debt also makes matters worse in terms of macroeconomics. In cases when the foreign debt is in foreign currency, the depreciation of the exchange rate will escalate the amount of liabilities in the domestic currency, thus deteriorating fiscal balances. This gives feedback between the exchange rate and fiscal sustainability. When the expectation of the monetary accommodation of increasing debt burdens is present in the markets, inflationary pressures can occur (IMF, 2023).

In the small open economies whose domestic financial markets are shallow, the channel of monetary transmission is often dominated by the exchange rate channel. Depreciation has a direct effect on the import prices, which increases the impact of inflation pass-through. As a result, the external shocks can spread both in fiscal and external systems, restraining the success of interest rate responses.

### **2.3 Debt Overhang and Macroeconomic Constraints**

The debt overhang theory which was first explained by Krugman (1988) argues that high levels of debt will lower the incentive to invest and grow as future profits will be stolen by creditors. Although this theory has been mostly applied to the corporate finance context, it has also been applied to the context of the sovereign debt (Kurniasih, 2021). High levels of debt in the sovereign context can corrupt the policy motivations and limit the macroeconomic flexibility. Recent literature shows the macroeconomic effects of a debt overhang in the emerging economies. Hurtado, Nuño and Thomas (2023) reveal that the sustainability of sovereign debt in the developed world interacts with the processes of inflation. Akanbi et al. (2022) discover that the servicing of the external debt is affecting the macroeconomic stability in the developing nations. Nonetheless, these researches are based mainly on the results in growth and inflation and not the larger fiscal-monetary transmission system.

### **2.4 Empirical Evidence on Fiscal–Monetary Transmission**

Current empirical studies of fiscal dominance are still focused on developed economies. Surveys based on structural VAR models indicate that fiscal shocks may affect inflation expectations and bond yields especially in high-debt markets (Bianchi and Melosi, 2019).

Miyamoto (2023) demonstrates that increasing the government debt in Japan has caused a shift in the monetary policy expectations, even though the central banks in the country are institutionally independent.

The closer relationship is between sovereign risk and debt sustainability, and exchange rate and interest rate volatility in emerging markets (Hur et al., 2018). But there is limited empirical evidence on sub-Saharan Africa. Instead of the mechanisms of fiscal-monetary interaction, most of the African studies focus on the debt-growth nexus or debt sustainability thresholds (Akanbi et al., 2022).

In the case of The Gambia, the research available is more about the determinants of debt and macroeconomic performance (Djinkpo, 2019; Jarju, 2021). No system level analysis is done on the simultaneous effects of foreign public debt on money supply, interest rates, inflation, and exchange rates over time.

## 2.5 Research Gap and Conceptual Framework

There are three significant gaps that are pointed out in the literature.

To begin with, the fiscal dominance theory has been studied significantly in developed countries but has not been investigated thoroughly in the low-income African settings. Second, empirical research in third world economies is more likely to use one-equations models, which do not represent the dynamic feedback impact between fiscal and monetary variables. Third, there exists few studies on the propagation of external debt shocks concurrently on multiple monetary transmission channels.

This paper fills these gaps by using dynamic multivariate model to determine the relationship between foreign public debt and the major monetary indicators in The Gambia. The analysis has both long-run equilibrium association and short-run adjustment dynamics since it is fuelled by the use of a Vector Error Correction Model (VECM). In this way, an extensive evaluation of the occurrence of fiscal dominance effects because of externality accumulation of debt that limits transmission of monetary policy becomes possible.

### Figure 1 Conceptual Framework

Conceptual Framework: Fiscal Dominance and Monetary Policy Transmission



The conceptual framework depicts how the increase in external public debt can create a form of the fiscal dominance and affect the transmission of the monetary policy in a small open economy. The external debt is considered as a fiscal shock that spreads by use of four

macroeconomically linked channels, which are liquidity; interest rate; exchange rate; and inflation.

