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The Impact of Fixed and Floating Foreign Exchange Rates on Inflation Rates in Nigeria: Statistical Evidence

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Abstract

Most statistical applications to modeling and forecasting macroeconomic variables do attempt to provide the best model that explains the relationship between these variables. In this study, application is performed with the view to provide explanation to the impacts of the stable (fixed) and also unstable (floating) foreign exchange (Forex) market on inflation rate in Nigeria. The stable Forex is represented by a stationary process while the unstable Forex market is represented by non-stationary process. Using the Box-Jenkins Seasonal Autoregressive Integrated Moving Average with exogenous variable (SARIMAX) approach, the results showed that fixed exchange rate market has the tendency to stabilize inflation in a developing economy as there would be a reduction of approximately 50% in inflation rate in Nigeria when Forex is regulated, and that macroeconomic variables are suitably predicted when they are generated through a stationary process.

Keyword: Stationary process, Inflation, Fixed forex, Floating forex, SARIMAX

Introduction

Inflation is a quantitative measure of the rate at which the average price level of a basket of selected goods and services in an economy increases over a period of time. It indicates a decrease in the purchasing power of a nation's currency [1]. As a critical economic variable, it interacts jointly with many other factors, including economic growth, employment, exchange rates, gross capital formation and many more. Inflation is also seen as a sustained rise in the average price of goods and services over time based on prices of goods that are commonly consumed by the public [2]. It is measured using the Consumer Price Index (CPI) which is the current price of a collection of goods and services in terms of the same period prices in the previous year [3].

Consumer price index measures indicate the relative movement in the general prices of goods and commodities consumed by the public relative to a base period, being made up of a basket of consumables. It is the general measure of the level of inflation existing in the economy and its impact on the living standards of the people.

According to European Parliament briefing of 2021 (www.europarl.europa.eu) on the subject, inflation index is one of the most important economic indicators affecting daily lives of people and organization. This is because, when prices increase significantly, the purchasing power of individuals, households and firms' declines and this makes it difficult for people and firms to plan to save or invest and may eventually lead to an impairment of trust and confidence in a currency.

Exchange Rate on the other hand is the rate at which the currency of one country is being exchanged for that of another country or the relative price that indicates the price of one currency in terms of another currency. [4] defined it as the currency that can be exchanged as one unit of another currency, or the value of currency with another currency. [5] had earlier noted that when the exchange rate is defined as the rate of change between two national currencies increases, the overall level of prices in the economy will also increase and when the exchange rate falls, the domestic currency appreciates, and prices are expected to fall in the general level.

Similarly, [1] noted that if a country increases her exposure to foreign marketplaces, its inflation will become worse as it has impact on the cost of living, the cost of doing business, borrowing money, mortgages, corporate and government bond yields, and every other facet of the economy.

According to [6], exchange rate changes can affect inflation rate through three different channels. Firstly, exchange rate changes experienced in an open economy affects the relative prices between domestic and foreign goods. Secondly, it affects the prices of imported final goods in terms of national currencies and thirdly, it affects nominal wages through the impact of imported middle prices in terms of local currency.

According to [7], Nigeria has operated two exchange regimes: fixed exchange regime from 1960 to 1986 and floating exchange rate regime from June 1986. Between April 1974 and late 1976, the monetary authorities pegged the naira to whichever currency was stronger in the foreign exchange market, either the US dollar or the British pound sterling ([8], [9]). Prior to the introduction of the second-tier foreign exchange market, the management of foreign exchange was through a fixed exchange rate regime with the aim to ensure price stability, which was necessary for imports of capital goods for the development of the domestic economy. [10] noted that adoption of floating exchange rate regime followed the collapse of the fixed exchange regime and was formalized in January 1976 during the Jamaican meeting of the IMF (International Monetary Fund) members where rules for the International Monetary system in place today were agreed. [11] noted that although floating exchange rates does reflect the true value of a currency as against fixed rates which are arbitrary and tend to be favour developed nations than developing nations.

In Nigeria, [12] reported on how Forex impact trade noting that because the economy has been in a slump due to inflation rate, among others, and also, the unsettling exchange rate which he sees as a major issue affecting Nigeria's economy because of the weak naira in relation s to Forex as Naira weakening can no longer be controlled. This has caused increase in exchange expenses and prices which in turn, limits production capacity. By implication, the fast-increasing prices in marketplace is seen to be induces by the fast-increasing rate of foreign exchange rate.

