Trans-Atlantic Transmission of Inflation Rate Shocks: Any Macroeconomic Concern for Nigeria?

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DOI: https://dx.doi.org/10.47772/IJRISS.2024.8110060

Received: 23 October 2024; Accepted: 28 October 2024; Published: 02 December 2024

ABSTRACT

The great convergence of global economies has led to undue uncertainties in several domestic economies. In the era of globalization, macroeconomic policies applied in one country can have a trans-boarder effect on other countries, either positively or negatively. As a result, this research paper focuses on examining the transmission of inflation rate shocks from the trans-Atlantic regions and its potential macroeconomic implications in Nigeria. The study utilizes annual time series data from the World Bank's Development Indicators for the year 2023. To achieve the objectives of this investigation, several econometric tests were conducted on the relevant variables. These tests include the Augmented Dickey-Fuller (ADF) test, Philip Peron Test, Johansen Cointegration test, variance decomposition test, and impulse response test. Each of these tests serves a specific purpose in analyzing the relationship between the policy variables and their impact on Nigerian economy. The impulse response analysis of our VAR model shows that Nigerian variables respond significantly to shocks from foreign variables. The study therefore concluded that macroeconomic shocks in Nigeria are mostly from across the Atlantic. In line with this, the study recommended that the Central Bank of Nigeria (CBN) should be cautious of both domestic developments and movements in the US prices in order to assess the potential risks of inflation.

Key Words: Trans-Atlantic shocks, Inflation Rates, Exchange rate, Interest rate, GDP growth rates, Nigerian economy,

JEL Classification codes: E 31, E 37, F 41, F62,

INTRODUCTION

The world is increasingly becoming a global village with greater interconnectedness among economies (Uzonwanne, Adonike & Egbunike, 2020; Damane, 2018). This condition has ensured that world economies are not entirely immune to policy dynamics of respective economies in the globe. For policy makers in most developing economies, the concern for cross boarder policy shocks are often placed at leading consideration following the perceived susceptibility of their fragile economies to these shocks (Ekeocha & Udeaja, 2020).

Across the Atlantic and the world at large, the United States of America is the largest economy whose influence on the global macroeconomic sphere cannot be overstated (Han & Wei, 2017). This economic influence has been exercised by the US government on several instances through channels like interest rate, exchange rate, trade, commodity prices and monetary policy. . These include when the US Federal Reserve raised the interest rate severally in the early 2000s, when it rolled out quantitative easing (QE) after the start of the Global Financial Crisis in 2018, and when the Federal Reserve further postponed another rate increase in 2016. During these periods, interest rates shocks were reported at the emerging markets in line with the actual or anticipated changes in the US macroeconomic policy changes (Uzonwanne, et al., 2020).

At post COVID-19, the US was the first major economy where inflation became pronounced (Sherman, 2023). This came as a result of government release of pandemic relief funds, thus, sparking a boom in activity and

expenditure in the country. The price hikes quickly extended abroad as a result of high demand from consumers driving up the cost of oil and other commodities, fee increment by international shipping co mpanies, and price increment by businesses experiencing shortages. To salvage the situations, the Federal Reserve Bank decided to raise interest rates in 2022 thus sparking a rush of capital into the US, bringing the dollar to its strongest level in two decades and driving up prices in 'dollarized' and in some import dependent nations of the world (Sherman, 2023).

Nigeria is an open economy and arguably an import dependent one (Aigheyisi, 2021). Oil represents approximately 90% of Nigeria's export revenue and more than 50% of government revenue, establishing the country's fiscal and economic dependency on this single commodity (World Bank, 2022). Consequently, any fluctuation in global oil prices directly affects Nigeria's economic stability. For instance, during the 2014-2016 global oil price collapse, Nigeria's GDP growth slowed to an average of 1.2% from over 5% annually between 2011 and 2014, while its currency devalued by more than 40% (International Monetary Fund, 2016). During global economic downturns, such as the COVID-19 pandemic, global demand (including the US) for oil fell, leading to a sharp drop in Nigerian exports by more than 25% in 2020, affecting foreign exchange inflows and amplifying inflationary pressures domestically (World Bank, 2021).

As at 2022, Nigeria had US as her largest investor with commercial activities in products and services reaching $8.1 billion. In November 2023, United States exported about $198m and imported an estimate of $553m from Nigeria, thereby strengthening the US and Nigeria economic ties (U.S. Department of State, 2023, World Bank, 2023). The consequence of this strong ties between the two economies, is that any changes in the US economy, including inflation, can have ripple effects on Nigerian economic stability.