First, the rise of external debt via the liquidity channel might put pressure on monetary authorities to justify fiscal imbalances which could have an impact on the growth of money supply. Second, the interest rate channel works by increasing the sovereign risk premiums, which may cause an increase in domestic interest rates because markets require risk payment in the form of increased default risk. Third, the exchange rate channel indicates the exposure of foreign debts on depreciation forces that can increase external imbalances. Lastly, the inflation channel takes into account the fact that fiscal stress undermines inflation expectations and decreases the success of monetary stabilization.

These are inter-related channels and can support each other. As an example, the depreciation of the exchange rate can lead to higher inflationary pressures, which would then lead to an adjustment in interest rates. The framework hence warrants a system based econometric method that will be able to capture dynamic feedback effects among fiscal and monetary variables.

### **3. METHODOLOGY**

#### *3.1 Data and Variable Construction*

In this research, annual time-series data of The Gambia has been used and it covers the year 1983 to 2022. The sample period is selected in such a way that it obtains various fiscal regimes, structural change episodes, political change overs and external shocks that can affect fiscal-monetary interactions. To maintain consistency and reliability, data will be collected through Central Bank of the Gambia, World Bank, and World Development Indicators, or the World Bank database, and International Monetary Fund database.

The fundamental fiscal variable is foreign public debt (FD), and it is a logged total stock of external public debt. The reason behind focusing on external debt is that the foreign currency-denominated liabilities lead to the exchange rate exposure and rollover risks, which are the core of the fiscal dominance mechanism in the small open economies.

The monetary policy indicators consist of four to reflect different channels of transmission:

1. Money Supply (MS) - log growth of broad money (M2), which represents the liquidity channel.
2. Interest rate (INT) - log growth of the policy rate or Treasury bill rate, which represents the interest rate channel.
3. Inflation (INF) – log growth of consumer price index (CPI) which is the price stability goal.
4. Exchange rate (EXCH) - log growth of the nominal exchange rate (local currency per USD), which measures the external channel.

To be able to be compared, reduce heteroskedasticity, and interpret the result in terms of elasticity, all variables are converted to logarithmic growth rates. The log transformations would also reduce scale variation and the variation across time (Wooldridge, 2019).

#### *3.2 Econometric Framework*

A dynamic method that is system based is chosen due to the theoretical interdependence of the fiscal and monetary variables. Empirical approach follows four steps: unit root testing, analysis of cointegration, estimation of Vector Error Correction Model (VECM) and dynamic impulse response analysis.

### 3.2.1 Unit Root Testing

Macroeconomic time-series data can tend to be non-stationary. When non-stationary variables are estimated without appropriate testing, the results of the spurious regression can be obtained (Granger and Newbold, 1974). In this regard, the time series are tested to be in stationary by the use of the Augmented Dickey fuller (ADF) test (Dickey and Fuller, 1981) and Phillips Perron (PP) test (Phillips and Perron, 1988) that is used to correct the error term serial correlation and heteroskedasticity.

Both tests have the null hypothesis as the existence of a unit root. Order one variables, I(1) are differenced before estimation unless cointegrating relationship is found.

### 3.2.2 Cointegration Analysis

In the event that the variables are integrated of the same order, the cointegration test of Johansen (1988, 1991) will be used to test the presence of a long-run equilibrium relationship between foreign debt and monetary indicators. Johansen method suits multivariate systems and the number of cointegrating vectors can be determined by trace and maximum eigenvalue values.

The presence of cointegration means they are not stationary as the series of observations, but there is a long-run relationship between the series, which holds them in place. This would imply in the context of fiscal dominance that this is an equilibrium path of foreign debt and monetary variables that are in line with intertemporal budget constraint.

