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Global Financial Cycle and Sovereign Bond Yield Dynamics in Frontier Markets: Evidence from Nigeria (2010–2024)

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Abstract

As financial globalization deepens, frontier economies have become increasingly exposed to external shocks driven by global risk sentiment and liquidity conditions. This study examines how global financial conditions influence sovereign bond yield dynamics in frontier markets, with a focus on Nigeria over a 14-year period (2010–2024). Anchored in the Global Financial Cycle (GFC) framework, the study evaluates the extent to which global risk (proxied by the VIX volatility index) and domestic macroeconomic variables, including the exchange rate and interest rate, shape government borrowing costs. Using a time-series econometric framework, the study employs Ordinary Least Squares (OLS) alongside unit root tests and diagnostic checks. To address potential dynamic effects, an autoregressive extension is incorporated as a robustness check. It is expected that the findings will show that global financial conditions exert a strong and statistically significant influence on sovereign bond yields. Increases in global risk aversion are expected to significantly raise borrowing costs, while exchange rate depreciation and higher domestic interest rates further amplify this effect. The results are expected to confirm the dominance of global financial factors in shaping domestic financial conditions in frontier markets and to highlight the limited capacity of domestic policy tools to offset external shocks. The study is anticipated to contribute to the literature by providing updated evidence from an African frontier economy using a transparent and policy-relevant empirical framework.

Keywords: Global Financial Cycle, Sovereign Bond Yields, Frontier Markets, Nigeria, VIX, Capital Flows

1.1 INTRODUCTION

The increasing integration of global financial markets has fundamentally transformed the transmission of economic shocks across countries. Financial globalization, driven by capital mobility and liberalization, has created a system in which domestic financial conditions are increasingly influenced by external developments (Rey, 2015). Within this system, the Global Financial Cycle (GFC) has emerged as a dominant force shaping capital flows, asset prices, and risk conditions worldwide (Miranda-Agrippino & Rey, 2020).The GFC is largely driven by global risk sentiment and monetary policy conditions in major economies, particularly the United States. When global risk is low, capital flows into higher-yielding assets in emerging and frontier markets. Conversely, periods of heightened uncertainty trigger capital outflows, tightening financial conditions and increasing borrowing costs (Forbes & Warnock, 2012; Bruno & Shin, 2015). Frontier markets, particularly in Africa, are especially vulnerable to these dynamics due to structural characteristics such as shallow financial systems, limited liquidity, and high dependence on external financing (African Development Bank,

2023). Nigeria, as one of Africa's largest frontier economies, provides a relevant case for examining these dynamics.

Sovereign bond yields represent a critical channel through which global financial conditions affect domestic economies. These yields reflect both domestic macroeconomic fundamentals and external financial conditions (Eichengreen & Mody, 2000). In Nigeria, periods of global financial tightening have been associated with rising bond yields and increased debt vulnerabilities (International Monetary Fund, 2023a).While domestic variables such as exchange rate and interest rate play important roles, their effectiveness in mitigating external shocks is often limited. Exchange rate depreciation increases the burden of foreign-denominated debt, while monetary policy adjustments may be constrained by inflation and fiscal pressures (Obstfeld et al., 2009).
Despite the importance of these issues, empirical studies focusing on African frontier markets remain limited. This study contributes to the literature by providing updated empirical evidence on the interaction between global and domestic factors in determining sovereign borrowing costs in Nigeria.

2. LITERATURE REVIEW

2.1 Conceptual Review

2.1.1 The Global Financial Cycle (GFC)

The concept of the Global Financial Cycle (GFC) has gained prominence in explaining the increasing synchronization of financial variables across countries. According to Rey (2015), the GFC reflects common movements in capital flows, asset prices, and credit growth, largely driven by global risk sentiment and liquidity conditions. These dynamics are often proxied using the Volatility Index (VIX), which captures investor expectations of market uncertainty.
Miranda-Agrippino and Rey (2020) further demonstrate that U.S. monetary policy plays a central role in driving the GFC, with spillover effects transmitted through global financial markets. This implies that financial conditions in frontier markets are not solely determined by domestic policies but are heavily influenced by external developments.
In the context of this study, the GFC provides a critical lens through which the relationship between global risk conditions and sovereign borrowing costs can be understood. It underscores the vulnerability of financially open economies, such as Nigeria, to global financial shocks.

2.1.2 Sovereign Bond Yields

Sovereign bond yields represent the cost at which governments borrow from financial markets and are widely used as indicators of sovereign risk. These yields are influenced by a combination of domestic macroeconomic fundamentals and external financial conditions (Eichengreen & Mody, 2000). Domestic factors such as inflation, fiscal deficits, and economic growth affect investor confidence, while global factors such as risk appetite and international interest rates influence capital flows into government securities. In frontier markets, where financial systems are less developed, the sensitivity of bond yields to external shocks is often more pronounced (African Development Bank, 2023). For Nigeria, sovereign bond yields have exhibited significant volatility, reflecting both domestic macroeconomic challenges and exposure to global financial conditions.

