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Global Economic Uncertainties, Foreign Capital Inflow and Foreign Exchange Market Pressure in Nigeria

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Abstract
The Nigerian economy being a capital scarce, monolithic and import-dependent economy is worse hit by global economic uncertainties especially in the past three decades. This study therefore examines the impact of global economic uncertainties on the Nigerian foreign exchange market due to foreign capital inflow over the period from Q1 1986 to Q4 2021. A non-parametric quantile-causality test and the Structural Vector Autoregressive (SVAR) were employed to ascertain the transmission mechanism of global economic uncertainty to Nigeria's foreign exchange market pressure via foreign capital inflow. The study found that global economic policy uncertainties granger causes foreign exchange market pressure in Nigeria from the middle to extreme tails. It also found the sensitivity of foreign exchange market pressure to uncertainties in global economic policy through foreign capital flow channels such as Official Development Assistance (ODA), Foreign Direct Investment (FDI), remittances and Foreign Portfolio Investment (FPI). The study, therefore, recommended that a deliberate policy aimed at increasing domestic production and export of non-oil goods and services that will increase the availability of foreign exchange to the economy and consequently reduce excess demand on foreign exchange market in Nigeria.

Keywords: Exchange Market, Global Economic Uncertainties, Foreign Capital Inflow
JEL Classification Codes: F2, F3, F44

1. Introduction

The world economies including Nigeria have been faced with global economic perturbations and shocks in the recent times that have resulted in high levels of economic uncertainties. Beginning with the black Monday of October 19, 1987 where the global stock markets

crashed, the 1998 Russian default in payment of its debts, the September 2001 terrorist attack known as 9/11, the Gulf War II that started in 2003 between United State of America and Iraq, the 2008/2009 global financial crisis, the 2015/2016 commodity price shock and COVID-19 pandemic 2019/2020 (Baker, Bloom & Davis 2016). Within these periods, the Nigerian economy has witnessed unstable macroeconomic trajectories especially in the foreign exchange market.

The Nigerian economy in particular is worst hit because of her over dependency on external capital such as: Foreign Direct Investment (FDI), Official Development Assistance (ODA), remittance and Foreign Portfolio Investment (FPI) to supplement domestic capital shortages. According to National Bureau of Statistics [NBS], 2022 report, foreign capital inflow to Nigeria declines by 17.5% to $1.6 billion year-on-year in the first quarter of Q1 2022. This is the lowest first quarter inflow since Q1 2017. Capital inflow decreased quarter-on-quarter by 28.1% from $2.2 billion in Q4 2021. Nigeria received $9.68 billion in capital inflows in 2020, compared to $23.99 billion in 2019. The 2020 inflow represents a 59.6% decline from $23.99 billion in 2019 and a 42.4% decline from $16.81 billion in 2018. In Nigeria, foreign capital inflow constitutes one of the major sources of foreign exchange supply in the economy. It is also, a source of growth, technological development and it fills the savings-investment gaps in the economy. Thus, contraction in foreign capital inflow has the potential effect of reducing the supply of foreign exchange thereby resulting into foreign exchange market pressure in the economy.

There is a large body of literature providing insight into the relationship between global economic uncertainties, foreign capital inflow and foreign exchange market pressure. For instance, (Liu, 2021; Zai, Zhang, Yu & Li 2017; Olanipekun, Olasehinde-Williams & Hasan 2019) have established that global economic uncertainties and foreign capital inflow have remarkable effect on foreign exchange market of different economies. Arising from these empirical findings, the declining trends of capital inflow have appeared to be associated with the epochs of global economic uncertainties. Thus, the questions that arise are: what is the nexus between global economic uncertainties, foreign capital inflow and foreign exchange market pressures in Nigeria? The answer to this question is the focus of this work. The purpose of this study is therefore to examine the impact of global economic uncertainties on foreign exchange market pressures from foreign capital inflows into Nigeria. Following the introductory section, Section two is literature review; section three deals with methodology, the discussion of results makes section four, while section five is conclusion and policy recommendations.

2. Literature Review

2.1 Theoretical Framework

The theoretical framework for this study is anchored on the pure monetary business cycle theory which provides a strong theoretical connection between global economic policy uncertainties, foreign capital inflow and foreign exchange market pressure. Global economic policy uncertainties are precipitated by cyclical movements in global economic activities caused by a variety of factors such as technological shocks which include innovations, bad weather, and stricter safety regulations among others. Hawtrey (1939) developed this theory and it takes into account an economy's money and credit system to analyze business cycles. The theory states that successive rounds of inflation and deflation accelerated by changes in money flows are responsible for business fluctuations. According to the theory, as the money supply increases, prices rise, profits increase; and total production is increasing. On the other hand there is a contraction of the money supply; prices go down; profits go down; and manufacturing activities are declining.

Therefore, a closer examination of other business cycle theories, namely, monetary overinvestment theory, Schumpeter's interaction theory, multiplier acceleration interaction theory, and business cycle theory by Hicksian, all proposed a theoretical framework in which political uncertainty affects expectations due to incomplete information about exchange rate preferences and paths. Expectation bias, where policymakers' expectations of the macro-economy are systematically wrong until the true preference is known. The theoretical link applies to the relationship between global economic uncertainties, foreign capital inflow and pressure on foreign exchange markets. Hence, the exchange rate and foreign capital inflow are closely related. In Nigeria, increase in foreign capital inflows such as FDI, FPI, ODA and remittance contributes enormously to the foreign exchange market stability and when there are turbulent periods, reduced amount of foreign capital inflows increase foreign exchange market pressure in the economy.