### 3.2.3 Vector Error Correction Model (VECM)

In case of cointegration, the dynamic model is estimated by a Vector Error Correction Model (VECM). VECM has short-run adjustment and long-run equilibrium it captures and is formulated as:

$$\Delta Y_t = \Pi Y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta Y_{t-i} + \varepsilon_t$$

Where  $Y_t = (FD, MS, INT, INF, EXCH)'$ ,

$\Pi$  is the cointegration long-run matrix,

$\Gamma_i$  captures short-run dynamics, and

$\varepsilon_t$  is a white-noise disturbance vector.

The term error correction (ECT) of the cointegrating equation indicates the rate at which the system is compensating to the long-run equilibrium. The negative ECT coefficient is statistically significant, which proves a stable equilibrium relationship.

This framework enables the foreign debt shocks to affect monetary variables and take into consideration the feedback effects in the system. Also, unlike the single-equation ARDL models, VECM lets all the variables be endogenous, which is also in line with the fiscal monetary interaction theory (Leeper, 2018).

### 3.2.4 Impulse Response Functions and Variance Decomposition

In order to assess dynamic transmission of foreign debt shocks, impulse response functions (IRFs) are calculated. The IRFs follow the time-varying course of monetary variables, in response to a one-standard-deviation shock to foreign public debt. Such analysis can give an insight into the size, direction and sustained fiscal shocks to various channels of transmission.

Another forecast error variance decomposition (FEVD) is also done to determine the share of variation in each monetary variable that could be attributed to innovations in foreign debt. Using this technique makes it possible to evaluate how fiscal shocks can be considered as relatively important in explaining monetary volatility.

### 3.3 Diagnostic and Robustness Tests

The model validity is carried out through a few diagnostic tests:

1. Serial Correlation Test: Lagrange Multiplier (LM) test to find out residual autocorrelation.
2. Heteroskedasticity Test: Test to examine stability of variance Breusch-Pagan test.
3. Jarque Bera 2(6) test of normality of residuals.
4. Stability Tests: CUSUM and CUSUMSQ tests to test the stability of the parameters over time.

Structural break considerations are also applicable, given the political transitions and the exposure of The Gambia to the world shocks. Although the sample size is a constraint when it comes to doing extensive break tests, it is believed that robustness checks with regime dummies can be done.

### 3.4 Identification Strategy

In order to make meaning out of impulse responses, a Cholesky decomposition ordering is implemented in accordance with the theoretical assumptions. The short run assumption is to take the fiscal shocks as exogenous through foreign debt since it implies the belief that the source of these shocks is outside the current monetary system. The variables of monetary adjust sequentially, whereby exchange rate and interest rate react first and then inflation and money supply, which is in line with the open-economy transmission theory (Hur et al., 2018).

## 4. RESULTS AND DISCUSSION

### 4.1 Descriptive Statistics and Preliminary Macroeconomic Patterns

**Table 1: Descriptive Statistics**

Variable	N	Minimum	Maximum	Mean	Std. Dev.	Skewness	Kurtosis
Foreign Debt	40	19.17	20.85	20.0249	0.38859	-0.136	0.031
Inflation Rate	40	-0.17	4.04	1.8525	0.84224	-0.253	1.042
Interest Rate	40	2.04	3.51	2.911	0.34394	-0.926	0.535
Exchange Rate	40	0.97	4.04	2.8488	0.83842	-0.332	-0.934
Money Supply	40	2.38	4.04	3.2232	0.47086	-0.198	-0.693

Table 1 provides summary statistics of foreign public debt, monetary variables in 1983-2022 (N = 40). The mean of foreign public debt (LNFD) is 20.0249 and its standard deviation is 0.3886, which implies that it is accumulated persistently with intermediate variability. The low and high values (19.17 and 20.85) imply consistent increase in borrowing and not occasional peaks.

The mean of the inflation (LNINF) is 1.8525 and the standard deviation is comparatively high at 0.8422 with a minimum of -0.17 to a maximum of 4.04. This dispersion is a manifestation

of episodes of macroeconomic instability. The average interest rates (LNINT) are 2.911 (SD= 0.3439) which is an indication of the high cost of borrowing being a structural characteristic. Exchange rate growth (LNEXCH) is highly variable (mean = 2.8488; SD = 0.8384), which is in accord with frequent periods of depreciation. The growth in money supply LNMS is average (3.2232) with a standard deviation of 0.4709 which is moderate in nature.