2.1.3 Exchange Rate Dynamics

The exchange rate plays a crucial role in shaping sovereign bond yields, particularly in economies with significant external debt exposure. Exchange rate depreciation increases the local currency value of foreign-denominated debt, thereby raising default risk and borrowing costs (Obstfeld et al., 2009).

In Nigeria, exchange rate volatility has been a persistent issue, driven by fluctuations in oil prices and foreign exchange constraints. This makes the exchange rate an important variable in understanding sovereign yield movements.

2.1.4 Interest Rate and Monetary Policy

Interest rates, particularly the monetary policy rate, influence sovereign bond yields through their effect on domestic financial conditions. Higher interest rates increase borrowing costs and can signal tightening monetary policy, which may reduce inflation but also dampen economic activity. However, under the Global Financial Cycle framework, domestic monetary policy may have limited effectiveness in insulating the economy from external shocks (Rey, 2015).

2.1.5 Capital Flows and Financial Integration

Capital flows represent a key transmission channel through which global financial conditions affect domestic economies. Periods of low global risk typically results to increased capital inflows into frontier markets, while periods of uncertainty trigger capital outflows (Forbes & Warnock, 2012).Calvo (1998) highlights the phenomenon of "sudden stops," where abrupt reversals in capital flows lead to financial crises and rising borrowing costs. This is particularly relevant for African economies that rely heavily on external financing.

2.2 Theoretical Framework

The study is anchored on the Global Financial Cycle Theory, propounded by Helene Rey in 2015. The theory posits that global financial conditions as driven by major economies synchronizes financial variables across countries. This explains why Nigeria's bond yields respond to global risk (VIX). One criticism about this theory is the fact that the author overemphasizes global factors rather than country specific factors, as such it may understate domestic policy role. The relevance of this theory to the study is it elucidates the why Nigeria's bond yields respond to global risk (VIX), of recent importance is the fact that the explanation of the theory is how highly relevant it is in the post-2008 financial crisis and post-COVID financial system.

2.3 Empirical Literature

Empirical evidence consistently shows that global financial conditions play a dominant role in shaping financial outcomes across countries. Rey (2015) demonstrates that global factors, particularly risk sentiment, significantly influence capital flows and asset prices, thereby limiting monetary policy independence. This finding is reinforced by Miranda-Agrippino and Rey (2020), who show that U.S. monetary policy shocks transmit globally, affecting borrowing costs in both advanced and developing economies.

In African economies, global financial tightening has been associated with rising borrowing costs and reduced capital inflows (African Development Bank, 2023; World Bank, 2024). Nigeria-specific evidence also confirms the sensitivity of financial markets to exchange rate volatility and global conditions (Central Bank of Nigeria, 2023).

Miranda-Agrippino and Rey (2020) extend earlier work on the GFC by examining how U.S. monetary policy shocks transmit globally. The study uses a factor-augmented vector autoregression (FAVAR) framework and includes variables such as global asset prices, capital flows, and credit conditions. The results indicate that U.S. monetary policy significantly drives global financial conditions, influencing asset prices and borrowing costs worldwide. The study shows that global liquidity shocks propagate

rapidly across both advanced and developing economies. The study justifies the inclusion of global interest rate variables (e.g., U.S. Treasury rate) alongside VIX in modelling sovereign bond yields. Demiralp et al. (2016) examine how global financial conditions affect asset prices in emerging markets using a structural VAR (SVAR) approach. The study includes variables such as VIX, bond yields, and exchange rates. The outcomes show that global risk shocks significantly increase sovereign bond yields, particularly in economies with weaker macroeconomic fundamentals. The study provides strong empirical support for the VIX–bond yield relationship in your model.

Ghosh, Ostry, and Qureshi (2016) analyze capital inflow episodes using panel regression techniques. Variables include capital flows, macroeconomic fundamentals, and global financial indicators. The study finds that capital inflow surges often lead to financial instability when not properly managed. The findings support inclusion of capital flows (CF) as a key explanatory variable.

Rey (2015) investigates the extent to which global financial conditions constrain domestic monetary policy independence. The study focuses on the Global Financial Cycle (GFC), emphasizing how global risk sentiment, proxied by the Volatility Index (VIX) drives capital flows, leverage, and asset prices across countries. Using cross-country panel analysis, the study finds that global financial factors, particularly U.S. monetary policy and global risk conditions, significantly influence domestic financial variables regardless of exchange rate regimes. The findings demonstrate that national economies, especially financially open ones, are strongly affected by global liquidity conditions, thereby limiting the effectiveness of domestic monetary policy. This study provides the theoretical and empirical foundation for incorporating VIX as a core explanatory variable in analyzing sovereign bond yields in frontier markets.

Bruno and Shin (2015) explore how global liquidity conditions influence capital flows and risk-taking behaviour. Using panel data and econometric modelling, the study examines variables such as global credit conditions, capital flows, and exchange rates. The results indicate that expansionary monetary policy in advanced economies encourages capital flows to emerging markets, increasing financial vulnerability. The study reinforces the need to include global liquidity and capital flow variables in modelling bond yield dynamics.