2.2 Empirical Review

In a cross-country study, Adekokun, Falayi, Adeyemi and Kumeka (2022) x-rayed the relationship between global economic uncertainties and exchange rate management in Africa within the framework of quantile regression. The study found that global economic uncertainties have a significant impact on exchange rate management in Africa. Similarly, Liu (2021) examined the impact of uncertainty on

foreign Exchange (FX) market stability, focusing on FX market pressure and jump risk using the Latent Threshold Time-Varying Parameter (LT-TVP VAR) model. The study found that the relationship of uncertainties in the latent threshold of the Chinese foreign exchange market is not linear dynamic time. This implies that increase in uncertainties has negative impact on foreign exchange market in China. Furthermore, Belcilar, Usman, Gungor, Roubaud and Wohar (2021) investigated the predictive effect of news-based measures of global, regional and advanced market economic policy uncertainty on bond spreads and their volatility in emerging markets using non-parametric quantile causality test. The work found that weakening global economic policies and sophisticated market measures predict emerging bond spreads in the ever-lower quantiles, while volatility forecast is stronger in higher quantiles.

In Nigeria, Akighir and Zakari (2020) interrogated the determinants of Nigeria's foreign exchange market pressure from 1970 to 2019 using the ARDL technique. The work found that oil prices, current account position and monetary policy rate were negatively related with foreign exchange market pressure. Conversely, inflation, government expenditure and foreign debts were positively related with foreign exchange market pressure in Nigeria both in the short and long-run.

Also, the study by Ominyi, Akighir and Abayol-Ikwue (2020) examined the effect of foreign exchange market demand pressure on economic growth in Nigeria. Using the ARDL and Granger causality tests, the study found negative effect of foreign exchange market demand pressure on economic growth in Nigeria. Findings of the study showed one-way causality running from foreign exchange market demand pressure to economic growth.

Again, Olanipekun, Güngör and Olasehinde-Williams (2019) examined the impact of economic policy uncertainty on exchange market pressure in a panel of twenty countries from 2003 to 2017 using quarterly data. Findings of the study revealed a long-run relationship between exchange market pressures in the long-run irrespective of the exchange rate regime. Also, the study found that domestic credit; Gross Domestic Product (GDP) and FDI inflows exert reduction influence on the pressure.

Aizenman and Hutchison (2012) study examined how the global financial crisis originating in the United State was transmitted to emerging markets. Using a panel data approach and accounting for various EMP-related factors, the study found clear evidence that emerging markets with higher levels of external liabilities, including short-term and in the long-term, equities, FDI and derivatives were more

exposed and were much more vulnerable to pressure from the foreign exchange markets. The studies reviewed on the subject matter only examined the relationship between economic policy uncertainty and foreign exchange market pressure, but not whether or not they are vulnerable to foreign exchange market pressures due to disruptions in foreign capital inflow. This study differs from previous studies on this subject matter in terms of methodology used in measuring the pass-through effect and thus, fills the gap by examining the role of foreign capital inflow as a channel of transmission of global economic uncertainties to the foreign exchange market in typical capital scarce, monolithic and import-dependent economy like Nigeria.

3. Methodology

The study uses quarterly data spanning from 1986 Q1 to 2021 Q4 which were sourced from various statistical bulletins of Central Bank of Nigeria [CBN], (2022) and NBS (2022). In line with Baker et al. (2016) economic policy uncertainty index was sourced from the web (available on: http://www.policyuncertainty.com). The study employed the non-parametric quantile causality test and the Structural Vector Autoregressive (SVAR) framework. The choice of quantile-causality test among other causality tests is first, to avoid misspecification problem and secondly, to account for non-linearity dependence, outliers, jumps and structural breaks. Again, the use of SVAR among other competing econometric techniques was predicated upon the fact that, it adequately captures pass-through effect among macroeconomic variables.

3.1. Specification of Quantile-in-Causality Tests

Following the framework of Adedokun et al. (2022) and Balcilar et al. (2021) who generalized the model by Jeong, Hardle and Song (2012), nonlinear causality through a hybrid method defined as follows:

In the θ -quantile with regard to the lag-vector of $\{Y_{t-1},...,Y_{t-P,}x_{t-1},...,x_{t-p}\}$, x_t does not cause Y_t, if:

$$Q_\theta\left(Y_t / Y_{t-1},...,Y_{t-p}, x_{t-1},...,x_{t-1}\right) = Q_\theta\left(Y_t / Y_{t-1},...,Y_{t-p}\right) \quad \text{-- (1)}$$

In the θ-quantile with regards to lag-vector of $\{Y_{t-1},...,Y_{t-P,}x_{t-1},...,x_{t-p}\}$, x_t cause Y_t, if: $Q_\theta\left(Y_t / Y_{t-1},...,Y_{t-p}, x_{t-1},...,x_{t-1}\right) = Q_\theta\left(Y_t / Y_{t-1},...,Y_{t-p}\right)$

\- - - - - - - -- (2)

$Q_\theta\left(Y_t / .\right)$ Shows the θ-th quantile of Y_t and the conditional quartiles of Y_t is given by $Q_\theta\left(Y_t / .\right)$, thus, t and the quartiles range from zero to 1 i.e. $0 < \theta < 1$.