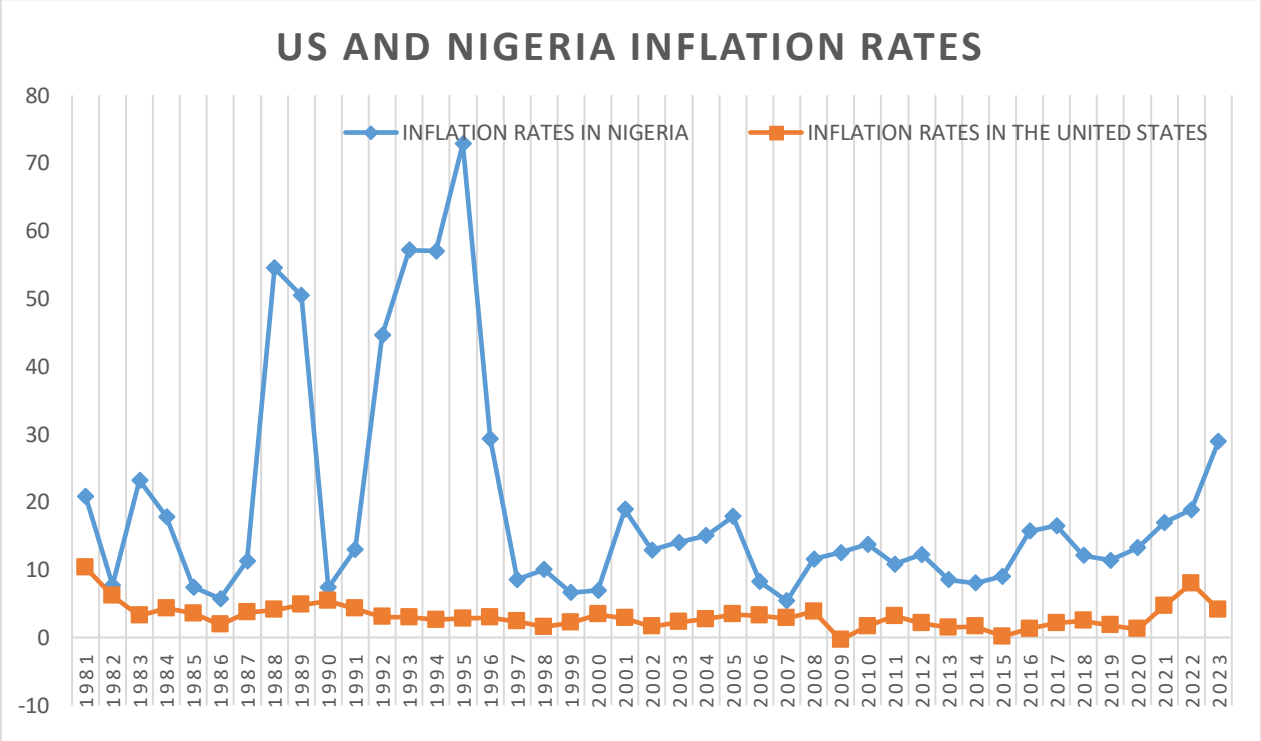

Fig 1. Comparative Trends of US and Nigeria Inflation Rates (1985-2023)

Source: World Bank Data (2023)

As shown in fig. 1, the inflation rates of the trans-Atlantic nations of Nigeria and US showed similar trends in some selected years. For instance, in 1982, inflation rates for Nigeria and US had negative change of 63% and 41% respectively. The same trend was shown in 1985 and 1986 where Nigeria recorded a respective negative inflation rate change of 58% and 23%. In that same period, the US also had negative change in inflation rate of 18% and 46% respectively. Subsequently, when the US inflation started biting hard in 1987 and 1988 with respective positive change in inflation rate of 93% and 11%, Nigeria also recorded 97% and 383% positive change in inflation rate for the same respective periods. The same perceived correlating trends in inflation

changes continued in Nigeria and US for 1994 (-0.23%, -11.7%), 1995 (27.7%, 7.6%), 1997 (-70.9%, -20.2%), 2000 (4.8%, 54.3%), 2002 (--31.8%, -43.9%), 2003 (9%, 43.1%), 2004 (6.9%, 18%), 2005 (19.1%, 26.7%), 2006 (--54%, -4.9%), 2007 (-34.4%, -11.6%), 2008 (114.9%, 34.6%), 2013 (-30.5%, -29.2%), 2016 (74.2%, 963.5%), 2017 (5.1%, 68.8%), 2019 (-5.8%, -25.8%), 2021 (28%, 280.8%) and in 2022 (11.1%, 70.3%).

In the plight of these, other macroeconomic indicators call for policy attention with respect to the US prices. Reports from the Nigerian Bureau of Statistics (2023) indicated that the rate of interest for example, rose from 13.85% to 18.75% in 2022 and 2023 respectively in line with the rising inflation. This rise in trend resulted from the avowed policy of the Nigerian Fiscal Authority to 'spend our way' out of economic recession in 2016 by expansionary government policies. There was also an upward trend in inflationary pressures throughout 2016 as evident in increase in consumer prices from 15.7% in 2016 to 16.6% in 2017 as shown in the fig. 2 below:

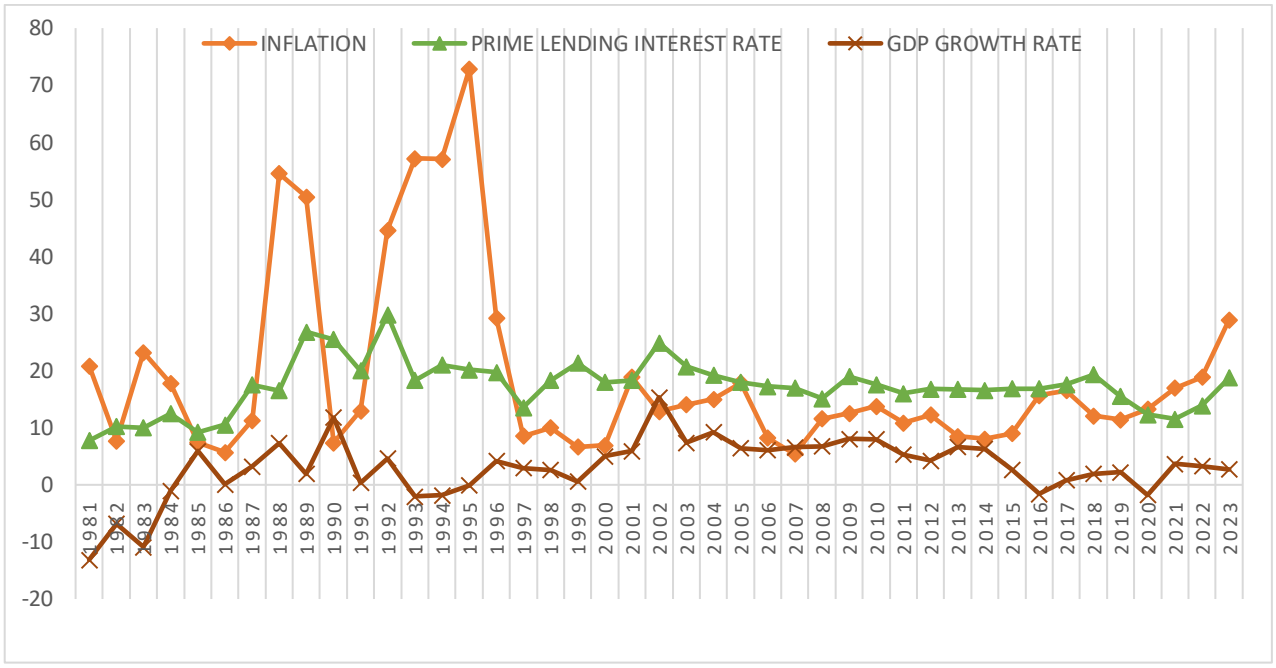

Fig 2. Fluctuating Trends of Some Selected Macroeconomic Variables in Nigeria (1981-2023)

Source: Central Bank of Nigeria statistical bulletin (2023); World Bank Data (2023).

With the continued wild swings in these macroeconomic indicators, especially in inflation rates, economic planning has become difficult for all stakeholder in the economy, thus, dovetailing into increasing interest rates, lower exports, higher prices of consumer goods, lower savings, mal-investments, inefficient government spending and tax increases. These challenges slow down economic activities for an underdeveloped economy like Nigeria that has been battling for a post COVID-19 recovery.

Several empirical studies on the cross boarder implication of macroeconomic shocks have been reviewed (Mbah, Uzonwanne, Adonike, & Egbunike, 2022; Cristiano-Botia, Gonzalez-Molano & Huertas-Campos, 2018; Ufuk, 2016; Asaleye, Popoola, Lawal, Ogundipe & Ezenwoke; 2018; Damane, 2018, Oguanobi, Akamobi & Agu, 2014). However, to the best of our knowledge, none has been conducted at post COVID-19 with emphasis on inflation rate shock across two continental economic giants. The possibility of this having an impact on the previous studies arises due to the perceived vulnerability of Nigerian economy to external shocks. In the light of this, the research aims to address the important research question on how Nigerian inflation rates are influenced by inflation rate shocks in the United States.

Following the introduction, the remainder of the paper is organized as follows: Section 2 offers a comprehensive analysis of existing literature. Section 3 outlines the theoretical framework and methodology employed in the study. Section 4 presents and examines the empirical findings. Finally, Section 5 concludes the study by providing policy recommendations.

LITERATURE REVIEW

Conceptual Review

Inflation is a widespread occurrence that lacks a universally accepted precise definition. Generally, inflation refers to the process of increasing prices, which leads to a decrease in the value of money. Imoughele and Ismaila (2016) describe inflation as a state in which the value of money decreases, resulting in rising prices. Thus, it is seen as the situation where there is an excess of money in circulation compared to the available goods and services.

Nwosa and Oseni (2012) are of the view that inflation rates can have a cross boarder transmission into the local economy and may further lead to an inflation rate shocks. This is conceptualized below using the trans-Atlantic channel.