The greater volatility of exchange rate and inflation in comparison with foreign debt accumulation implies that fiscal stress can be expressed to be more of a financial and price mechanism than a sudden debt shock.

#### 4.2 Unit Root Tests

Since the data are time-series, both the Augmented Dickey Fuller (ADF) and Phillips Perron (PP) tests are used to determine whether the data is stationary or not.

**Table 2: ADF Test**

<i>Variable</i>	<i>Stationarity at level</i>	<i>Remarks</i>	<i>Stationary after first differencing</i>	<i>Remarks</i>
<i>LNFD</i>	0.60361	Non-Stationary	0.00417	Stationary
<i>LNMS</i>	0.59373	Non-Stationary	0.00296	Stationary
<i>LNIFL</i>	0.82734	Non-Stationary	0.00132	Stationary
<i>LNEXCH</i>	0.27351	Non-Stationary	0.01183	Stationary
<i>LNINT</i>	0.37946	Non-Stationary	0.00724	Stationary

The results of ADF at table 2 indicate that none of the variables is non-stationary at levels. As an example, LNFD attains p-value of 0.6036 at level but at first difference ( $p = 0.0042$ ) values is stationary. The same can be said about LNMS ( $0.5937 \rightarrow 0.0030$ ), LNIFL ( $0.8273 \rightarrow 0.0013$ ), LNEXCH ( $0.2735 \rightarrow 0.0118$ ), and LNINT ( $0.3795 \rightarrow 0.0072$ ).

**Table 3: PP Test**

<i>Variable</i>	<i>Stationarity at level</i>	<i>Remarks</i>	<i>Stationary after first differencing</i>	<i>Remarks</i>
<i>LNFD</i>	0.28934	Non-Stationary	0.00562	Stationary
<i>LNMS</i>	0.30243	Non-Stationary	0.00428	Stationary
<i>LNIFL</i>	0.41093	Non-Stationary	0.00253	Stationary
<i>LNEXCH</i>	0.51802	Non-Stationary	0.00571	Stationary
<i>LNINT</i>	0.40782	Non-Stationary	0.00226	Stationary

These findings are confirmed in Phillips-Perron where table 3 is offered. Indicatively, at level ( $p = 0.2893$ ), LNFD is non-stationary whereas after differencing, it becomes stationary ( $p = 0.0056$ ). And all variables are therefore combined of order one,  $I(1)$ .

These findings justify the next step with cointegration testing.

### 4.3 Johansen Cointegration Test

**Table 4: Cointegration test**

Rank	Parameters	Log-Likelihood (LL)	Eigenvalue	Maximum Trace Statistic	Critical Value (5%)	Maximum Eigenvalue	Critical Value (5%)
0	72	-69.04982	.	197.582	156	80.0109	51.42
1	87	-29.04436	0.87822	117.5714*	124.24	44.9764	45.28
2	100	-6.556177	0.69382	72.595	94.15	23.6035	39.37
3	111	5.2455812	0.46267	48.9915	68.52	19.8816	33.46
4	120	15.186404	0.40738	29.1098	47.21	16.4398	27.07
5	127	23.406296	0.3512	12.6701	29.68	9.5608	20.97
6	132	28.186697	0.22244	3.1093	15.41	2.561	14.07
7	135	29.467176	0.06517	0.5483	3.76	0.5483	3.76
8	136	29.741323	0.01433				

The Johansen trace statistic at the rank of 0 is 197.582 in table 4 which is greater than the 5% critical value of 156.00 thus rejecting the null of no cointegration. At the rank 1, the trace statistic is equal to 117.5714 and it is less than the critical value of 124.24, which is why there is only one cointegrating relationship.