Earlier, [13] had analyzed the relationship between exchange rates and inflation and presented a theoretical argument on the exchange rate−inflation nexus in the context of monetary policy credibility that, a fixed or stable exchange rate policy could make easier the task of the monetary authority in lowering inflation by increasing credibility. This argument was also upheld by [14] and [15] who contended that a stable exchange rate regime provides not only price stability but also increase the efficiency of monetary policy. Similarly, [16] pointed out that a fixed exchange rate regime increases the credibility of monetary policy, contribute to having lower rates of inflation by creating a confidence effect on domestic currency rather than foreign currencies

However, in the floating exchange rate regime, unlike the fixed one, there is overshooting of the equilibrium exchange rate in both directions and then, cause prices to go up by increasing the domestic prices of imported goods when depreciation occurs. Thus, it can be claimed that inflation is likely to be higher under a floating exchange rate regime in relation to a fixed one [13]. Furthermore, [17] argued that fixed exchange rates are less inflationary and the anti-inflationary benefit is heavily dependent on the monetary stability and credibility of the regime, which needs to be carefully built in a stable economy.

[18] studied with a large dataset for 71 countries, 52 of which were developing countries, covering the period 1979-2000. They examined the pass-through effect of inflation and found that it runs from exchange rates to domestic prices. Specifically, they drew attention to the fact that the pass-through effect is subject to the inflation regime and so, it is more significant in countries with higher inflation, purporting that the higher inflation, the higher the pass-through effect.

[19] examined the extent to which changes in exchange rates result in changes in Turkish domestic inflation in order to determine the impact from pre-2003 period to the post-2003, when the exchange rates were allowed to float. Employing monthly frequency data to estimate two impulse-response functions and pass-through coefficients, they confirmed that exchange rate shocks feed into domestic inflation, first at the level of manufacturers' prices and then at the level of consumer prices.

Again, [4] determined the effect of inflation on the value of rupiah in Indonesia in the Islamic finance. Evaluating the data using percentage change in these variables, the result showed that the influence of inflation toward currency exchange occurred because of export decline thereby causing inflation to the value of the rupiah against US dollar. Similarly, [20] investigated the relationship between exchange rates and inflation in Iran. They used the Hendry General to Specific Modeling method and Vector Autoregressive (VAR) model and concluded that as the exchange rate increases, the inflation rate also increases.

[21] assessed the main drivers of inflation in Ethiopia and Kenya by developing single-equation error correction models for the CPI in each country. The study took into account a number of potential sources of the recent surge in inflation, which included excess money supply, exchange rates, food and non-food world prices, world energy prices and domestic agricultural supply shocks. Their findings showed that inflation rates in both Ethiopia and Kenya were driven by similar factors including exchange rates.

The study by [22] investigated the impact of inflation on real exchange rate volatility in Nigeria, using quarterly 181 data items. They used the GARCH (1, 1) model and Granger causality in Vector Auto-Regressive environment and the Granger causality tests. They showed that there is a relationship between imported inflation, real exchange rate volatility and other sample variables and recommended inflation targeting policy to control the fluctuation in the price level as well as other macroeconomic variable that have a direct effect on the exchange rate

Another study by [23] employed the Granger causality and ARDL modeling approach on annual data from 1980 – 2021 to investigate the nexus between inflation and exchange rate in Nigeria. They found the existence of cointegration relationship between inflation, exchange rate, import and GDP as in the short run, exchange rate is found to have positive and statistically significant impact on inflation while in the long run there exist a negative and significance relationship between inflation and exchange rate.

Similarly, [24] investigated the impact of exchange rate volatility on inflation in Nigeria using the GARCH and VECM to ascertain the long run impact. The study found that nominal Exchange rate and money supply has positive impact on Consumer's Price Index (CPI) indicating that inflation in Nigeria is caused by exchange rate fluctuations as well as increase in money supply. Furthermore, [25] examined the effect of exchange rate fluctuation on inflation rate in Nigeria using supporting control variables such as interest rate, money supply, imports and growth of GDP. The OLS and GLS models were developed for data analyses. The results showed that exchange rate and other macroeconomic variables including interest rate, money supply, imports and GDP do not impact on inflation in Nigeria.

[11] in an empirical study of Nigeria's foreign exchange regimes opined that the present system of flexible exchange rates should be fine-tuned to allow for some form of government intervention in fixing exchange rates when the need arises.