Where Y_t the level of foreign exchange is market pressure (EMP) distribution, and X_t is the level of global economic policy uncertainty (EPU) distribution.

Systematic presentations of causality in quantiles test in terms of vectors are specified as follows:

$Y_{t-1} = (Y_{t-1},...,Y_{t-p})$, $X_{t-1} = (x_{t-1},...,x_{t-p})$, and $Z_t = (X_t, Y_t)$

Further, the conditional distribution functions as defined by the following specifications

$Fy_t / z_{t-1}(Y_t / Z_{t-1})$ and $Fy_t / y_{t-1}(Y_t / Y_{t-1})$. These show the distribution function of Y_t conditioned on vectors Z_{t-1} and Y_{t-1}, respectively. The conditional distribution $Fy_t / z_{t-1}(Y_t / Z_{t-1})$ proves continuous in Y_t for all Z_{t-1}.

Thus, $Q_\theta(Z_{t-1}) = Q_\theta(Y_t / Z_{t-1})$ and $Q_\theta(Y_{t-1}) = Q_\theta(Y_t / Y_{t-1})$-- - -(3)

$Fy_t / Z_{t-1}\{Q_\theta(Z_{t-1}) / Z_{t-1}\} = \theta$; Which holds with probability one. Therefore, we test the hypotheses for the causality-in-quantiles on the basis of equation (1) and (2).

$H_O : P\{Fy_t / Z_{t-1}\{Q_\theta(Y_{t-1}) / Z_{t-1}\} = \theta\} = 1$ - - - (4)

$H_1 : P\{Fy_t / Z_{t-1}\{Q_\theta(Y_{t-1}) / Z_{t-1}\} = 0\} < 1$ - - - (5)

Following Jeong et al. (2012) the metric for the application of causality-in-quantiles is given as:

$J = \{\Sigma_t E(\Sigma_t / Z_{t-1}) f_Z(Z_{t-1})\}$,

Where, Σ_t is the regression error and $f_Z(Z_{t-1})$ is the marginal density function of Z_{t-1}. Σ_t is then generated due to the null hypothesis stated in equation (4). This hypothesis is true only if:

$E[1\{Y_t \le Q_\theta(Y_{t-1}) / Z_{t-1}\}] = 0$

The regression error can be written as $1\{Y_t \le Q_\theta(Y_{t-1})\} = 0 + \Sigma_t$, where $1\{\bullet\}$ is a signal function. Therefore, the Jeong et al. (2012) distance metric is specified as:

$J = E[\{Fy_t / z_{t-1}\{Q_\theta(Y_{t-1}) / Z_{t-1}\} - \theta\}^2 f_Z(Z_{t-1})]$ - -(6)

From equation (6), the statistic for the fixed quantile θ called the Kernel-based causality-in-quantiles test is as follows:

$$\hat{J}_T = \frac{1}{T(T-1)\iota 2P} \sum_{t=p+1}^{T} \sum_{S=p+1}^{T} K_{S=T}\left(\frac{Zt-1-Zs-1}{h}\right) \hat{\Sigma}_t \hat{\Sigma}_s \quad -(7)$$

Where T is Sample sizes, K (1) is the Kernel function, while h represents band width for the Kernel calculation, and P is log-order used in specifying the vector Z_t. However, the re-scaled statistic $Th^P \hat{J}_T / \hat{\sigma}_0$ is asymptotically distributed as standard normal, where $\hat{\sigma}_0 = \sqrt{2\theta}(1-\theta)\sqrt{1/T(T-1)^{2P}}\sqrt{\Sigma_{t\neq s}K^2(Z_{t-1}-Z_{s-1})/h}$

Thus, the regression error $\hat{\Sigma}_t$ becomes the most crucial element of the test statistic. The regression error is estimated as:

$$\hat{\Sigma}_t = 1\left\{Y_t \leq \hat{Q}_\theta(Y_{t-1})\right\} - \theta \quad - \quad - \quad -(8)$$

In equation 8, quantile estimator defined as $\hat{Q}_\theta(Y_{t-1})$ return an estimate of the $\theta - th$ conditional quantile of Y_t, considering Y_{t-1}. By using the non-parametric Kernel approach, $\hat{Q}_\theta(Y_{t-1})$ is evaluated as:

$$\hat{Q}_\theta(Y_{t-1}) = \hat{F}\, y_t / y_{t-1}(\theta / Y_{t-1}) \quad - \quad - \quad -(9)$$

$\hat{F}\, y_t / y_{t-1}(Y_t / Y_{t-1})$ Depicts the Nadarya Watson Kernel estimator specified as:

$$\hat{F}\, y_t / y_{t-1}(Y_t / Y_{t-1}) = \frac{\sum_S^T = p+s, s \neq tL(\frac{Y_{t-1}-Y_{s-1}}{h})}{\sum_S^T = p+1, s \neq tL(\frac{Y_{t-1}-Y_{s-1}}{h})} \quad - \quad (10)$$

Where *h* is the band width and *L(.)* is referred to as Kernel function.