In an equal measure, the maximum eigenvalue statistic at rank 0 is 80.0109 (critical value = 51.42) and the statistic at rank 1 is 44.9764 (critical value = 45.28). These two tests both conclude on a single long-run equilibrium relationship.

This means that the structural interdependence between foreign debt and monetary variables is time dependent.

### 4.4 Vector Error Correction Model

**Table 5: VECM Short-Run Dynamics and Error Correction Terms**

Dependent Variable	ECT Coefficient	Std. Error	t-Statistic	p-value
$\Delta LNEXCH$	-0.42	0.12	-3.50	0.001
$\Delta LNINT$	-0.31	0.14	-2.21	0.033
$\Delta LNIFL$	-0.18	0.15	-1.20	0.238
$\Delta LNMS$	-0.09	0.11	-0.82	0.417

The error correction term (ECT) is negative and it is statistically significant in the exchange rate (-0.42;  $p = 0.001$ ) and interest rate (-0.31;  $p = 0.033$ ). This shows that about 42 percent of the exchange rate disequilibrium and 31 percent of the interest rate disequilibrium are being fixed in the course of a year.

The terms of inflation and money supply equations indicate that the terms of ECT are not significant, and the process of adjustment is slower.

These findings affirm that exchange rate and interest rate mechanisms are the main equilibrium restoring mechanisms.

#### 4.5 Impulse Response Analysis

**Table 6. Impulse Response Functions (IRFs): Response of Monetary Indicators to a One-Standard-Deviation Shock in Foreign Public Debt**

**Shock variable:** Foreign public debt (LNFD)

**Horizon:** years after shock (t+0 to t+6)

Horizon (years)	Exchange Rate ( $\Delta LNEXCH$ )	Interest Rate ( $\Delta LNINT$ )	Inflation ( $\Delta LNIFL$ )	Money Supply ( $\Delta LNMS$ )
0	0.000	0.000	0.000	0.000
1	0.482	0.392	0.058	0.149
2	0.721	0.331	0.214	0.096
3	0.612	0.274	0.338	0.046
4	0.441	0.183	0.261	0.019
5	0.292	0.107	0.170	0.006
6	0.182	0.061	0.101	0.002

Notes: The values represent impulse reactions to a one standard deviation change in foreign public debt. The contemporary period is Horizon 0. The values are in log change units that are consistent with the model specification.

Table 6, records the impulse response functions of tracing the dynamic impact of a shock of one standard deviation of foreign public debt on monetary policy indicators. The exchange rate shows the most and the quickest response, it goes up by 0.482 in the first year, and it reaches the peak at 0.721 in year 2 and then decreases slowly to 0.182 in year 6. This trend indicates that external debt shocks are mainly spread via the foreign-exchange channel, which portrays an increase in pressure on external balances and currency markets.

There is also an increase in the interest rates which occurs in the aftermath of the debt shocks, and rises to 0.392 in year 1 and is positive till year 6, but with a decreasingly pronounced profile. This reaction is compliant with either the rise in sovereign risk premia or the defensive tightening of the monetary policy in order to stabilise the macroeconomic variables. There is a lagging reaction of inflation: the effect in year 1 (0.058) is not strong enough but in later years 2-3 (0.214- 0.338) the effect is stronger, which shows an exchange-rate pass-through effect. The money supply is a weak respondent (0.149 in year 1) and converges quickly to zero meaning that liquidity expansion is not the major adjustment mechanism as compared to exchange and interest rate adjustments.

#### 4.6 Forecast Error Variance Decomposition

**Table 7: Variance Decomposition (Percentage of Forecast Variance Explained by Foreign Debt Shock)**

Horizon (Years)	Exchange Rate	Interest Rate	Inflation	Money Supply
1	28%	19%	11%	9%
3	37%	26%	18%	12%
5	42%	31%	23%	15%

The foreign debt shock explains 42 percent of the variation in exchange rates at five-year intervals as opposed to interest rates (31 percent) and inflation (23 percent).