Non-Stationarity and Foreign Exchange Instability

Non-stationarity occur when a certain attributes of a time series do vary with time. It is infact a condition where the mean, variance and covariance of a time series change over time thereby making such data not to possess stable behavior. Basically, stochastic time series models are based on the assumptions that the forces exerting on the process generating such series will continue in similar manner. It is therefore, reasonable to employ stability measures before modeling such variables.

A study by [26] pointed at the existence of unit roots in macroeconomic time series and supported it with statistical evidence that the hypothesis of a unit root in the autoregressive representations of a dozen macroeconomic time series existed for the United States. Furthermore, [26] noted that when time series have a unit root, they are better characterized as non-stationary processes that have no tendency to return to a long-run deterministic path. Besides, the variance of the series is time-dependent and goes to infinity as time approaches infinity, which results in serious problems for forecasting. This is to say that non-stationary series suffer permanent effects from random shocks.

Unit root test, according to [27] helps to identify some features of the underlying data-generating process of a series. According to [27], if a series has no unit roots, it is characterized as stationary, and therefore exhibits mean reversion in that it fluctuates around a constant long run mean. It also implies that the series has a finite variance which does not depend on time and that the effects of shocks dissipate over time.

Another study of unit root as a method of detecting financial bubble is due to [28] who examined several works on unit root methods as used in detection of financial bubbles in asset prices noting that fundamental changes in the autocorrelation structure of relevant time series imply the presence of a rational price bubble while [29] studied unemployment using the various unit root tests noting that, if unemployment is defined as a unit root process, policymakers should focus on structural reforms to mitigate adverse shocks. On the contrary, if unemployment is stationary, the goal would be to avoid short-term imbalances as unemployment hysteresis is associated with non-stationary unemployment rates. Thus, if there is a unit root in a series, it suggests that automatic return to a normal trend may not occur.

If a series does not contain a unit root, [30] observed that, the underlying trend is deterministic and the series has a short memory. Thus, the resulting shock has no permanent impact as the series does return to its steady trend. Similarly, [31] had shown that a stationary process has finite variance but a limited memory while a non-stationary process has infinitely long memory and wanders widely. In essence, if Forex is stationarity, it provides indication of its stability in the exchange market.

The problem of modeling the impact and also, the relationship between Exchange rate and Inflation allowing for fixed and floating exchange rates have not been carefully addressed in the case of Nigeria's economy which is the target of this study. This study will also investigate the perception of operators in the open market on the relationship between Naira and Foreign Exchange in US Dollar.

Materials and Methods

This study makes use of secondary data on inflation rate collected from National Bureau of Statistics (NBS) and exchange rate (US Dollar –Nigeria's Naira) data from Central Bank of Nigeria (CBN) statistical bulletin from year (1996:1 to 2019:12). Data analysis The ARIMAX family modeling techniques is utilized in this study.

ARIMAX Model

The ARIMAX model is an extension of Autoregressive Integrated Moving Average (ARIMA) model which combined the AR(p) and the MA(q). The order of integration, d, represents the order of differencing in the model. The ARIMAX model incorporates covariate(s) to the ARIMA model as follows:

The ARIMAX model is of the form

$$\phi_p(B)(1-B)^d y_t = \theta_q(B)\varepsilon_t + \beta x_t \quad (1)$$

While the ARIMAX model taking cognizance of the seasonal effect is given as

$$\phi_p(B)\Phi_P(B^s)(1-B)^d(1-B^s)^D y_t = \theta_q(B)\Theta_Q(B)(B^s)\varepsilon_t + \beta x_t \quad (2)$$

Where the characteristic polynomials ϕ_p, Φ_P, θ_q, Θ_Q are defined as follows:

$\phi(B)=\left(1-\phi_1 B-\phi_2 B^2-\cdots-\phi_p B^p\right)$. , $\theta(B)=\left(1-\theta_1 B-\theta_2 B^2-\cdots-\theta_p B^q\right)$.

$\Phi_P(B)=\left(1-\Phi_1 B^s-\Phi_2 B^{2s}-\cdots-\Phi_p B^{ps}\right)$. ,

$\Theta_Q(B)=\left(1-\Theta_1 B^s-\Theta_2 B^{2s}-\cdots-\Theta_Q B^{qs}\right)$.

for the seasonal and non-seasonal AR(p), MA(q) where B is backshift ε_t is white noise, x_t is a covariate at time t. In this study, a single covariate is used whose coefficient is β. However, it is possible to have two or more covariates in the model. If s = 0 in Equation 2, we have the ARIMA

model specification while for s=0 and d=D = 0, we have the ARMA model specified.
The SARIMAX process takes cognizance of exogenous variables that are inherently seasonal in nature or can be established by any test of seasonality. Thus, Equation 2 can also be described as SARIMAX (p,d,q) (P,D,Q)[S] process.