3.2. Specification of the Structural Vector Autoregressive Model

The Structural Vector Autoregressive (SVAR) model is specified in estimating the spillover effect of global economic uncertainties on foreign exchange pressure through foreign capital inflow. Foreign capital inflow consisting of FDI, FPI, remittance and ODA constitutes the supply of foreign exchange to the Nigerian foreign exchange market. Any global uncertainty would reduce the inflows of foreign exchange in the market thereby causing a pressure in the market. Therefore, the transmission channel which is the pass-through repercussion of global economic policy uncertainties (EPU) to foreign exchange market pressure (EMP) via foreign capital flow (CAFL) is given as follows:

$$EPU \longrightarrow CAFL \longrightarrow EMP \quad - \quad (11)$$

Where EPU is global economic policy uncertainty, $CAFL$ is foreign capital flow, and EMP is foreign exchange market pressure. Transposing the transmission yields,

$$EMP_t = f(EMP_{t-1}, CAFL_{t-1}, EPU_{t-1}, CAFL_t, EPU_t) \text{ - -} \quad \text{-(12)}$$

$$CAFL_t = f(EMP_{t-1}, CAFL_{t-1}, EPU_{t-1}, EMP_t, EPU_t) \text{ -} \quad \text{-(13)}$$

$$EPU_t = f(EMP_{t-1}, CAFL_{t-1}, EPU_{t-1}, EMP_t, CAFL_t) \text{ -} \quad \text{-(14)}$$

Therefore, the normalized SVAR (11) system of equation gives the following,

$$EMP_t = \alpha_{11}^1 EMP_{t-1} + \alpha_{12}^1 CAFL_{t-1} + \alpha_{13}^1 EPU_{t-1} + \alpha_{12}^0 CAFL_t + \alpha_{13}^0 EPU_t + \varepsilon_{1t} \quad \text{- -} \quad (15)$$

$$CAFL_t = \alpha_{21}^1 EMP_{t-1} + \alpha_{22}^1 CAFL_{t-1} + \alpha_{23}^1 EPU_{t-1} + \alpha_{21}^0 CAFL_t + \alpha_{23}^0 EPU_t + \varepsilon_{2t} \quad \text{- -} \quad (16)$$

$$EPU_t = \alpha_{31}^1 EMP_{t-1} + \alpha_{32}^1 CAFL_{t-1} + \alpha_{33}^1 EPU_{t-1} + \alpha_{31}^0 EMP_t + \alpha_{32}^0 CAFL_t + \varepsilon_{3t} \quad \text{- -} \quad (17)$$

Rearranging the contemporaneous effects from the system of equation to the Left-Hand Side (LHS) gives,

$$EMP_t - \alpha_{12}^0 CAFL_t - \alpha_{13}^0 EPU_t = \alpha_{11}^1 EMP_{t-1} + \alpha_{12}^1 CAFL_{t-1} + \alpha_{13}^1 EPU_{t-1} + \varepsilon_{1t} \quad \text{-} \quad (18)$$

$$-\alpha_{21}^0 EMP_t + CAFL_t - \alpha_{23}^0 EPU_t = \alpha_{21}^1 EMP_{t-1} + \alpha_{22}^1 CAFL_{t-1} + \alpha_{23}^1 EPU_{t-1} + \varepsilon_{2t} \quad \text{-} \quad (19)$$

$$-\alpha_{31}^0 EMP_t - \alpha_{32}^0 CAFL_t + EPU_t = \alpha_{31}^1 EMP_{t-1} + \alpha_{32}^1 CAFL_{t-1} + \alpha_{33}^1 EPU_{t-1} + \varepsilon_{3t} \quad \text{-} \quad (20)$$

Expressing equation 18 to 20 in matrix form

$$\begin{bmatrix} 1-\alpha_{12}^0 - \alpha_{13}^0 \\ -\alpha_{21}^0 1 - \alpha_{23}^0 \\ -\alpha_{31}^0 - \alpha_{32}^0 1 \end{bmatrix} \begin{bmatrix} EMP_t \\ CAFL_t \\ EPU_t \end{bmatrix} = \begin{bmatrix} \alpha_{11}^1 \alpha_{12}^1 \alpha_{13}^1 \\ \alpha_{21}^1 \alpha_{22}^1 \alpha_{23}^1 \\ \alpha_{31}^1 \alpha_{32}^1 \alpha_{33}^1 \end{bmatrix} \begin{bmatrix} EMP_{t-1} \\ CAFL_{t-1} \\ EPU_{t-1} \end{bmatrix} + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \end{bmatrix} \text{-} \quad \text{-(21)}$$

Hence, $A_O Z_t = A_1 Z_{t-1} + \varepsilon_1$ --(22)

Where A_O = 3 x 3 which is the matrix of simultaneous effects of endogenous parameters

Z_t = 3 x 1 is the matrix of column vectors of the endogenous variables,

A_1 = 3 x 3 represents the lagged matrix of the endogenous variables,

Z_{t-1} = 3 x 1 is the matrix of column vectors of the lagged estimable endogenous variables, and

ε_{it} = 3 x 1 column vector of error term in the system.