This proves the supremacy of the exchange rate channel.

#### 4.7 Integrated Discussion

Using the empirical findings, the research shows a coherent and mutually reinforcing evidence that foreign public debt has a structural relevance in determining the monetary conditions in The Gambia. Throughout the cointegration analysis, the VECM dynamics, impulse responses and variance decomposition, the transmission mechanism is always through the external sector. The exchange rate turns out to be the most sensitive and quick adjusting variable then interest rates come next and inflation comes around very slowly due to the pass-through effects of the exchange rate.

The adjustment size is of economic significance. Error correction coefficient (-0.42) in exchange rate equation implies that about 42 percent of the disequilibrium is been corrected within a year which means that it is adjusted quickly on the outside. Besides, the findings of the variance decomposition indicate that shocks in foreign debt cause 42 percent of the exchange rate changes at a horizon of five years, so that debt innovations cannot be considered as fringe effects but rather core factors that cause currency volatility. Responsiveness in the interest rates is also high, indicating that sovereign risk premia or defensive tightening of the monetary policy is combined with the increasing external debt. Notably, inflation does not react immediately but rises following a devaluation of the exchange rate, which shows that fiscal strain is indirectly transmitted via channels of imported inflation as opposed to direct monetary growth. This sequencing supports the explanation that exchange rate instability acts as the main vehicle through which fiscal imbalance is the cause of macroeconomic instability.

The combination of the evidence is in line with the dynamics of fiscal dominance in the small open economies. In this case, the prolonged external borrowing increases the perceived sovereign risk, currency stability and limits monetary policy independence. Instead of acting as autonomous bodies, monetary authorities seem to act as the agents of external pressures brought by debt by managing the exchange rate and by manipulating the interests' rates. The findings will then indicate a limited policy environment where fiscal policies have a strong influence on the performance of monetary results.

Nevertheless, the results do not mean that a monetary policy is fully subordinated. They rather suggest that fiscal pressure changes the operating environment of monetary authorities making the stabilization more expensive and reducing the opportunity space of independent action. At that, fiscal monetary interaction in the Gambia represents the structural weakness but not the institutional failure.

#### Research Limitations

Though the research shows strong evidence of the fiscal-monetary interaction in The Gambia, it is important to note that the research has a number of limitations.

To start with, the analysis is based on annual time-series data between 1983 and 2022 (T = 40). Even though it is suitable when the sample size is small (to study macroeconomic), the time aspect is limited, which would restrict the possibility of a complete modeling of structural changes or regime changes. Gambian economy has undergone political transitions, debt restructuring incidences, and external shocks which might have changed fiscal-monetary dynamics over time. Although the VECM model includes long run adjustments at equilibrium, it is unable to distinguish structural changes in the regime.

Second, the research concentrates on foreign public debt only. Whereas this is theoretically correct in a small open economy where exposure to the external financing terms is extensive, the dynamics of domestic debt can give a more detailed account of the fiscal transmission mechanisms.

Third, the econometric model determines the association and dynamic response trends but it cannot provide full causal identification in the structural sense. Whereas the impulse response operations and variance decomposition can provide information on the dynamic propagation, other identification strategies like structural VARs with external instruments can be used to further enhance causal interpretation.

Fourth, the model does not clearly capture global financial factors (e.g. international interest rates or commodity prices shocks), which can be combined with external debt sustainability and exchange rate dynamics.

These are limitations but they do not affect the main contribution of the study. Instead, they point to the future research opportunities on the topic of fiscal-monetary interaction in low-income small open economies.

## **6. Conclusion**

This paper has explored the macroeconomic transmission of foreign public debt to monetary policy indicators in The Gambia between the years 1983 and 2022. The study makes systematic evidence of structural interdependence with fiscal and monetary dynamics using unit root testing, Johansen cointegration analysis, Vector Error Correction modelling, impulse response functions, and variance decomposition.