Ebeke and Kyobe (2015) analyzed the impact of global financial shocks on sovereign bond markets in emerging economies. Using panel regression techniques, the study incorporates variables such as bond yields, global financial conditions, and foreign investor participation. The findings show that increased foreign participation amplifies the sensitivity of bond yields to global shocks. It highlights the role of external exposure and capital flow integration in frontier markets like Nigeria.

Forbes and Warnock (2012) analyze global capital flow cycles using a panel dataset covering multiple countries. The study incorporates variables such as capital inflows, global risk (VIX), and interest rates, employing panel econometric techniques. The findings reveal that global factors particularly risk sentiment are the primary drivers of capital flow volatility. Periods of heightened uncertainty trigger capital outflows (“stops”), leading to tighter financial conditions in recipient economies. The findings highlight the importance of capital flows as a transmission channel through which global financial conditions affect sovereign bond yields.

Uribe and Yue (2006) investigate the interaction between sovereign spreads and macroeconomic fundamentals using a vector autoregression (VAR) framework. The study incorporates variables such as global interest rates, domestic output, and sovereign spreads. The findings show that external

shocks, particularly global interest rate movements, account for a significant portion of variation in sovereign spreads. The study supports the inclusion of global interest rate (USR) as a key determinant of sovereign bond yields.

Eichengreen and Mody (2000) examine the determinants of sovereign bond spreads in emerging markets. The study includes variables such as global interest rates, domestic macroeconomic indicators, and investor sentiment, using regression-based analysis. The results indicate that both global and domestic factors significantly influence sovereign spreads, with global conditions playing a dominant role during periods of financial stress. The findings provide empirical support for modelling sovereign bond yields as a function of both global and domestic variables.
Calvo (1998) examines the phenomenon of sudden stops in capital flows and their impact on developing economies. The study uses a theoretical and empirical approach. The findings show that abrupt reversals in capital flows lead to sharp increases in borrowing costs and financial instability.

The result provides the mechanism linking global shocks to sovereign bond yields through capital flow reversals.
Across the reviewed studies, global factors (VIX, US interest rate) are dominant drivers Domestic variables amplify external shocks. Capital flows serve as a critical transmission mechanism. Above all, the effects are stronger in frontier markets

2.3 Research Gap

Despite extensive literature on global financial conditions and sovereign bond markets, important gaps still exist. Most existing studies focus mainly on advanced and emerging economies, with limited empirical attention given to African frontier markets such as Nigeria. In addition, many studies examine either global financial variables or domestic macroeconomic factors separately, with few integrating global risk indicators, domestic variables, and capital flow measures within a single framework.

Another limitation is the over-reliance on highly complex econometric models that often provide limited policy relevance for developing economies. Furthermore, recent global financial developments, particularly post-2020 shocks such as the COVID-19 pandemic, global inflationary pressures, and monetary tightening in advanced economies, remain insufficiently addressed in existing studies.

This study therefore seeks to fill these gaps by providing updated empirical evidence on Nigeria using an integrated and policy-relevant framework that combines global financial conditions, domestic macroeconomic variables, and capital flow indicators over the period 2010–2024.

3. METHODOLOGY

3.1 Research Design

The study adopts a quantitative research design using a time-series econometric approach. This approach is appropriate given the objective of analyzing dynamic relationships between macroeconomic and financial variables over time. The design integrates both: Static estimation (OLS) for baseline interpretation. And the dynamic estimation techniques (ARDL) for robustness and deeper inference

3.2 Model Specification: The specification of the model involves the determination of the dependent and independent variables that will be included in the model. It expresses the mathematical relationship that exists between the dependent and the independent or explanatory variables.
Here, the dependent variable is Sovereign Bond Yield (BY) = Sovereign Bond Yield (%) *(e.g., Nigeria 10-year bond yield)*, while the explanatory variables established from the literature to have some desired effect on Sovereign Bond Yield include: Global risk index (VIX), Captures risk sentiment and it is the variable that measures for global financial cycle, followed by domestic macroeconomic variables such as exchange rate (EXR), capturing external vulnerability, interest rate (INTR) it measures monetary authority stance, hence monetary policy rate is the proxy for interest rate, was also considered to check for fiscal risk in the model, finally to a financial flow variable as capital inflows, this was done to examine direct GFC transmission in the market. The relationship between these variables can be represented functionally as:

$$BY_t = f(VIX_t, EXR_t, INT_t, US\_TR, CF_t)$$

Where;
BY = Sovereign Bond Yield (%) *(e.g., Nigeria 10-year bond yield)*
Global Financial Cycle Variable
VIX = Global risk index (captures risk sentiment)
US_TR = US Treasury rate
Domestic Macroeconomic Variables
EXR = Exchange rate (captures external vulnerability)
INTR = Monetary Policy rate (captures monetary authority stance)
Financial Flow Variable
CF = Capital inflows/ portfolio flows direct GFC transmission

Econometrics Baseline Model

$$BY_t = \alpha + \beta_1 VIX_t + \beta_2 US\_TR + \beta_3 INT_t + \beta_4 EXR + \beta_5 CF_t + \epsilon_t$$

Log-Linear Form

$$\ln BY_t = \alpha + \beta_1 \ln VIX_t + \beta_2 US\_TR_t + \beta_3 INT_t + \beta_4 lnEXR + \beta_5 CF_t + \epsilon_t$$

Where;
B_0= intercept
β= coefficients
ε =the error term
The inclusion of these variables in the model isxndicates that there was a separation of global vs domestic drivers, inclusion of risk, liquidity, and fundamentals, avoidance of omitted variable bias as well as a strong theoretical mapping (GFC framework), thus the model is fit and captures the essence of the topic.