This model imposes some restrictions on some parameters of the A_O matrix from economic and institutional knowledge to overcome the difficulties of SVAR identification due to over-parameterization that cannot be estimated by SVAR. Using the recursive approach, the upper elements above the diagonal of the array are constrained to zero as follows.

$$-\alpha_{12}^{0} = -\alpha_{13}^{0} = -\alpha_{23}^{0} = 0$$

Given the limitations imposed, the concise form of the model is given as:

$$A_0 = \begin{bmatrix} 1 & 0 & 0 \\ -\propto_{21}^{0} & 1 & 0 \\ -\propto_{31}^{0} & -\propto_{32}^{0} & 1 \end{bmatrix} \begin{bmatrix} EMP_t \\ CAFL_t \\ EPU_t \end{bmatrix} = \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \end{bmatrix} \quad - \quad \text{-(23)}$$

Where $\varepsilon_t = \beta\eta_t$, and

$$\beta = \begin{bmatrix} \delta_1^2 & 0 & 0 \\ 0 & \delta_2^2 & 0 \\ 0 & 0 & \delta_3^2 \end{bmatrix} = \text{Unit Variance i.e, } Var(\eta_t) = 1$$

$$A_0 = \begin{bmatrix} 1 & 0 & 0 \\ -\alpha_{21}^{0} & 1 & 0 \\ -\alpha_{31}^{0} & -\alpha_{32}^{0} & 1 \end{bmatrix} \begin{bmatrix} EMP_t \\ CAFL_t \\ EPU_t \end{bmatrix} =$$

$$\begin{bmatrix} \delta_1^2 EMP & 0 & 0 \\ 0 & \delta_2^2 CAFL & 0 \\ 0 & 0 & \delta_3^2 EPU \end{bmatrix} \begin{bmatrix} \mu_t^{EMP} \\ \mu_t^{CAFL} \\ \mu_t^{EPU} \end{bmatrix} \quad - \quad (24)$$

This means that $A_O Z_t = A_1 Z_{t-1} + \varepsilon_t$ which is the normalized form of the model reduces to $A_O e_t = \beta\eta_t$. However, $\beta\eta_t = \beta\mu_t$ therefore, the reduced form baseline for estimable SVAR model can be specified as:

$$A_O e_t = \beta\mu_t \quad - \quad - \quad (25)$$

Where A_O = represents the long-run matrix of contemporaneous effects

e_t = is the column vector matrix of error for the respective variables

β = matrix of structural shocks in the model, and

μ_t = column vector of structural shocks in the model.

So the specification of the "S" matrix is:

$$e_t = A_O \beta \mu_t = \begin{bmatrix} e_t EMP \\ CAFL \\ e_t EPU \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 \\ -\alpha_{21}^{0} & 1 & 0 \\ -\alpha_{31}^{0} & -\alpha_{32}^{0} & 1 \end{bmatrix} \begin{bmatrix} \mu_t^{EMP} \\ \mu_t^{CAFL} \\ \mu_t^{EPU} \end{bmatrix} \quad - \quad \text{-(26)}$$

Above shows the initial effect of the shock on the model. We also used impulse response decomposition and variance prediction errors in examining the effect of limb impact in the SVAR model.

4. Results and Discussion

4.1. Unit Root Test

The results presented here are unit root tests to exclude spurious estimates from the series. Augmented Dickey-Fuller (ADF) and Kwiatkowski-Philips-Schmidt-Shin (KPSS) tests were used as priors, and the results are shown in Table 1.

Table 1: Unit Root Tests' Results

Var.	ADF			KPSS			Order of Integration
	Level	First Diff.	Crit. Value	Level	First Diff.	Crit. Value	
EMP	-1.9287	-3.8672	-3.5629	0.8759	0.4000	0.4630	I(1)
CAFL	-1.7285	-6.7155	-3.5684	0.6549	0.38402	0.4630	I(1)
EPU	-1.2484	-4.2004	-3.4797	0.5844	0.3299	0.4630	I(1)

Source: Computed from Eviews-10, (2022)

The unit root tests reveal that, for both the ADF and KPSS tests, all the series were not stationary at levels but all the series turn stationary once the series were differenced. It suggests that the series are all integrated of order one (i.e., I(1)). This implies the presence of the reverting ability of the series under study due to shocks.

4.2. Quantile Causality for Global Economic Policy Uncertainty (EPU) and Foreign Exchange Market Pressure (EMP) in Nigeria

Before the Quantiles Causality test was estimated, the optimal lag using order (p) of the VAR by the Bayesian Information Criteria (BIC) was used. Table 2 presents the results of the optimal lag.