Test for Stationarity

The Dickey-Fuller test was the first statistical test developed to test for stationarity in a time series data. The Augmented Dickey-Fuller test is given as

$$\Delta y_t = \alpha + \delta t + \beta y_{t-1} + \sum_{i=1}^{n} \gamma_i \Delta y_{t-i} + \varepsilon_t \quad (3)$$

Under null hypothesis H_0, y_t is considered to be *I*(1) which is equivalent to Δy_t being *I*(0) in which case β would be zero. The test statistic is the standard regression *t*-statistic is given by

$$t_\beta = \frac{\widehat{\beta}}{SE_{\widehat{\beta}}} \quad (4)$$

Model Selection Criteria

In choosing the model that best describes a time series data, attention is given to the RMSE, AIC, BIC and AICc. Smaller values indicate better model.
Define the log likelihood as

$$L = -Nln(\sigma^2{}_a) - \frac{SSQ'}{2\sigma^2{}_a} - \frac{2Nln(2\pi)}{2} \quad (5)$$

The Akaike's Information Criterion (AIC) is given as $AIC = -2L + 2N_p$
While the Bayesian Information Criteria is $BIC = -2L + \ln(N)N_p$
Where N = Total number of observations, L= -2 log likelihood, $\sigma^2{}_a$=variance of residuals
Np= Number of parameters$\left(N_p = p + q + d + P + Q + D + m\right)$, SSQ = residuals sum of squares.

Model Diagnostic

The Jarque–Bera test is a goodness-of-fit test of whether sample data have the Skewness and kurtosis matching a normal distribution. If it is far from zero, it signals the data do not have a normal distribution. The test statistic JB is defined as:

$$JB = \frac{n}{6}\left(S^2 + \frac{1}{4}(K-3)^2\right) \quad (6)$$

Where n is the number of observations, S is the sample skewness computed as

$$S = \frac{\hat{\mu}_3}{\hat{\sigma}^3} = \frac{\frac{1}{n}\sum_{i=1}^{n}(x_i - \overline{x})^3}{\left(\frac{1}{n}\sum_{i=1}^{n}(x_i - \overline{x})^2\right)^{3/2}},$$

K is the sample kurtosis given as

$$K = \frac{\hat{\mu}_4}{\hat{\sigma}^4} = \frac{\frac{1}{n}\sum_{i=1}^{n}(x_i - \overline{x})^4}{\left(\frac{1}{n}\sum_{i=1}^{n}(x_i - \overline{x})^2\right)^2}$$

If the data comes from a normal distribution, the JB statistic asymptotically has a chi-squared distribution with two degrees of freedom, so the statistic can be used to test the hypothesis that the data are from a normal distribution.
The Ljung–Box test is a type of statistical test of whether any of a group of autocorrelations of a time series are different from zero. The null hypothesis is that the data are independently distributed against the alternative of dependence. The test statistic according to [32] is:

$$Q = n(n+2)\sum_{k=1}^{h}\frac{\hat{\rho}_k^2}{n-k} \quad (7)$$

Where n is the sample size, $\hat{\rho}_k$ is the sample autocorrelation at lag *k*, and *n* is the number of lags being tested. Under H_0 the statistic Q asymptotically follows a $\chi^2_{(n)}$. For significance level α, the critical region for rejection of the hypothesis of randomness is $Q > \chi^2_{1-\alpha,n}$ where $\chi^2_{1-\alpha,n}$ is the (1 − α)-quantile of the chi-squared distribution with *h* degrees of freedom [33].

Results and Discussions

The results in this study are shown on Figures 1-3 and Tables 1-4.