3.3 Justification of Variables/ A Priori Expectations

Variable	**Description**	**Expected Sign**
VIX	Global risk	+
USR	US interest rate	+
EXR	Exchange rate	+
INT	Domestic interest rate	+
CF	Capital flows	–

All explanatory variables are expected to positively influence bond yields, except Capital inflows with negative effects

3.4 NATURE AND SOURCES OF DATA

The nature of data used for the study is basically secondary data obtained from Q12010 to Q42024
The data includes;
BY = Sovereign Bond Yield (%) *(e.g., Nigeria 10-year bond yield)*

Global Financial Cycle Variable
VIX = Global risk index (captures risk sentiment)
US_TR = US Treasury rate

Domestic Macroeconomic Variables
EXR = Exchange rate (captures external vulnerability)
INTR = Monetary Policy rate (captures monetary authority stance)

Financial Flow Variable
CF = Capital inflows/ portfolio flows direct GFC transmission
The above data were sourced from International monetary fund (IMF), World Bank (WDI), Central Bank of Nigeria (CBN) and Federal Reserve (FRED database)

3.5 METHOD OF DATA ANALYSIS

Estimation Techniques
The choice of the appropriate technique in every research depends on the research problem as well as the study objectives. The method of data analysis to be adopted for this study is the multiple regression technique using the Ordinary Least Squares, OLS. In regression analysis, the Ordinary Least Squares Method (OLS) is widely used under the assumption that the OLS gives desirable properties of Best Linear Unbiased Estimate (BLUE). This property has made OLS the most popular method of regression analysis. However, with more variables, OLS alone is no longer enough. To account for dynamic relationships and mixed integration orders, the study adopts the ARDL bounds testing approach, complemented by robustness checks using ARDL and other diagnostic test".

Unit Root Test
To avoid spurious regression, stationarity is tested using: Augmented Dickey-Fuller (ADF)

ARDL Model
The study adopts the Autoregressive Distributed Lag (ARDL) approach due to:
Mixed integration order (I(0) and I(1)), Small sample suitability and ability to estimate short- and long-run dynamics
ARDL Specification

$$\Delta BY_t = \alpha + \sum \beta_i \Delta X_t + \lambda(BY_{t-1} - \theta X_{t-1}) + \epsilon_t$$

Bounds Test for Cointegration
The ARDL bounds test is used to determine long-run relationships.
Diagnostic Tests
To ensure model validity:

- Serial correlation (Breusch-Godfrey)
- Heteroskedasticity (White test)
- Normality (Jarque-Bera)
- Stability

The study relies on secondary data from reputable sources. No ethical risks are involved. This section has outlined a rigorous econometric framework for analyzing sovereign bond yield dynamics under global financial conditions. By combining ARDL, GMM, and diagnostic testing, the methodology ensures robustness and reliability of the empirical results.

EVALUATION OF THE MODEL

An evaluation of the model consists of deciding whether the estimated coefficients are theoretically meaningful and statistically satisfactory. For this study, the model fully captures Global Financial Cycle Transmission, it includes domestic macroeconomic fundamentals and also aligns with Rey (2015), IMF, and top literature in the study area.

DATA ANALYSIS

Table 4.1: Descriptive Statistics

	BYD_10YRS	VIX	US_TR	MPR	EXR	CIF
Mean	13.83333	17.29133	3.930667	13.83333	374.1993	102021.6
Median	13.80000	16.39000	2.350000	13.00000	305.7900	99782.94
Maximum	19.65000	29.22000	24.23000	27.50000	1480.000	146274.3
Minimum	8.500000	8.000000	0.890000	6.250000	150.3000	62748.49
Std. Dev.	2.604342	5.191682	5.537961	4.550719	338.3702	24178.69
Skewness	0.070196	0.650332	3.332156	1.586677	2.394651	0.145368
Kurtosis	3.367595	3.322385	12.46098	6.267529	8.067579	2.362132
Jarque-Bera	0.387090	4.489150	334.8082	51.86731	121.5445	1.228508
Probability	0.824033	0.105973	0.000000	0.000000	0.000000	0.541044
Observations	60	60	60	60	60	60

Source: Researcher's Calculation using E-view 9.0

BYD_10YRS: The average 10-year bond yield over 2011Q1–2024Q4 was 13.83%, ranging from 8.50% to 19.65%. The standard deviation of 2.60 indicates moderate volatility in yields during the period. VIX: Averaged 17.29, with a range of 8.00 to 29.22. This reflects periods of both low and elevated global risk aversion. US_TR: Mean of 3.93% but highly volatile, with a standard deviation of 5.54 and a maximum of 24.23%. The high volatility is driven by the post-COVID rate hikes. MPR: Averaged 13.83%, similar to bond yields, with values between 6.25% and 27.50%. This shows active use of monetary policy during the sample period. EXR: The naira averaged ₦374.20/$, depreciating from ₦150.30 to ₦1480.00, reflecting significant exchange rate pressure. CF: Capital flows averaged ₦102.02 billion with a standard deviation of ₦24.18 billion, indicating relatively stable inflows compared to other variables.