Table 2: Optimal Lag Order Selection Criteria Test Results

LAG	Log L	LR	FPE	AIC	SC	HQ
0	-134.4929	NA	41.99726	9.413304	9.507600	9.442836
1	-111.4345	41.34614*	11.29840*	8.098929*	8.381818*	8.187527*
2	-109.3777	3.404359	12.98958	8.232943	8.704425	8.380605
3	-108.2506	1.709981	16.03479	8.431079	9.091153	8.637806
4	-106.9518	1.791539	19.76551	8.617364	9.466030	8.883156

**indicates lag order selection criterion, LR: Sequential modified LR test statistic (each test at 5% level); FPE: Final prediction error; AIC: Akaike information Criterion; SC: Schwarz information criterion; and HQ: Hannan-Quim information criterion.*
Source: Computed from Eviews-10, (2022)

Order 1 was selected as the optimal lag length in the Quantile process using the Schwarz information criteria; this is because it assists in solving the problem of over-parameterization that is commonly associated with the non-parametric frameworks. Its superiority over other alternative lag-length selection criteria stems from the fact that, it has the capacity of producing parsimonious number of lags than other criteria. To estimate the Quantile causality test between EPU and (EMP), the test for independence proposed by Brock, Scherkman, Dechert and Lebarm (1996) called the BDS test was performed on the data set and the results are represented in the following Table 3.

Table 3: BDS Test for Non-Linearity

Dimension (M)	BDS Statistic	Std. Error	Z-Statistic	Normal Prob.	Bootstrap Prob.
2	0.082710	0.012	6.91	0.0000	0.0008
3	0.114460	0.019	5.88	0.0000	0.0024
4	0.080853	0.024	3.40	0.0007	0.0312
5	0.104240	0.025	4.11	0.0000	0.0154
6	0.127008	0.025	5.06	0.0000	0.0060

Source: Computed from Eviews-10, (2022)

The results in the table reveal that, the BDS statistic for all the dimensions has statistically significant values for both the normal and Bootstrap values. Thus, we accept the null hypothesis that the residuals at different embedding dimensions (M) are identically and independently

distributed (i.i.d). This means statistically significant evidence against linearity. This therefore, suggests stronger high-level evidence of non-linearity among the series of EPU and EMP. The implication is that, using Granger Causality test framework on the series would produce false, undependable and inconsistent results. Hence, the quantile causality test becomes the most appropriate technique amidst the families of causality tests.

In estimating the quantile causality test, the quantile regression was estimated using the Kernel as the Sparsity method and Hall-Sheather as the Bandwith method. Four quantile intervals were used in the estimation. That is, $[(0.2,0.4),(0.4,0.5),(0.5,0.6),(06,0.8)]$ to ascertain the quantile causality between EPU and EMP in Nigeria. The optimal lag length in the quantile intervals were determined by the SIC in a VAR process. The results are presented in the following tables.

Table 4: Causality in Quantiles EPU does not Granger cause EMP

Quantile Intervals	Test Statistic	Lag Length	Probability
0.2, 0.4	0.5432	1	0.2804
0.4, 0.5	4.8415**	1	0.0406
0.5, 0.6	6.9284**	1	0.0284
0.6, 0.8	12.4216**	1	0.0047

Note: **denotes the rejection of null hypothesis of no causality at 5% level of significance.
Source: Computed from Eviews-10, (2022).

Table 5: Causality in Quantiles: EMP does not Granger cause EPU

Quantile Intervals	Test Statistic	Lag Length	Probability
0.2, 0.4	0.009	1	0.8131
0.4, 0.5	0.0006	1	0.8397
0.5 0.6	0.0027	1	0.3598
0.6, 0.8	0.0068	1	0.1198

Source: Computed from Eviews-10, (2022)

The results from Table 4 reveal the causality running from EPU to EMP in the quantile intervals of (0.4, 0.5), (0.5, 0.6), (0.6, 0.8) at 5% level of significance. This suggests that EPU is more likely to cause EMP in Nigeria in the middle to tail quantile intervals. That is, extremely high episode of global economic uncertainties. Arising from these results, the trending patterns of EPU and EMP were juxtaposed and five major episodes of co-movement between EPU and EMP were identified.

These are: 2000-2001 (middle episode) which corresponds to terrorist attack of 9/11 September 2001; 2002-2003 (middle episode) which coincides with the World com of July 2002 and the Gulf War II of February, 2003; 2008-2009 (high episode) which corresponds to the global financial crisis of 2008-2009; 2014-2016 (high episode) which coincides with commodity prices slump of 2014 through 2016; and 2019-2020 (high episode) which coincides with the outbreak of COVID-19 pandemic.

These high and middle episodes in the trending patterns of EPU and EMP validate the outcomes of quantiles causality tests which revealed causality between EPU and EMP in the middle and high tail quantiles. Thus, the results have appeared to be more robust than full-sample from the causality running from EMP to EPU, the null hypothesis of no causality running from EMP to EPU is accepted for all the quantile intervals; since all the probability values for all the quantile intervals are greater than the cut-off threshold of 0.05. This no causality may be ascribed to the fact that the Nigerian currency (the Naira) is not an international currency that is used in foreign transactions. Thus, Naira depreciation may not cause any global economic shock or perturbation.

4.3. Pass-through effect due to Global Economic Policy Uncertainty on Foreign Exchange Market Pressure via Foreign Capital Inflows

A SVAR model was used to study the pass-through effect of EPU on EMP in Nigeria through foreign capital flows. First, the unit root tests results indicating that all-time series are I(1), followed by Johansen's cointegration test are used to check whether there is a long-run relationship between the studied time series, and the results are presented below in Table 6.