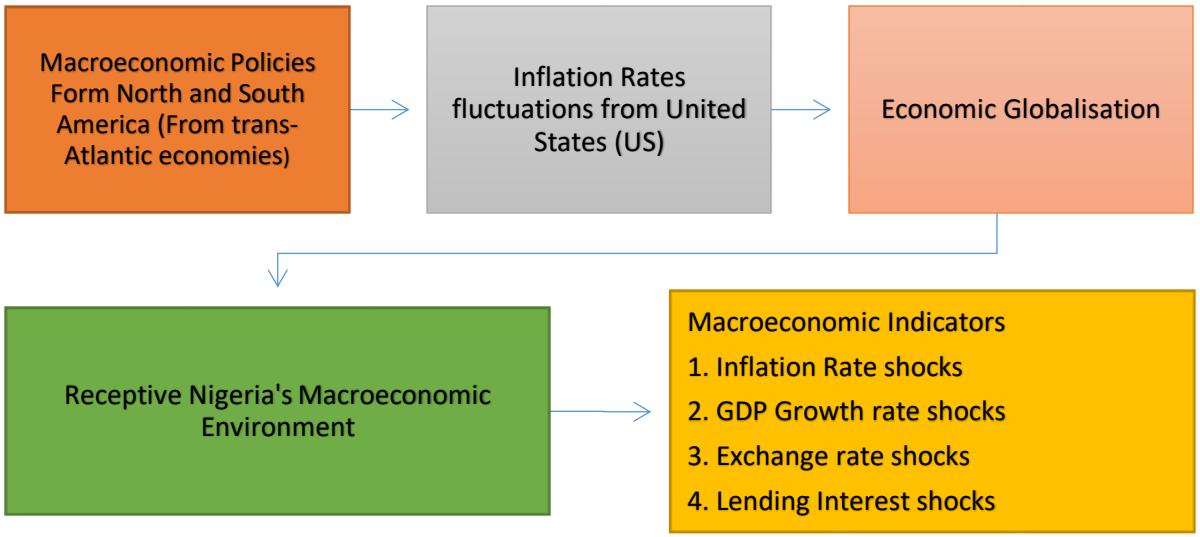

Figure 3. Conceptual Framework on Trans-Atlantic transmission of interest rate shocks

Source: Researchers' compilation, (2024).

Theoretical Literature

This study is anchored on the Rational Expectation Theory. The rational expectations theory, developed by John F. Muth in 1961 and popularized by Robert Lucas and T. Sargent in the 1970s, is a concept relevant to economic studies. This theory assumes that individuals form their expectations about future outcomes based on all available information, including past experiences and current market conditions. It posits that these expectations are not systematically different from the equilibrium results of the market. According to the rational expectations theory, individuals do not make systematic errors when predicting the future. Instead, any deviations from perfect foresight are considered to be random. This implies that people incorporate all relevant information into their expectations and adjust them accordingly. In economic modeling, this theory is applied by assuming that the expected value of a variable is equal to the expected value predicted by the model.

The rational expectations theory has important implications for various areas of economics, including macroeconomics, finance, and policy analysis. By assuming that individuals have rational expectations, economists can better understand how economic agents make decisions and how these decisions impact market outcomes.

In the context of this study, the rational expectation theory is utilized to elucidate how fluctuations in US interest rates can serve as a predictor for changes in the Nigerian lending rate. Following the 2008 stock market crisis in the US, which had significant macroeconomic repercussions globally, it is expected that these expectations will be rational.

Empirical Literature

Numerous research studies have been undertaken to assess the impact of cross-border macroeconomic shocks on the economic environment of other nations. Edwards (2010) conducted a comprehensive analysis on the influence of changes in the U.S. Federal Reserve's Federal Funds rate on interest rates in developing countries. The study utilized high-frequency weekly data to examine the impact of these changes on interest rates in Latin American and Asian economies. In addition, the research investigated how alterations in the U.S. term structure affected differentials in short-term rates using the Generalized Least Squares (GLS) method with White-corrected covariance estimates. The findings of the study revealed a strong and relatively rapid transmission of changes in the Federal Funds rate to interest rates in Latin American economies. This impact was equally significant in Asian economies over the long run.

Ufuk (2016) conducted a study to examine the impact of external indebtedness and international financial integration on foreign interest rate shocks in a small-open economy. The empirical analysis focused on quantifying the effects of U.S. interest rate shocks on the Turkish economy. To achieve this, a business cycle model was constructed, which successfully replicated the empirical impulse response functions. The model was estimated using quarterly Turkish data, and the findings highlighted that financial integration plays a crucial role in shaping an economy's response to foreign rate shocks, with the magnitude of this response being influenced by the level of external debt. When an economy has higher levels of external debt, financial integration helps to mitigate the impact of foreign rate shocks. On the other hand, for economies with lower levels of external debt, financial integration amplifies the effects of these shocks.

Furthermore, Cristiano-Botia, Gonzalez-Molano, and Huertas-Campos (2018) conducted a study using alternative economic models to examine the impact of policy interest rate expectations and unanticipated changes in reference interest rates on saving and credit interest rates in the Colombian economy. The empirical findings of the study revealed that policy surprises have a significant influence on setting both passive and active interest rates. Additionally, the study observed changes in deposit rates prior to the announcement of monetary authority decisions, but no significant changes were observed on the day of the announcement or the day after. Based on these findings, the study recommended that financial institutions consider their expectations regarding policy rates when determining interest rates.

Asaleye, Popoola, Lawal, Ogundipe, and Ezenwoke (2018) conducted a study to examine the impact of monetary policy transmission through credit channels on output and employment in Nigeria from 1981 to 2016. They employed the Structural Vector Autoregression (SVAR) and Autoregressive Distributed Lags (ARDL) models to analyze the data. The authors found evidence of shock effects resulting from variations in monetary policy indicators on output and employment. The study revealed that in the first two periods, variations in monetary policy indicators had a greater impact on output than on employment. However, in subsequent periods, the effects on employment became more pronounced. This suggests that monetary policy can have a significant influence on employment in the long run through credit channels.