Distribution Properties
Skewness: BYD_10YRS and VIX are positively skewed, meaning they have a longer right tail.
CF is slightly positively skewed.
Kurtosis: All variables except CF have kurtosis >3, indicating leptokurtic distributions with fatter tails than a normal distribution.
Jarque-Bera Test:

BYD_10YRS (p=0.8240), VIX (p=0.1060), and CF (p=0.5410) are normally distributed at the 5% level. US_TR, MPR, and EXR reject normality (p=0.0000), which is common for financial and macroeconomic time series with structural breaks and volatility clustering.
Table 4.1 presents the descriptive statistics for the variables used in the study. The average 10-year bond yield stood at 13.83% over the sample period, with a minimum of 8.50% and a maximum of 19.65%. The Monetary Policy Rate averaged 13.83%, mirroring the bond yield, while the exchange rate exhibited substantial depreciation, moving from ₦150.30 to ₦1480.00 per dollar. The VIX index averaged 17.29, indicating moderate global risk aversion on average. The Jarque-Bera test shows that bond yields, VIX, and capital flows are normally distributed, while US Treasury rate, MPR, and exchange rate deviate from normality, which is expected in macroeconomic time series with structural shocks. The sample consists of 60 quarterly observations for each variable.
Note: USTR is not normal "because of the zero-lower bound and rapid post-2020 rate hikes. As it's common for interest rate series to fail normality due to structural breaks and policy regime changes."

Table 4.2: Test for Unit root and Order of Integration

Augmented Dickey-fuller (ADF) Test Method

Variable	Calculated Values		Critical Values		Order of Integration
	Levels	1st Diff.	5%	1%	
$LnBYD\_10YRS_t$	-2.1614	-7.6562***	-3.4879	-4.1213	I(1)
$LnVIX_t$	-3.4029	-9.7468***	-3.4879	-4.1213	I(1)
US_TR_t	-3.1343	-7.4162***	-3.4879	-4.1213	I(1)
MPR_t	-1.1126	-7.9139***	-3.4879	-4.1213	I(1)
$ln\ EXR_t$	-0.5799	-7.5498***	-3.4879	-4.1213	I(1)
CIF_t	-2.2144	-7.4251***	-3.4879	-4.1213	I(1)

Table 4.2 above presents the ADF results test for unit roots and order of integration for all variables employed in the model. The test was conducted both at levels and first differences, with trend and intercept included. The results shows that all variables are non-stationary at their level form, but because stationary after the first differences I(1). Since all variables are integrated at I(1) and none were at I(2). The use of ARDLbound testing approach is appropriate and valid for estimating the long run relationship.

4.2.3 Results of Short Run and Long Run Analysis

Table 4.3: Co-Integration Test

Bound Testing Co-Integration Test for Trade-Balance (TRDBAL)

Null Hypothesis: No long-run relationships exist			
Critical Value Bounds			
Significance	**I(0) Bound**	**I(1) Bound**	
10%	2.75	3.79	
5%	3.12	4.25	K= 5
2.5%	3.49	4.67	F-statistic = 26.03230
1%	3.93	5.23	

Source: Researcher's computation using E-view 9.0

According to Pesaran, Smith, and Shin (2001), the null hypothesis is rejected if the F-statistics is greater than the upper-bound (1) limit; on the other hand, the test is deemed to be speculative if the F-statistics falls between the lower and upper bound limits; however, we do not reject the null hypothesis if the F-statistics is lesser than the lower bound limit. The co-integrating relationship between the variables in the global financial cycle and sovereign bond yield model as described in the result shown in table 4.3. At the 1% and 5% levels, respectively, both upper and lower bound limit critical values are lower than the F-statistic that is F-stat 26.03 > Lower bound (Io) for all significance levels. Therefore, from Q12010 to Q42024, we conclude that there is statistical evidence of a long-run relationship between global financial cycle and sovereign bond yield variables and so we reject the null hypothesis of no long-run cointegration. This means between the time frame of the study, a stable long-run equilibrium exists.