Table 6: Trace and Max-Eigen Statistics for the Pass-through Effects of Foreign Capital Inflow

Hypothesized No. of CE(s)	Trace Statistic	5% Critical values	Prob.**	Max-Eigen Statistic	5% Critical Value	Prob.**
$r = 0$	77.23864	29.79707	0.0000	36.35731	21.13162	0.0002
$r \leq 1$	40.88133	15.49471	0.0000	32.86332	14.26460	0.0000
$r \leq 2$	8.018004	3.841466	0.0046	8.018004	3.841466	0.0046

Source: Computed from Eviews-10, (2022).

The results of both the Trace and Max-Eigen statistics have indicated 3 cointegrating equations. This suggests the presence of long-run relationship between EPU, CAFL and EMP in Nigeria. Given the established relationships among the series, the contemporaneous short-run estimates of the SVAR were carried out to ascertain the pass-through effects of EPU on EMP via CAFL.

Table 7: Estimated Contemporaneous Structural Parameters

Variable	EMP	CAFL	EPU
EMP	1.000000		
CAFL	-6.54003*	1.000000	
EPU	-0.058014*	-0.00652*	1.000000

*denotes 5% level of significance
Source: Computed from Eviews-10, (2022)

Table 7 shows that there is a negative and statistically significant relationship between EPU and CAFL in the short run. This means that a 1% increase in EPU over the same period in Nigeria would reduce CAFL by 0.01%. This may be ascribed to the fact that in times of global economic uncertainties, investors will be scared in carrying out investments across national frontiers. According to the NBS (2022) due to the COVID-19 pandemic, Nigeria received capital inflows of USD 9.68 billion in 2020, up from USD 23.99 billion in the previous year in 2019. Inflow 2020 decreased by 59.6% from $23.99 billion in 2019 and 42.4% from $16.81 billion in 2018. Furthermore, the results reveal a negative and statistically significant relationship between CAFL and EMP in the short run. This suggests that 1% reduction in foreign capital inflow will increase EMP by 6.54% in Nigeria at the same time horizon. This may be due to the fact that CAFL constitute part of the supply of foreign exchange in Nigeria. Thus, a reduction in foreign capital inflows affects the supply of foreign exchange and consequently, puts pressure on the market.

4.4. Diagnostic Tests

Several SVAR diagnostic tests were performed and presented in Table 8 to evaluate the impulse response and estimated error variance decomposition.

Table 8: SVAR Diagnostic Test Results

Type of Test	Test statistic	Prob**
SVAR Correlation LM Test	LRE* F-Stat (3.78)	0.9252

SVAR Heteroskedasticity Test	Joint Chi-Sq (6.180)	0.9067
SVAR Residual Normality Tests	Jarque-Bera (0.66)	0.7202

Source: Computed from Eviews-10, (2022)

This table shows the SVAR residual tests for serial correlation, heteroscedasticity and normality, respectively. The results show that the LRE* F-Statistic value is 3.78 and the probability value is 0.9252, accepting the null hypothesis. This indicates no correlation between the sequence residues. Again, the Joint Chi-square value of 6.180 with the probability value of 0.9067 indicates that the residuals are homoscedastic. Furthermore, Jarque-Bera value of 0.66 which is not statistically significant at 5% level of significance, the null hypothesis that the residuals are multivariate normal was accepted. This shows that the SVAR model is insensitive to the trimetric problems of serial correlation, heteroskedasticity and normality. Furthermore, the result of the impulse responses of CAFL to innovations in EPU and EMP to innovations in CAFL is shown in Figure 1.

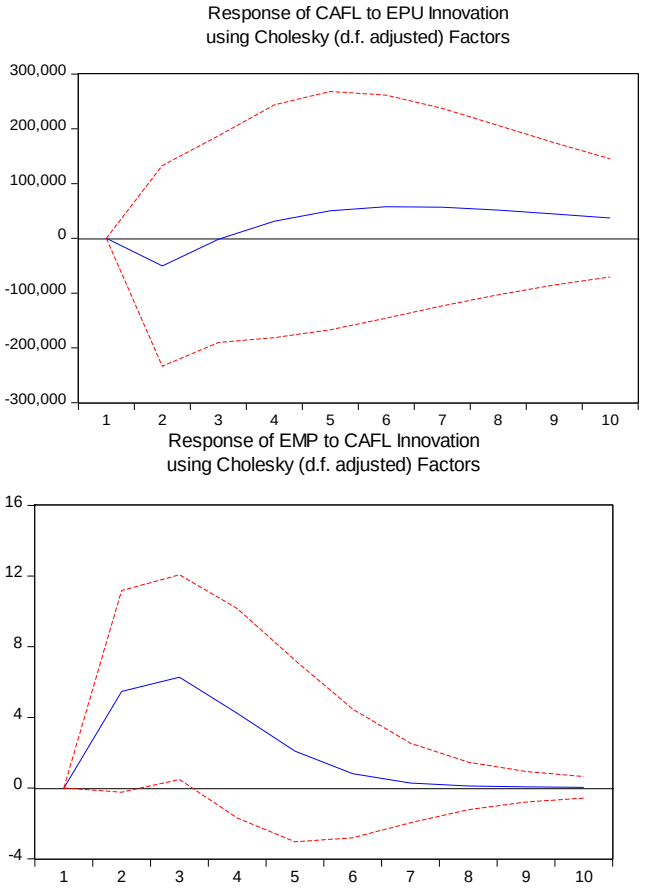

Figure 1: Impulse Responses of CAFL, EPU, and EMP
Source: Computed from Eviews-10, (2022)