METHODOLOGY

This study employed the Structural Vector Autoregressive (SVAR) methodology as adopted by Mbah, et al., (2022). The Structural Vector Autoregression (SVAR) is an econometric model that utilizes economic theory to assess the simultaneous relationship between variables. One of its advantages over other specifications of Vector Autoregressive (VAR) models is its ability to provide a better empirical fit. The SVAR model allows researchers to investigate the impact of unexpected shocks on one variable (external) on the other variables (internal) within the system (Chuku, Akpan, Sam, & Effiong. 2011). Further, VAR estimation is highly sensitive to the lag order of the selected variables. Consequently, choosing an appropriate lag length can effectively demonstrate the long-term effects of certain variables on other variables within the system. The exogeneity assumptions also suggest that Nigeria's economy is relatively small and lacks the ability to influence global macroeconomic indicators, either with time lags or contemporaneously. Another advantage of this method over alternative approaches is that the block exogeneity assumption eliminates the impact of spurious terms of trade and external financial shocks. As a result, it allows for an examination solely focused on the trans-Atlantic transmission of inflation rate shocks, aiming to identify any macroeconomic concerns

specific to Nigeria. The internal (Nigeria) vector variables are the inflation rates, lending interest rates, official exchange rates and the gross domestic product (GDP) growth rates, whereas the external vector variable is the US inflation rate as obtained from the World Bank Development Indicators (WDI, 2023).

Model Specification

Following the approach of Yildrim (2016), we utilize a Structural Vector Autoregressive (SVAR) model with block exogeneity:

$$\sum_{p=0}^{n} \begin{bmatrix} B_{11}(s) & B_{12}(s) \\ B_{21}(s) & B_{22}(s) \end{bmatrix} \begin{bmatrix} y_t^d \\ y_t^f \end{bmatrix} = \begin{bmatrix} {}^{d}_{t} \\ {}^{f}_{t} \end{bmatrix} \quad (1)$$

Where B_{ij} represents a coefficient matrix, $y_{t=}\left[y_t^d, \quad y_t^f\right]^t$ is a vector of variables. ${}_t = \left[{}^{d}_{t}, \quad {}^{f}_{t} \right]^t$ denotes a vector of structural disturbances that satisfies $E[\ {}_t | y_{t-s}, s > 0] = 0$ and $E[\ {}_t\ {}^{d} | y_{t-s}, s > 0] = I$. The vector of structural shocks of the domestic origin is represented by ${}_t{}^{d}$ while that of external origin is represented by ${}^{f}_{t}$. y_t^d is a vector of domestic variable in Nigeria and y_t^f is the vector of shocks exogenous to Nigeria. The use of SVAR models can lead to challenges in identifying parameters, which can result in inconsistent estimates when employing Ordinary Least Squares (OLS) estimation. Consequently, it becomes necessary to present a reduced form of the SVAR model to address these issues. The reduced form is illustrated in (2) below:

$$\mathbf{Z_{it}} = \begin{pmatrix} \mathbf{HINF} \\ \mathbf{GDPR} \\ \mathbf{INF} \\ \mathbf{EXR} \end{pmatrix} = \mathbf{a_1} + \mathbf{a_2(L)\ Z_{a\text{-}1}} + \square \mathrm{j}\ (\mathbf{USINF}) \quad \mathbf{(2)}$$

In this context, our initial model consists of four endogenous variables and one exogenous variable for Nigeria, the home country. The endogenous variables are specific macroeconomic indicators: inflation rate (HINF), real gross domestic product growth rates (GDPR), interest rates (INT), and exchange rate (EXR). These endogenous variables are influenced by their own previous values (lags) and a constant term. Additionally, the model includes an exogenous variable, which is the previously defined US inflation rate (USINF). It is expected that this exogenous variable will have a direct impact on the endogenous variables. The aims of this study would be accomplished by estimating the VAR equation (2) and examining the Impulse Response Functions (IRF). Traditionally, the IRF have been widely utilized as a method of analyzing an estimated VAR model (Hamilton, 1994 as cited in Oguanobi, et al. 2014). In this context, the IRF is expected to reveal the extent to which domestic inflation rates, as well as other domestic macroeconomic variables, react to shocks in trans-Atlantic inflation rate.

DISCUSSION AND RESULTS

Time Series Properties of the Variables

The Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests were conducted for each series, and the results are presented in Table 1.

Table 1: Results of Unit Root Tests

Variables	Augmented Dickey-Fuller (ADF)			Phillips-Perron (PP)			Decision
	ADF Test Stat	**5% critical value**	**I(d)**	**ADF Test Stat**	**5% critical value**	**I(d)**	
USINF	-5.862857	-2.936942	I(1)	-5.911385	-2.936942	I(1)	Stationary
HINF	-6.636713	-2.938987	I(1)	-10.66382	-2.936942	I(1)	Stationary

GDPR	-3.203694	-2.936942	I(0)	-4.333019	-2.935001	I(0)	Stationary
INT	-6.114593	-2.938987	1(1)	-9.777860	-2.936942	1(1)	Stationary
EXR	-4.211353	-2.936942	I(1)	-4.125444	-2.936942	I(1)	Stationary

Source: Source: Authors' computation (E-views 10), 2024

Table 2 displays the outcomes of the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests conducted prior to estimating the reduced form Vector Autoregressive (VAR) model (Equation (1)). The purpose of the unit root test, as suggested by Granger (1986), is to prevent spurious regression. The variables USINF, HINF, INT, and EXR exhibit stationarity at first difference according to both the ADF and PP tests. On the other hand, GDPR is stationary at levels under both the ADF and PP tests. Khan and Ali (2003) and Sims (1980) advocate for estimating the VAR model in levels when dealing with mixed variables, i.e., variables that are both stationary and non-stationary at levels. However, Johansen (19991) emphasizes that in the presence of non-stationary time series data, there is a risk of obtaining spurious results in econometric analysis. Herrera and Pesavento (2013) suggest that it is important to test variables that are non-stationary but have the same order of integration for the presence of cointegration. In this case, the variables USINF, HINF, INT, and EXR should be tested. If these variables are found to be cointegrated, then a Vector Error Correction Model (VECM) should be estimated as a VAR. On the other hand, if the variables are not cointegrated, then the VAR should be estimated in first differences.