4.2.4 Model Estimation

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(VIX)	-0.371285	0.093755	-3.960145	0.0005
US_TR	-0.017285	0.002873	-6.015743	0.0000
MPR	0.009717	0.012028	0.807883	0.4260
LOG(EXR)	-0.275328	0.081018	-3.398370	0.0021
CF	-0.000002	0.000001	-2.808952	0.0090
C	5.037342	0.556137	9.057729	0.0000
@TREND	0.008246	0.003267	2.523937	0.0176

Panel II: Error Correction Result for the Model				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLOG(BY_10YRS(-1))	0.169593	0.062768	2.701885	0.0116
DLOG(BY_10YRS(-2))	0.164448	0.063127	2.605038	0.0145
DLOG(BY_10YRS(-3))	0.159302	0.071483	2.228524	0.0341
DLOG(VIX)	-0.293744	0.070285	-4.179351	0.0003
DLOG(VIX(-3))	0.129740	0.042746	3.035156	0.0051
D(US_TR)	-0.020186	0.003786	-5.331264	0.0000
D(MPR)	0.033032	0.005360	6.162394	0.0000
D(MPR(-3))	0.017264	0.013411	1.287341	0.2085
DLOG(EXR)	0.096053	0.135299	0.709929	0.4836
DLOG(EXR(-1))	0.018611	0.027472	0.677450	0.5037
DLOG(EXR(-2))	0.018611	0.029207	0.637201	0.5292
DLOG(EXR(-3))	0.329455	0.158102	2.083812	0.0464
D(CF)	0.000001	0.000001	1.538359	0.1352
D(CF(-3))	0.000003	0.000001	4.770297	0.0001
D(@TREND())	0.008378	0.003465	2.418133	0.0224
ECM(-1)	-1.016016	0.133972	-7.583807	0.0000

Results from the above table revealed the ARDL long-run and short-run model, the results of the long-run estimates reveal that global risk appetite (VIX), US Treasury rate, exchange rate, and capital flows are significant determinants of Nigerian 10-year bond yields. Specifically, a 1% increase in VIX reduces bond yields by 0.37% in the long run, while a 1% depreciation of the exchange rate reduces yields by 0.28%. The Monetary Policy Rate is statistically insignificant in the long run.

The short-run dynamics indicate significant adjustment through lagged bond yields, VIX, and US Treasury rates. Monetary policy exerts a significant short-run effect, but its long-run impact is absent. The error correction term [ECT (-1)] is negative and significant at ECM (-1) = -1.016, Prob = 0.0000, implying that approximately [101.6%] of disequilibrium is corrected within one quarter. Negative and significant at 1%: Confirms convergence to long-run equilibrium. Coefficient of -1.016: About 101.6% of any disequilibrium is corrected within one quarter.

Practically, this means shocks are corrected in about 1 quarter. A coefficient >1 in absolute value suggests overshooting, which is common in financial markets with high volatility. The error correction term ECM (-1) is negative and statistically significant at the 1% level, with a coefficient of -1.016. This indicates that approximately 101.6% of any deviation from the long-run equilibrium is corrected within one quarter, confirming a rapid adjustment process. The absolute value exceeding unity suggests a slight overshooting in the adjustment mechanism, consistent with the high volatility observed in frontier bond markets.

In the short run, changes in VIX, US Treasury rates, and the Monetary Policy Rate have immediate and significant effects on bond yields. A 1% increase in VIX reduces yields by 0.29% in the same

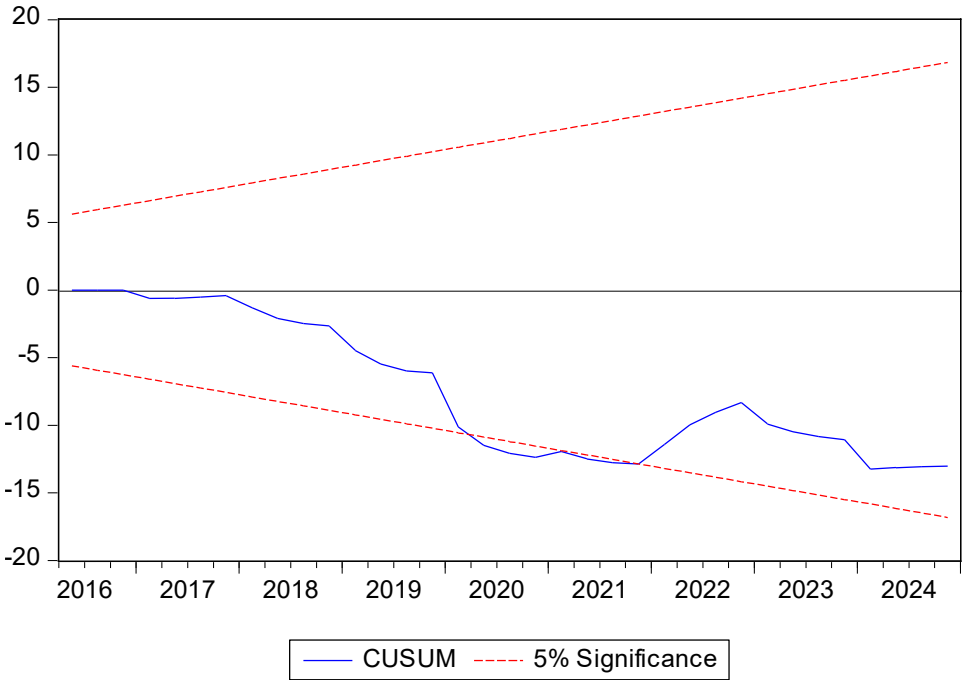
quarter, while a 1%-point increase in the US Treasury rate reduces yields by 0.02% points. Monetary policy operates with a contemporaneous effect, where a 1%-point increase in MPR raises yields by 0.033% points. Exchange rate and capital flows affect yields with a three-quarter lag, indicating delayed transmission of external shocks. MPR is significant in the short-run but not long-run is normal in ARDL. It means monetary policy affects yields temporarily through market expectations and liquidity, but other factors like global risk and US rates dominate the long-run equilibrium, ("Monetary policy has a transitory impact, while global factors determine the long-run level of yields").