The figure reveals that foreign capital inflows immediately responses negatively to innovations in global economic policy uncertainties and after the third quarter it turn positive. This may be ascribed to the fact that, when there are global economic policy uncertainties, investors will be risk averse; thereby constraining capital movement to developing countries like Nigeria that are vulnerable to external shocks. Furthermore, the figure indicates that foreign exchange market pressure response positively to innovations in foreign capital inflows beginning in the first quarter up to the third quarter after which it began to decline and the effect appears to be temporary. Also, the forecast error variance decomposition for CAFL and EMP are represented in Table 9.

Table 9: Results of Variance Decomposition of CAFL

Period	S.E.	EMP	CAFL	EPU
1	1041027.	0.000000	98.93414	1.065863
2	1355510.	0.137799	99.20888	0.653326
3	1468526.	0.117539	99.18042	0.702038
4	1507136.	0.154107	98.96500	0.880892
5	1520018.	0.261723	98.74653	0.991745
6	1524645.	0.403418	98.55801	1.038571
7	1526686.	0.540672	98.40169	1.057633
8	1527820.	0.653137	98.27995	1.066914
9	1528543.	0.736772	98.19081	1.072422
10	1529029.	0.795543	98.12848	1.075972

Source: Computed from Eviews-10, (2022)

The variance decomposition result indicates the dominance of CAFL own shocks in the maiden quarter to the last quarter. CAFL then falls from 98.93% in the maiden quarter to 98.13% which is the last (tenth) quarter. This suggests that EMP and EPU are forecasters of foreign capital inflows. A unit change in EMP account for 0.14% of forecast error variance of CAFL in the second quarter, and the impact appears to increase down to 0.80% in last quarter. A change in EPU accounts for 1.06% of the forecast error variance of CAFL in the initial quarter and the impact appears to increase up to 1.08% in the last (tenth) quarter. This implies that economic policy uncertainty is a strongest predictor of foreign capital inflows in Nigeria.

Table 10: Results of Variance Decomposition of EMP

Period	S.E.	EMP	CAFL	EPU
1	32.06178	100.0000	0.000000	0.000000
2	38.33099	97.16006	2.038832	0.801106
3	39.29723	94.65948	4.490039	0.850480
4	39.53376	93.57864	5.580858	0.840502
5	39.64169	93.33037	5.828865	0.840763
6	39.66895	93.29654	5.863495	0.839967
7	39.67220	93.29152	5.867648	0.840837
8	39.67295	93.28805	5.868284	0.843661
9	39.67360	93.28509	5.868394	0.846512
10	39.67403	93.28306	5.868381	0.848561

Source: Computed from Eviews-10, (2022)

The outcome of the variance decomposition reveals that EMP own shocks overshadow others shocks right from the maiden quarter to the last quarter; after which, it declines from 100.00% in the first quarter to 93.28% in the tenth quarter. This implies that CAFL and EPU are the forecasters of EMP in Nigeria. It is observed that a unit change in CAFL reports 2.04% of the sensitivity of EMP in second period, this impact appears to progress significantly to 5.87% in the last quarter. For EPU, a change in EPU results into 0.80% of sensitivity (forecast error variance) of EMP in the second period and the impact appears to accelerate up to 0.85% in the last time horizon. This implies that foreign capital inflows predict exchange market pressure more than EPU in Nigeria.

5. Conclusion and Policy Recommendations

The results of this study concluded that global economic uncertainty Granger stressed the Nigerian foreign exchange market from the middle to extreme quantiles. Uncertainty in the global economic policy has been shown to put pressure on the Nigerian foreign exchange market by reducing foreign capital inflow. The impact of global economic policy uncertainty on foreign exchange market pressure through foreign capital inflows has important policy implications for currency management and macroeconomic stability in Nigeria. It negatively affects foreign direct investment with its positive spillovers in Nigeria such as employment creation, transfer of technology, managerial skills and transfer of capital for enhanced economic growth. Again, it affects foreign portfolio investment in Nigeria, this in turn affects the performance of the stock market with its attendant consequences on domestic investment and management of exchange rate in Nigeria. Given these negative implications of foreign exchange market pressure precipitated by global economic policy uncertainties via foreign capital inflows in Nigeria, this study makes the following recommendations:

That there should be deliberate policy that is aimed at increasing domestic production and exports of non-oil goods and services, this will increase the economy's supply of foreign exchange and consequently reduce the pressure on Nigeria's foreign exchange demand. To do this, the government must inject developmental funds into the development banks such as Bank of Industry, Bank of Agricultural, Nigerian Export-Import Bank, NIRSAL microfinance bank to support agri-business, manufacturing sector as well as the small and medium scale Enterprises. If the domestic production of agricultural products and manufacturing products are enhanced, Nigeria can leverage on the opportunities of the Free Trade Area Agreements to increase her non-oil exports to other countries and continents.

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