Table 2: Cointegration Result table for variables cointegrated at same order 1 (Trace)

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.457604	44.99298	47.85613	0.0906
At most 1	0.249243	20.52263	29.79707	0.3881
At most 2	0.197977	9.055702	15.49471	0.3603
At most 3	0.005757	0.230963	3.841466	0.6308

Source: Authors' computation (E-views 10), 2024

Table 3: Cointegration Result table for variables cointegrated at same order 1 (Maximum Eigenvalue)

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.457604	24.47035	27.58434	0.1191
At most 1	0.249243	11.46693	21.13162	0.6007
At most 2	0.197977	8.824739	14.26460	0.3010
At most 3	0.005757	0.230963	3.841466	0.6308

Source: Authors' computation (E-views 10), 2024

Table 2 and table 3 demonstrates that there is no cointegration among USINF, HINF, INT, and EXR. Since the non-stationary variables at levels are not cointegrated, the study follows Marcet's (2005) recommendation and estimates Equation (2) in first differences with an appropriate lag length to ensure the absence of serial correlation.

Lag Length Selection

The next step in our analysis is to select the optimal lag length. In line with Mbah, et al., (2022), the AIC is adopted for this purpose. The lag length chosen is the one that minimses the following:

$$AIC = -2\ln(L) + 2K \quad (5)$$

Where, K represents the total number of parameters and L represents the maximum value of the likelihood function for the model. Table 4 summarizes the results of employing this technique.

Table 4: Lag Length Result

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-663.1373	NA	1.29e+09	35.16512	35.38059	35.24178
1	-563.8997	167.1370	26214295	31.25788	32.55071*	31.71786*
2	-532.6856	44.35695*	20309798*	30.93082	33.30101	31.77411
3	-506.6331	30.16601	23329339	30.87543	34.32298	32.10204
4	-481.5320	22.45888	35181270	30.87011*	35.39501	32.48003

indicates lag order selected by the criterion; LR: sequential modified LR test statistic (each test at 5% level); FPE: Final prediction error; AIC: Akaike information criterion; SC: Schwarz information criterion; HQ:Hannan-Quinn information criterion

Source: Authors' computation (E-views 10), 2023

According to the findings presented in table 4, the lag length that minimizes the Schwarz criterion (SC) is four, making it our optimal lag length. With this optimal lag length determined, we can now analyze the impulse response in our study.

Impulse Response Functions

As indicated in figure 4 below, the impulse response functions show the impact of a one standard deviation (SD) shock of one variable (USINF) to all other variables (INF, GDPR, EXR and INT) in the system; therefore, it is considered as an essential tool in achieving the stated aim of the study. In this study, the researchers utilize impulse responses and variance decomposition tests to examine how inflation rate shocks in the trans-Atlantic region affect other selected macroeconomic variables. The goal is to identify any potential macroeconomic policy concerns for Nigeria. The impulse response functions are shown in the Figure 4 below:

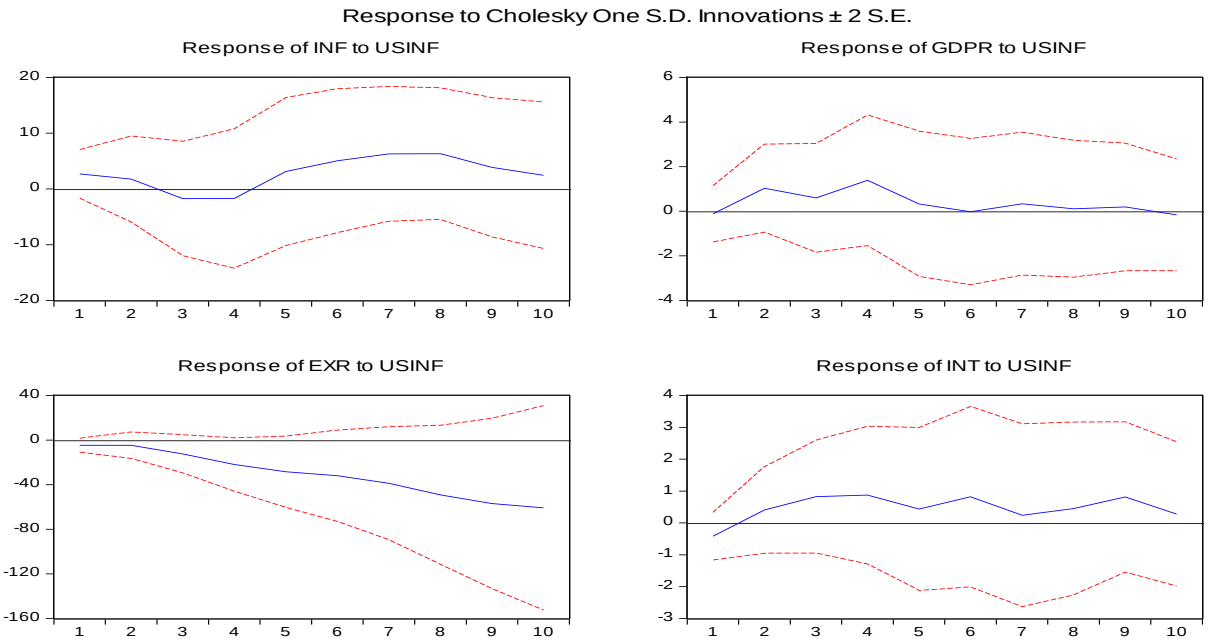

Fig. 4 Impulse responses to US Inflation rate shock under Cholesky ordering: D(INF) D(GDPR) D(EXR) D(INT).