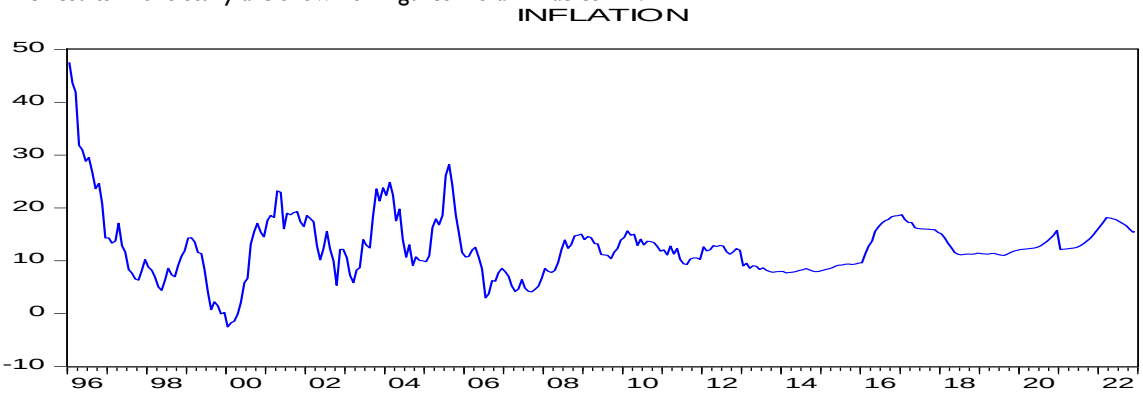

***Figure 1**: Time plot of Nigeria's Monthly Inflation Rates from 1996-2022*

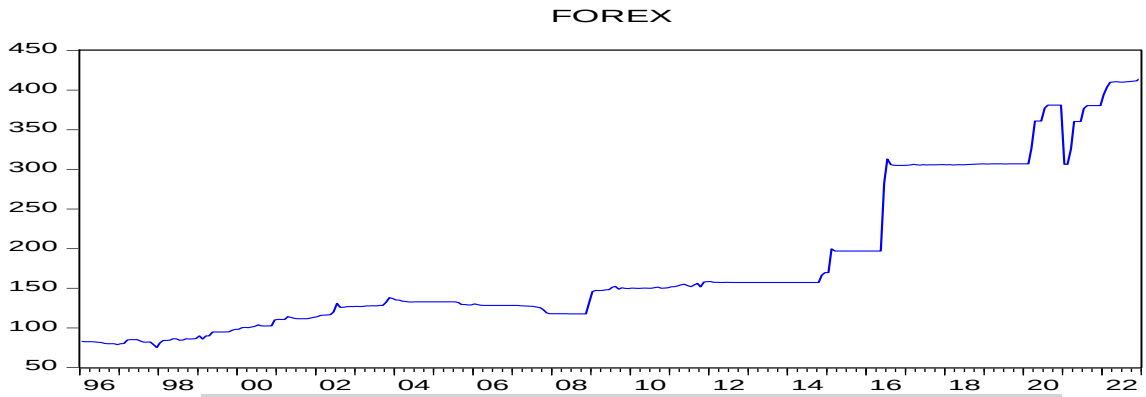

Figure 2: Time plot of Nigeria's Monthly Actual Foreign Exchange Rates from 1996-2022

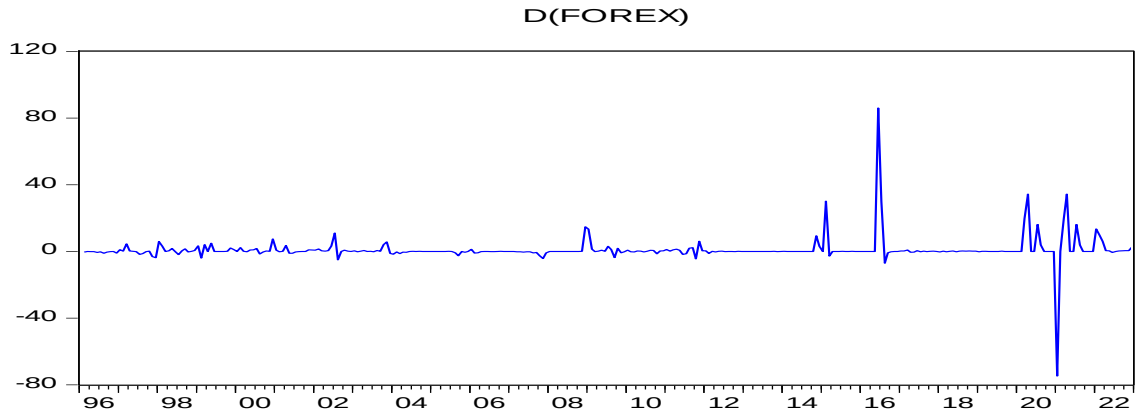

Figure 3: Time plot of Nigeria's FOREX from 1996 - 2022 at First Differences

Table 1: Unit Root Test for Inflation and Forex Time Series

Variable	Levels	t_c	$t_{0.05}$	P	Decision
Inflation	I(0)	-5.684	-3.426	0.000	Reject H0: Stationary at level of data
Forex	I(0)	-1.253	-3.426	0.8969	Do not Reject H0: Unit Root
D(Forex)	I(1)	-13.41	-3.426	0.000	Reject H0: No Unit Root