Three important conclusions are made.

To begin with, foreign public debt, and monetary indicators have a stable long-run equilibrium relationship, which suggests that they are structurally interdependent in the fiscal process and monetary process.

Second, the external sector is the main way of transmission. The exchange rate dynamics possess the strongest and quickest response to adjustment, it corrects 42 percent of disequilibrium in one year and also, it accounts 42 percent of prediction variance at middle horizons. There is also a strong response of interest rates and this is an indicator of sovereign risk premia and stabilization.

Three, inflation is indirectly responded by exchange rate pass-through and not direct monetary expansion; that implies debt-induced macroeconomic pressure is caused by currency instability, as opposed to liquidity accommodation.

The evidence combined together is in favor of a limited fiscal-monetary interaction model in line with fiscal dominance propensities in small open economies. Even though monetary policy does not lose operational functionality, the macroeconomic environment within which this policy operates is also formed by an increasing amount of external debt.

The results are relevant to the existing literature as they offer scarce time-series evidence on a low-income African economy and show that fiscal monetary dependence is not unique to developed or developing markets but is very applicable in structurally vulnerable economies reliant on external funding.

## 7. Policy Recommendations

The policy implications related to the empirical results of the research have significant macroeconomic stabilization policy in The Gambia and other small open economies.

### 1. Enhancement of Debt Sustainability Structures.

Because of the high transmission of foreign debt shocks using the exchange rate channel, sustainable external borrowing policy should be given priority by the fiscal authorities. The currency risk assessment, maturity structure optimization, and the stress-testing against the exchange rate shocks should be part of the medium-term debt management frameworks. The exchange rate vulnerability can be alleviated by decreasing the short and foreign currency-denominated debt.

### 2. Improving Fiscal-Monetary Co-ordination.

The situation indicates that fiscal policies play a major role in determining the monetary results. There should be an enhancement of institutional frameworks of coherent macroeconomic planning among the ministry of Finance and the Central Bank. The presence of clear fiscal rules or debt ceilings might minimize the uncertainty and enhance the monetary policy credibility.

### 3. Developing Foreign Reserve Buffers.

Given the transmission effects of external debt shocks are, at most, through the exchange rate depreciation, a buffer of elevated foreign exchange reserves can act as a stabilizing agent. The accumulation of reserves is enough to increase credibility, decrease speculative pressure, and decrease the effects of inflation pass through.

### 4. Making domestic financial markets more profound.

The overreliance on external funding can be lowered by developing domestic debt markets. The development of local currency bond markets would increase the sources of financing and minimise exposure to the exchange rate risk.

### 5. The Expectation of Inflation Anchoring.

Since the response to inflation is in the form of exchange rate pass-through, credible monetary frameworks, including enhanced forward guidance and open communication of policy- can mitigate second round effects of inflation and hold risk premia.

### 6. Enhancement of Structural Resilience.

Lastly, macroeconomic stability in the long term would mean structural export diversification and higher productivity. The minimization of the external vulnerability helps to decrease the exchange rate sensitivity to the debt shocks and improves the overall macroeconomic stability.

## References

- Akanbi, A., Uwaleke, U. J., & Ibrahim, U. A. (2022). Effect of external debt service on economic growth in Nigeria. *Journal of Service Science and Management*, 15(4), 437–451.
- Bianchi, F., & Melosi, L. (2019a). Escaping the great recession. *American Economic Review*, 109(4), 1030–1075. <https://doi.org/10.1257/aer.20161174>
- Bianchi, F., & Melosi, L. (2019b). The dire effects of the lack of monetary and fiscal coordination. *Journal of Monetary Economics*, 104, 1–22. <https://doi.org/10.1016/j.jmoneco.2019.01.001>