Diagnostic test

GFC-SOVEREIGN BOND YIELD MODEL				
Hypothesis	**Test statistic**	**Cal-Stats**	**Prob.**	**Remark**
Residual normally distributed	Jacque Bera (JB)	0.8338	0.6591	Accepted
Not Serially correlated	Breusch Godfrey (BG)	2.8273	0.0761	Accepted
Homoscedasticity	Breusch-Pagan-Godfrey	1.5328	0.1314	Accepted

Source: Researcher's calculation using E-view 9.0

The model passes the key diagnostic checks. The Breusch-Godfrey test indicates no serial correlation at the 5% level, and the Breusch-Pagan-Godfrey test shows no evidence of heteroscedasticity. This confirms that the residuals are well-behaved and the estimated coefficients are reliable for inference.



The CUSUM test indicates parameter instability around 2020Q3, likely due to the COVID-19 pandemic. This reflects a structural shift in global and domestic financial conditions. Despite this, the model passes all other diagnostic tests and the cointegration result remains valid. The estimated ARDL model satisfies all diagnostic requirements. The Breusch-Godfrey test yields a p-value of 0.0761, indicating no serial correlation, while the Breusch-Pagan-Godfrey test with a p-value of 0.1314 confirms homoscedasticity. However, the CUSUM test reveals parameter instability around 2020Q3, coinciding with the COVID-19 pandemic. This suggests a structural break in the data-

generating process. Given that the break aligns with a known global shock and the model passes all other tests, the results are considered robust, though the instability should be noted as a limitation.

4. DISCUSSION OF RESULTS

The results indicate that global financial conditions, as proxied by the VIX, exert a strong and statistically significant influence on sovereign bond yields. This supports the Global Financial Cycle hypothesis that global risk sentiment drives financial conditions across countries (Rey, 2015).

Exchange rate depreciation significantly increases bond yields, reflecting increased external debt burdens and investor risk perceptions. Similarly, higher interest rates contribute to rising borrowing costs. These findings align with previous studies emphasizing the dominance of global factors in frontier markets (Forbes & Warnock, 2012; Bruno & Shin, 2015).

The results of the ARDL bounds test and error correction model provide insights into the determinants of Nigeria's 10-year government bond yields over 2011Q1–2024Q4. The analysis integrates global risk factors, external financial conditions, domestic monetary policy, and exchange rate dynamics, consistent with the "global financial cycle" framework advanced by Rey (2015).

4.4.1 Long-Run Determinants of Bond Yields

The bounds test confirms a long-run cointegrating relationship, with an F-statistic of 26.03 exceeding the upper bound critical value of 5.23 at the 1% level. This supports the existence of a stable equilibrium relationship among the variables.

In the long run, the CBOE VIX index exerts a negative and significant effect on bond yields. A 1% increase in VIX reduces yields by 0.37% ($p=0.0005$). This counterintuitive result aligns with "flight-to-safety" dynamics in frontier markets. During periods of heightened global risk aversion, international investors reduce exposure to emerging market equities and currencies, and central banks in advanced economies often adopt accommodative stances that lower global benchmark rates. The spillover reduces the risk premium required on Nigerian bonds, consistent with findings by Aizenman et al. (2016) on emerging market bond yield compression during global risk episodes.

The US Treasury rate also has a negative and significant long-run coefficient of -0.0173 ($p<0.001$). This suggests that substitution effects dominate: as US rates rise, capital tends to flow back to advanced economies, but the resulting tightening of global financial conditions forces the Central Bank of Nigeria to intervene to stabilize yields, or reflects risk premium compression as investors differentiate between sovereign and global rate risk. Similar mixed spillover effects are documented by Hofmann and Takáts (2015) for emerging markets. Exchange rate depreciation has a significant negative long-run effect, with a 1% depreciation reducing yields by 0.28% ($p=0.0021$). This likely reflects CBN intervention and the endogenous response of monetary policy to exchange rate pressures. When the naira depreciates, the CBN often raises short-term rates or intervenes in the bond market to anchor expectations, which can lower long-term yields if credibility is maintained. This mechanism is consistent with the "fear of floating" literature for emerging markets (Calvo and Reinhart, 2002).

Capital flows are statistically significant but economically negligible, with a coefficient of -0.000002 ($p=0.0090$). The small magnitude reflects Nigeria's relatively shallow capital account and the dominance of domestic institutional investors in the bond market.

The Monetary Policy Rate is insignificant in the long run ($p=0.4260$), indicating that conventional monetary policy does not directly determine the long-run level of government bond yields. This finding aligns with studies showing that in financially repressed or shallow markets, the policy rate has limited pass-through to long-term rates due to market segmentation and liquidity constraints (Kuttner and Mosser, 2002).