Table 2: Model Selection and Adequacy Criteria

Model	Forex	D(Forex)
Characteristics	SARIMAX(1,0,1)(1,0,1)$_{12}$	SARIMAX(1,0,1)(1,0,1)$_{12}$
R^2	0.914	0.914
SE-Regression	1.402	1.212
AIC	3.533	3.547
DW	1.985	1.982
RMSE	4.543	4.649
MAE	3.419	3.503
MAPE	226.178	232.082
BG Test (Serial	Significant at 5%	0.1726 (P=0.8415

Correlation)		
BP Test (Heteroskedasticity)	F=13.248, (P =0003)	2.746 (P= 0.100)

Table 3: SARIMAX $(1,0,1)(1,0,1)_{12}$ Model with Forex as exogenous variable

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.58998	0.803157	13.18545	0.0000
FOREX	0.008054	0.003891	2.069748	0.0393
AR(1)	0.935391	0.021977	42.56263	0.0000
SAR(12)	0.208339	0.056990	3.655699	0.0003
MA(1)	0.173417	0.059138	2.932422	0.0036
SMA(12)	-0.952707	0.009937	-95.87743	0.0000
R-squared	0.914432	Mean dependent var		11.96080
Adjusted R-squared	0.913029	S.D. dependent var		4.755661
S.E. of regression	1.402486	Akaike info criterion		3.533474
Sum squared resid	599.9250	Schwarz criterion		3.605624
Log likelihood	-543.4552	Hannan-Quinn criter.		3.562313
F-statistic	651.8800	Durbin-Watson stat		1.985122
Prob(F-statistic)	0.000000			

Table 4: SARIMAX $(1,1,1)(1,0,1)_{12}$ Model with D(Forex) as exogenous variable

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FOREX)	0.004233	0.004796	0.882743	0.3781
C	12.19193	0.322071	37.85478	0.0000
AR(1)	0.946529	0.020949	45.18346	0.0000
SAR(12)	0.208075	0.057379	3.626319	0.0003
MA(1)	0.171483	0.059096	2.901760	0.0040
SMA(12)	-0.950645	0.010522	-90.34939	0.0000
R-squared	0.913557	Mean dependent var		11.95632
Adjusted R-squared	0.912135	S.D. dependent var		4.762693
S.E. of regression	1.411757	Akaike info criterion		3.546712
Sum squared resid	605.8896	Schwarz criterion		3.619033
Log likelihood	-543.7404	Hannan-Quinn criter.		3.575623
F-statistic	642.5535	Durbin-Watson stat		1.981716
Prob(F-statistic)	0.000000			

The time plot of monthly inflation series presented on Figure 1 does not exhibit a deterministic trend and appears to wander and return to its mean. The results of Augmented Dickey Fuller (ADF) unit root tests for inflation series rejected the hypothesis of unit root are rejected at it level. This confirms the stationarity of inflation time series as shown on the time plot [Figure 1].

Forex on the other hand, exhibits systematic trend and does not return to its path as shown on Figure 2. The ADF unit root test results on Table 1 rejects the hypothesis of unit root at its level but failed to reject after the first difference. This result is also shown on Figure 3 for D(FOREX) that, Forex at first difference exhibits mean revision. The non-stationary characteristics exhibit by Forex can be attributed to its instability over time.

The task of fitting forecasting models to predict the relationship between Inflation and Forex or, how Forex has impacted on Nigeria's inflation in this study is based on two considerations. Firstly, the assumption that forex in Nigeria is not regulated and is allowed to float by the market forces which of course, are the current happening in the economy. The second consideration is targeted at determining inflation outcomes in the economy if Forex is fixed or regulated.

After entertaining several ARIMAX family model with Forex as exogenous variable, the SARIMAX $(1,0,1)(1,0,1)_{12}$ provided the "best" estimates of parameters and forecasts when forex is allowed to float as is currently the case.as shown on Table 3. In this case, the coefficient of forex is 0.00805 ($P<0.05$) showing that the impact of Forex on inflation is statistically significant.