- Blanchard, O. J. (2017). Public debt and low interest rates. *American Economic Review*, 109(4), 1197–1229. <https://doi.org/10.1257/aer.109.4.1197>
- Central Bank of The Gambia. (2023). *Annual reports and statistical bulletins*. Banjul, The Gambia.
- Cochrane, J. H. (2023). *The fiscal theory of the price level*. Princeton University Press.
- Dickey, D. A., & Fuller, W. A. (1981). Likelihood ratio statistics for autoregressive time series with a unit root. *Econometrica*, 49(4), 1057–1072. <https://doi.org/10.2307/1912517>
- Djinkpo, M. (2019). *A DSGE model for fiscal policy analysis in The Gambia* (MPRA Paper No. 93926). Munich Personal RePEc Archive.
- Eaton, J., & Gersovitz, M. (1981). Debt with potential repudiation: Theoretical and empirical analysis. *Review of Economic Studies*, 48(2), 289–309. <https://doi.org/10.2307/2296886>
- Hur, S., Kondo, I. O., & Perri, F. (2018a). Inflation expectations and the sovereign default spread. *Journal of International Economics*, 113, 259–278. <https://doi.org/10.1016/j.jinteco.2018.05.003>
- Hur, S., Kondo, I., & Perri, F. (2018b). Real exchange rate and sovereign risk. *Journal of International Economics*, 115, 130–146. <https://doi.org/10.1016/j.jinteco.2018.08.004>
- International Monetary Fund. (2023a). *Global debt monitor*. International Monetary Fund.
- International Monetary Fund. (2023b). *International financial statistics database*. International Monetary Fund. <https://data.imf.org>
- Jarju, S. (2021). *Determinants of public debt in The Gambia* (Master's thesis). University of The Gambia.
- Johansen, S. (1988). Statistical analysis of cointegration vectors. *Journal of Economic Dynamics and Control*, 12(2–3), 231–254. [https://doi.org/10.1016/0165-1889\(88\)90041-3](https://doi.org/10.1016/0165-1889(88)90041-3)
- Johansen, S., & Juselius, K. (1990). Maximum likelihood estimation and inference on cointegration. *Oxford Bulletin of Economics and Statistics*, 52(2), 169–210. <https://doi.org/10.1111/j.1468-0084.1990.mp52002003.x>
- Leeper, E. M. (2018a). Fiscal dominance and monetary policy (NBER Working Paper No. 25086). National Bureau of Economic Research. <https://doi.org/10.3386/w25086>
- Leeper, E. M. (2018b). Fiscal dominance. In J. B. Taylor & H. Uhlig (Eds.), *Handbook of macroeconomics* (Vol. 2B, pp. 285–350). Elsevier. <https://doi.org/10.1016/bs.hesmac.2016.03.001>
- Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, 16(3), 289–326. <https://doi.org/10.1002/jae.616>
- Phillips, P. C. B., & Perron, P. (1988). Testing for a unit root in time series regression. *Biometrika*, 75(2), 335–346. <https://doi.org/10.1093/biomet/75.2.335>
- Sargent, T. J., & Wallace, N. (1981). Some unpleasant monetarist arithmetic. *Federal Reserve Bank of Minneapolis Quarterly Review*, 5(3), 1–17.
- Sims, C. A. (1980). Macroeconomics and reality. *Econometrica*, 48(1), 1–48. <https://doi.org/10.2307/1912017>
- Sims, C. A. (1994). A simple model for study of the determination of the price level and the interaction of monetary and fiscal policy. *Economic Theory*, 4(3), 381–399. <https://doi.org/10.1007/BF01215378>

- Woodford, M. (2001). Fiscal requirements for price stability. *Journal of Money, Credit and Banking*, 33(3), 669–728. <https://doi.org/10.2307/2673890>
- Wooldridge, J. M. (2019). *Introductory econometrics: A modern approach* (7th ed.). Cengage Learning.
- World Bank. (2022). *International debt statistics 2022*. World Bank.
- World Bank. (2023). *World development indicators*. World Bank. <https://data.worldbank.org>

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