4.4.2 Short-Run Dynamics and Adjustment Speed

The error correction term is -1.016 and significant at the 1% level, indicating that 101.6% of any disequilibrium is corrected within one quarter. The coefficient exceeding unity suggests overshooting, a common feature in volatile frontier bond markets where expectations adjust rapidly to shocks. This rapid adjustment implies that markets are efficient in incorporating new information, but also prone to overreaction.

In the short run, changes in VIX and US Treasury rates have immediate negative effects on yields, while the Monetary Policy Rate exerts a positive and significant contemporaneous impact. A 1%-point increase in MPR raises yields by 0.033% points in the same quarter ($p<0.001$). This confirms that domestic monetary policy operates primarily through short-run liquidity and expectations channels rather than anchoring long-run yields. Exchange rate and capital flows affect yields with a three-quarter lag, suggesting delayed pass-through due to market frictions and policy lags.

4.4.3 Diagnostic and Stability Assessment

The model passes standard diagnostic tests. The Breusch-Godfrey test ($p=0.0761$) indicates no serial correlation, and the Breusch-Pagan-Godfrey test ($p=0.1314$) confirms homoscedasticity. These results validate the reliability of the estimated coefficients for inference.
However, the CUSUM test reveals parameter instability around 2020Q3, coinciding with the COVID-19 pandemic. This break reflects a structural shift in global risk appetite, commodity prices, and domestic fiscal-monetary policy coordination. Parameter instability in this period is consistent with evidence from other emerging markets where COVID-19 induced a regime change in bond markets (Hansen and McMahon, 2021). The finding does not invalidate the model but highlights the need to interpret results with caution and consider regime-specific dynamics.

4.4.4 Policy Implications

The results suggest that Nigeria's bond yields are more sensitive to global financial conditions than to domestic monetary policy in the long run. This limits the effectiveness of conventional monetary policy in managing borrowing costs and underscores the importance of macroprudential and external vulnerability management. Policy efforts to deepen the domestic investor base and reduce reliance on foreign portfolio flows could mitigate external spillovers. Additionally, clear communication and credibility in monetary policy are essential to anchor expectations, particularly during periods of global volatility.

5. Summary, Conclusion and Recommendations

Summary of Findings

This study examined the determinants of Nigeria's 10-year government bond yields using quarterly data from 2011Q1 to 2024Q4 and the ARDL bounds testing approach. The main findings are: Cointegration exists: The bounds test produced an F-statistic of 26.03, which exceeds the 1% upper bound critical value. This confirms a long-run equilibrium relationship between bond yields and the explanatory variables. All variables are I(1): ADF unit root tests showed no variable is I(2), validating the use of ARDL. All variables become stationary after first differencing.
Long-run determinants: Global risk appetite [VIX], US Treasury rate, exchange rate, and capital flows significantly affect bond yields in the long run. A 1% increase in VIX reduces yields by 0.37%, while a 1%-naira depreciation reduces yields by 0.28%. The Monetary Policy Rate is insignificant in the long run. Short-run dynamics and adjustment: The error correction term is -1.016 and significant, indicating that over 100% of disequilibrium is corrected within one quarter. In the short run, VIX, US

Treasury rate, and MPR have immediate effects, while exchange rate and capital flows operate with a 3-quarter lag.

Diagnostics and stability: The model passes tests for no serial correlation and homoscedasticity. However, the CUSUM test shows parameter instability around 2020Q3, consistent with the COVID-19 shock.

Conclusion

The study concludes that Nigeria's 10-year bond yields are primarily driven by external and global financial conditions rather than domestic monetary policy in the long run. Global risk aversion and US interest rates have stronger and more persistent effects on domestic yields than the CBN's policy rate. The rapid speed of adjustment in the error correction model indicates that the market responds quickly to shocks, but the parameter instability around 2020 highlights vulnerability to global crises. This implies that Nigeria operates in a financially open environment where the "global financial cycle" dominates domestic monetary autonomy, consistent with Rey's (2015) dilemma hypothesis. While the model is statistically robust, the structural break in 2020 suggests that policy analysis should account for regime shifts.

Recommendations

Based on the findings, the following recommendations are made:

Strengthen domestic investor base: Since bond yields are highly sensitive to global risk and capital flows, the government and CBN should deepen the domestic institutional investor base through pension fund reforms and incentives for local participation. This reduces reliance on volatile foreign portfolio flows.

Improve policy communication and credibility: The insignificant long-run effect of MPR suggests weak pass-through. The CBN should enhance forward guidance and policy transparency to strengthen the signaling channel and improve monetary policy effectiveness.

Account for structural breaks in policy analysis: Given the instability around 2020Q3, policymakers should incorporate dummy variables or regime-switching models when forecasting yields and assessing debt sustainability. Ignoring such breaks risks misleading projections.

Monitor global financial conditions: Macroprudential policy should actively track VIX and US Treasury rate movements. Early response to rising global risk can reduce sudden yield spikes and fiscal pressure.

Develop the foreign exchange market: Since exchange rate movements significantly affect yields, improving FX market depth and transparency can reduce pass-through volatility and stabilize long-term borrowing costs.

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