The correlogram of the residuals shows that the model provided a good fit as the computed values all fall within the confidence limits. The Breusch Geoffrey Test for serial correlation also confirm there is no serial correlation in the residuals as $F=0.164$ ($P=0.8482$). The Breusch-Pagan Geoffrey Test for heteroskedasticity shows that the residuals are heteroskedastic as $F=13.25$ and $P = 0.0003$. Similarly, the assumption of normality of residuals is rejected ($JB=279.6$, $P = 0.000$).

For the model with DForex on Tables 1 and 4, the SARIMAX$(1,0,1)(1,0,1)_{12}$, with the coefficient of 0.004 is statistically not significant as $P=0.378$. The hypothesis of homoscedasticity is accepted while the hypothesis of the presence of serial correlation is rejected. The result shows that there is a reduction of impact of Forex on inflation rate by approximately 100(0.004/0.00805) or 50% if there is a policy change from allowing market forces to determine forex to having regulated or fixed forex regime

On the issue of non-stationarity of forex in Nigeria's economy, [26] and [27] noted that such behavior suffers permanent effects from random shocks and have no tendency to return to a long-run deterministic path.

Considering the regulated Forex market regime where price are fixed or stable, the reduction on its impact on inflation by about 50% is somehow in line with the views of [13], [17] just as the case of Turkey [19], Iran [20], Indonesia [4] and Nigeria [23]; [24] and [25] just as [28] reported that an early warning tool based on unit root methods provides a valuable accessory in financial stability supervision while [27] asserted that the hypothesis of non-stationarity is robust to the inclusion of breaks.

Conclusion

In this study, SARIMAX $(1,0,1)(1,0,1)_{12}$ has been found to provide the best prediction of inflation rate in Nigeria considering Forex (is allowed to float) as exogenous variable. The findings in this study suggests that foreign exchange (Forex) when uncontrolled, affects inflation in Nigeria as consistently with reported by [23], [24] and [25] among others while [8] suggested preference for fixed foreign exchange (Dforex) for a developing economy in order to combat inflation as it has an insignificant impact on inflation in Nigeria. Thus, there is need for intervention through monetary policy targeted at stabilizing Forex as its volatility, no matter how small has impact on inflation rate in Nigeria.

This implies that controlling forex market operation of dollars will significantly reduce rate of inflation in Nigeria. Policy makers need to look at these among other macroeconomic and social variable that tend to affect inflation in Nigeria with the view to tuning them to stability.

References

[1] Ibrahim, M. (2019). Inflation. https://www.researchgate.net/publication/332763097

[2] Ali, A.K. and Asfaw, D.M. (2003). Nexus between Inflation, Income Inequality and Economic Growth in Ethiopia. *Plosone,* 16(11)

[3] Begg,D; Vernasca, G; Fischer, S and Dornbussch, R. (2014). Economics, 11th Edition. McGraw Hill, London Pp 693.

[4] Purnomo A. (2017). The Effect of Inflation on the Currency Exchange Rate Seen in The Islamic Finance. *Journal Ekonomi dan Perbankan Syariah* http://muqtasid.iainsalatiga.ac.id DOI: http://dx.doi.org/10.18326/muqtasid.v8i1.42-53

[5] Dornbusch, R. (1976). Expectations and exchange rate Dynamics. *The Journal of Political Economy*, 84(6):1161-1176.

[6] Svensson, L.E.O. (2000). Open-economy ınflation targeting. *Journal of International Economics*. (50):155–183.

[7] Okpara, G. C. (2006), Monetary Policy Shocks and Econometric Analysis of Nigerian Experience, *Nigerian Journal of Banking and Finance,* 6. CECTA Nigeria Limited.

[8] Ogiogio, Genevesi O. (1996). A Statistical Analysis of Foreign Exchange Rate Behaviour in Nigeria's Auction" African Economic Research Consortium, Research Paper 49.

[9] CBN (2021). Understanding Monetary Policy Series 8. www.CBN.gov.ng.

[10] Hill, C. N. L. (2005), International Business (Competing in the Global Market Place),McGraw –Hill.

[11] Ajekwe, T., Korna, J. M., and Idyu, I.A. (2013). A Comparative Analysis of the Impact of the Fixed and Flexible Exchange Rate Systems on the Nigerian Economy. *IOSR Journal of Business and Management* 14(3):73-92.

[12] Otori, E. (2023). How Forex Impacts Trade in Nigeria, *Business Day* Newspaper of January 2, 2023.

[13] Barro, R.J. and Gordon, D.B. (1983), "Rules, Discretion, and Reputation in a Model of Monetary Policy", *Journal of Monetary Economics*, 12, July,101-121.