Source: Authors' computation (E-views 10), 2023

The impulse responses are presented in Figure 2. The dotted lines are one standard error bands computed by Cholesky simulations. Cushman, and Zha (1997) suggested that using one standard deviation bands is advantageous because it allows for easy comparison of research findings with other studies. In their research, they calculated impulse responses over a period of 10 years. Figure 4 shows that when a one standard deviation shock is applied to the US inflation rate, it immediately leads to an increase in the inflation rate in Nigeria during the first and second periods. The response continues from the second period before gradually declining in the third period. Subsequently, the impulse from the US inflation rate results in a rising response in Nigeria's inflation rate starting from the fourth period and continuing until the eighth period, followed by a steady decline onward. This indicated that there is an asymmetric response of home inflation rates to inflation impulses from across the Atlantic in the short run and long run in Nigeria. The asymmetrical disposition on the impulse and responses is in tandem with the submissions of Mbah, et al., (2022), who indicated that responses to US interest rates will have an asymmetric impact on Nigeria's interest rates both in the short-run and long-run.

Furthermore, a one standard deviation renovation given to inflation rate in the US will result in an increasing response to the GDP growth rate at the first period before declining at the third period. This continued with a rising and falling of the home inflation rates in response to the US inflation rate at the fourth to sixth period respectively before having a continuous asymmetric shortwaves onwards. Also, the result showed that the home interest rates started on a negative note in response to the US inflation's impulse. It however, it rose up till the fourth period before showing another continuous positive asymmetric shortwaves afterwards.

Also, the response of the Naira-US Dollar exchange rate to a positive shock in the US inflation rate is negative and significant from period 1 onwards. This validates the notion that Nigeria's currency value is highly susceptible to the impulse of the general price level in US. This further connotes that there is significant response of the naira to any unit impulse of the US dollar (given that the value of currency is inversely related to the general price level in the country). These findings, given the positive interest rate response seen from period 1, is in tandem with the submission of Canova (2005) who discovered that an inflow of foreign capital raises the demand for domestic currency.

Variance Decomposition

Table 5: Variance Decomposition

Variance Decomposition of D(USINF):

Period	S.E.	USINF	INF	EXR	GDPR	INT
1	1.231976	100.0000	0.000000	0.000000	0.000000	0.000000
2	1.727880	74.49128	9.014431	14.07072	0.810208	1.613355
3	2.240047	58.49169	18.54778	19.41078	1.626676	1.923076
4	2.506545	61.20245	18.99270	16.31713	1.848956	1.638767
5	2.587577	61.57563	19.43894	15.54506	1.896142	1.544230
6	2.666769	60.13706	20.66180	15.76982	1.960758	1.470566
7	2.842740	57.04771	20.84298	18.73989	2.017262	1.352162
8	3.011379	52.55842	21.27172	22.65107	2.302471	1.216329
9	3.102773	49.65500	21.48246	24.90032	2.609759	1.352463
10	3.150904	48.21559	21.14526	25.83202	3.025399	1.781734
Variance Decomposition of D(INF)						

Period	S.E.	USINF	INF	EXR	GDPR	INT
1	13.57085	3.928635	96.07136	0.000000	0.000000	0.000000
2	18.44786	3.049016	94.66016	0.319084	1.818443	0.153294
3	19.93390	3.358748	81.83100	2.087112	11.35708	1.366060
4	20.48479	3.875926	77.74557	2.015432	10.88253	5.480534
5	21.14352	5.816645	73.09720	2.113773	13.05680	5.915586
6	22.33635	10.33069	65.64346	2.501431	14.49857	7.025854
7	23.74321	16.15886	58.38805	4.084383	14.03858	7.330131
8	25.07199	20.83360	54.09283	3.700103	14.30252	7.070944
9	25.72498	22.05540	51.80577	5.187371	13.82469	7.126765
10	26.02203	22.44257	50.82441	5.838742	13.74946	7.144815
Variance Decomposition of D(EXR):						
Period	S.E.	USINF	INF	EXR	GDPR	INT
1	19.72833	5.534132	0.015239	94.45063	0.000000	0.000000
2	29.30079	4.992451	0.379789	93.72299	0.244346	0.660421
3	36.85651	14.52959	0.293717	80.09729	1.378947	3.700463
4	46.46572	31.44238	3.076372	56.08697	2.777654	6.616615
5	57.31116	45.26063	3.865210	40.54691	3.941027	6.386218
6	67.95381	54.39929	3.206085	31.85911	4.777867	5.757652
7	80.71693	61.60100	2.709270	24.35870	6.031216	5.299809
8	97.14827	68.10475	3.297847	16.90324	6.403709	5.290457
9	116.2370	71.55417	4.978573	11.89490	6.085256	5.487107
10	134.6715	73.68198	6.527353	9.113355	5.452107	5.225209
Variance Decomposition of GDPR						
Period	S.E.	USINF	INF	EXR	GDPR	INT
1	3.891852	0.089913	11.40749	13.90129	74.60130	0.000000
2	4.345768	5.733518	13.59133	11.86001	67.95084	0.864310
3	4.863190	6.095841	10.89002	11.99861	62.42696	8.588570
4	5.222002	12.33030	11.32242	14.69228	54.20226	7.452744
5	5.323015	12.25062	11.51695	14.87655	53.22551	8.130363
6	5.370900	12.03445	12.36288	15.14807	52.46854	7.986068
7	5.432763	12.14642	13.58613	15.13358	51.29048	7.843399
8	5.473897	12.00545	13.76996	15.21263	50.67243	8.339525
9	5.535529	11.85865	14.22621	16.01066	49.74573	8.158759
10	5.570852	11.79171	14.24341	16.11767	49.71641	8.130798
Variance Decomposition of INT:						
Period	S.E.	USINF	INF	EXR	GDPR	INT