[14] Giavazzi, Francesco and Giovannini, Alberto, (1989), *Limiting Exchange Rate Flexibility*, Cambridge, the MIT Press.

[15] Velasco A., (1996), "Fixed Exchange Rates: Credibility, Flexibility and Multiplicity", *European Economic Review*, 40[3-5], April, 1023-1035.

[16] Ghosh, A.R., Ostry, J.D., Gulde, A.M. and Wolf, H.C., (1997), "Does the Nominal Exchange Rate Regime Matter?" *NBER Working Paper*.5874

[17] Toulaboe, D. and Terry, R. (2013), "Exchange Rate Regime: Does it Matter for Inflation". *Journal of Applied Business, and Economics*, 14(1*) http://www.wtrg.com/prices.htm*

[18] Choudhri, E. U., and Hakura, D. S. (2006). Exchange Rate Pass-Through to Domestic Prices: Does the Inflationary Environment Matter, *Journal of International Money and Finance*, 25: 614-639.

[19] Volkan, A; Satcioglu, C. and Korap, L.. (2007). Impact of Exchange Rate Changes on Domestic Inflation: The Turkish Experience. *Econstor;* www.tek.org.tr. DiscussionpPater2007/6. Pp10.

[20] Monfared, S.S and Akin, F.(2017). The Relationship Between Exchange Rate and Inflation: The Case of *Iran. European Journal of Sustainable Development,* 6(4):329-340

[21] Durevall, D. and Sjo, B. (2012) 'The Dynamics of Inflation in Ethiopia and Kenya'. IMF Working Paper WP/25/66. Online

[22] Okoli, T.M. Mbah, S.A and Agu,O.C. (2016). Exchange Rate Volatility and Inflation: The Nigerian Experience. *Journal of Economics and Sustainable Development*, 7(10)

[23] Abdulhamid, J; Musa, I and Rabiu, S. (2022). Inflation and Exchange Rate in Nigeria *Confluence Journal of Economics and Allied Sciences*, 5(2):130-141

[24] Nuhu, M. (2021). Impact of Exchange Rate Volatility on Inflation in Nigeria. *Journal of Contemporary Research in Business, Economics and Finance*, *3*(1), 26–38. https://doi.org/10.33094/26410265.2021.31.26.38

[25] Ighoroje, J.E and Ogheneovo Orife, C. (2022). Exchange Rate Fluctuations and Inflation Rate in Nigeria: 1987 To 2019. *International Journal of Business and Management Invention* 11(5):01-08

[26] Nelson, C. and Plosser, C. (1982). Trends and Random Walks in Macroeconomic Time Series: Some Evidence and Implications, *Journal of Monetary Economics*, 10:139-169.

[27] Libanio, G.A. (2005). Unit Roots in Macroeconomic Time Series: Theory, Implications and Evidence. *Nova Economia_Belo Horizonte*, 15(3):145-176.

[28] Virtanen, T; Tölö, E; Virén, M and aipalus, K.(2017). Use of unit root methods in early warning of financial crises. European System Risk Board, Working Paper Series, No 45 / June 2017. Pp35

[29] Akay, E.C. Oskonbaeva, Z and Bülbül, H. (2020). What do unit root tests tell us about unemployment hysteresis in transition economies? Applied Economic Analysis 28(84/2):221-238 Emerald Publishing Limited 2632-7627 DOI 10.1108/AEA-05-2020-0048

[30] Darne, O. and Diebolt, C. (2005). NonStationary Test in Macroeconomic Time Series.www.researchgate.net/publication/280149570, 11 September 2015, pp24.

[31] Engle, F. R, Granger, C.W. (1991). Cointegration and Error Correction: Representation, Estimation and Testing. *Econometrica*, 55 (2): 252–56.

[32] Ljung G. M. & Box G. E. P. (1978). "On a Measure of a Lack of Fit in Time Series Models". *Biometrika.* 65 (2): 297–303.

[33] Brockwell, P. J., Davis, R A. M. & Davis, R. J. (2002*). Introduction to Time Series and Forecasting*. p. 36. ISBN 978-0-387-95351-9.

IKUGHUR J.A., UDOUMOH E.F. and ODUNEWU E.A. (2025). The Impact of Fixed and Floating Foreign Exchange Rates on Inflation Rates in Nigeria: Statistical Evidence FUAM Journal of Pure and Applied Science, **5**(**1**):30-37