1	2.326435	3.182685	0.984173	23.73703	7.511354	64.58476
2	3.315492	3.067245	31.95363	24.83168	8.346374	31.80106
3	3.593096	7.873165	28.40231	23.67036	12.97117	27.08300
4	4.047840	10.84754	22.38063	34.40932	10.22057	22.14194
5	4.530090	9.586219	22.76300	31.07989	17.78050	18.79039
6	4.638753	12.28652	21.98594	30.47581	17.28840	17.96332
7	4.790232	11.77326	21.50060	31.57150	16.28094	18.87370
8	4.829716	12.46081	21.34296	31.30969	16.01951	18.86704
9	4.911003	14.80464	20.71139	30.52589	15.49707	18.46101
10	4.940422	14.94985	20.52933	30.41728	15.48561	18.61793

Source: Authors' computation (E-views 10), 2023

These forecast show a ten year period into the future. Given our periods 1-5 as short run and 6-10 as long run, the result above revealed that in the short run, looking at year 1-5, an average of about 71% of the forecast errors variance in USINF is explained by the variable itself. With an average of 53.6% long run (6-10periods) prediction of USINF to itself, this implied that other variables (INF, EXR, GDPR and INT) in the model do not have any strong prediction on USINF in these periods. In that case, those variables have strong exogenous impact. On the other variables the US inflation rates determines an average of 4% and 18.2% of the changes in inflation in the short run and long run respectively. Also, US inflation rates explains an average of 19.8% and 66% of the variations in exchange rate in the short run and long run respectively. In the same vein, the US inflation rates determines an average of 7.2% and 12% of the changes in inflation in the short run and long run respectively. Lastly, in the short run and long run, US inflation rates explains an average of 6.8% and 13.2% of the variations in Nigerian interest rates respectively. This implied further that Nigerian policy makers should be more concerned about her exchange rates and interest rates which are observed to be highly exposed to the dictates of the aggregate price level in the US.

CONCLUSION

This study evaluated the trans-Atlantic transmission of inflation rate shocks with concern for Nigerian macroeconomic environment. Macroeconomic variables such as the US inflation rates, inflation rate from Nigeria, real gross domestic product growth rates (GDPR), interest rates (INT), and exchange rate (EXR) using the structural method. In this study, concern has been shown that our macroeconomic environment is susceptible to exogenous shocks. Our research indicates that the macroeconomic variables in the Nigerian economy exhibit significant responsiveness to shocks from foreign variables. In general, our findings suggest that the Nigerian economy is highly influenced by external shocks. This implies that the substantial macroeconomic volatility experienced by the country is primarily driven by factors originating from outside Nigeria, with only a negligible portion of domestic shocks being attributed to internal factors.

The inflation rates in the United States play a significant role in determining changes in Nigerian macroeconomic indicators in both the short run and the long run. In the short run, an average of 4% of the changes in Nigerian inflation can be attributed to US inflation rates. On the other hand, in the long run, US inflation rates account for an average of 18.2% of the changes in Nigerian inflation. Similarly, US inflation rates also have an impact on Nigerian exchange rates. In the short run, approximately 19.8% of the variations in Nigerian exchange rates can be explained by US inflation rates. In the long run, this percentage increases to 66%, indicating a stronger relationship between US inflation rates and exchange rate fluctuations in Nigeria. Furthermore, US inflation rates influenced changes in Nigerian interest rates. In the short run, an average of 7.2% of the changes in inflation can be attributed to US inflation rates. In the long run, this percentage decreases slightly to 12%. Lastly, when considering variations in interest rates, US inflation rates explained an average of 6.8% and 13.2% in the short run and long run, respectively.

RECOMMENDATION

Despite the limited impact of US shocks in explaining fluctuations in the Nigerian macroeconomic indicators, their influence on Nigerian prices cannot be disregarded. This is particularly significant as research has shown that US inflation shocks have the greatest effect on domestic inflation in Nigeria compared to other domestic macro variables. It is therefore, recommended that the Central Bank of Nigeria (CBN) should be cautious of the domestic developments and movements in the US prices in order to assess the potential risks to inflation. This is crucial, especially considering the double digit inflation rates she has consistently recorded in the past years (34.19% in June, 2024).

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