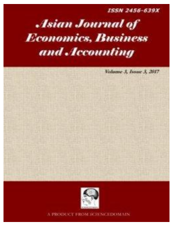

Asian Journal of Economics, Business and Accounting

8(4): 1-9, 2018; Article no.AJEBA.39863
ISSN: 2456-639X

An Empirical Relationship between Foreign Exchange Rate, Inflation and Interest Rate in Nigeria

David Adugh Kuhe[1*]

[1]*Department of Mathematics/Statistics/Computer Science, Federal University of Agriculture, Makurdi, Benue State, Nigeria.*

Author's contribution

The sole author designed, analyzed and interpreted and prepared the manuscript.

Article Information

DOI: 10.9734/AJEBA/2018/39863
Editor(s):
(1) Dr. Maria-Dolores Guillamon, Department of Financial Economics and Accounting, University of Murcia, Spain.
Reviewers:
(1) Vadasan Ioana, West University of Timisoara, Romania.
(2) Senibi K. Victoria, Covenant University, Nigeria.
Complete Peer review History: http://www.sciencedomain.org/review-history/27279

Original Research Article

Received 13 December 2017
Accepted 22 February 2018
Published 17 November 2018

ABSTRACT

This paper investigates the empirical relationship between naira/US dollar exchange rate, inflation and interest rate in Nigeria. The study uses annual time series data from 1970-2017. Augmented Dickey-Fuller unit root test, Johansen cointegration, fully modified least squares; Error correction model and Granger causality test based on Toda-Yamamoto procedure were employed in this study as methods of analysis. The results reveal that all variables are integrated of order one and hence cointegrated. The study finds inflation as having negative and significant impact on exchange rate while interest rate was found to have positive and significant impact on the foreign exchange rate in Nigeria in the long-run. The economic impacts of inflation and interest rate on the exchange rate in the short-run are found to be low, temporal and not long lasting. The ECM model has identified a moderate speed of adjustment by 50.39% for correcting disequilibrium annually for achieving long-term equilibrium steady-state position. The Granger causality test result shows statistical evidence of unidirectional causality between exchange rate and inflation and between exchange rate and interest rate in the short-run. There is also a unidirectional causality that runs from interest rates to inflation meaning that inflation is Granger caused by interest rates in Nigeria. The study recommends that lowering the lending interest rate and targeting inflation to single digit is a better exchange policy strategy for Nigeria.

**Corresponding author: E-mail: davidkuhe@gmail.com;*

Keywords: Exchange rate; inflation rate; interest rate; regression model; granger causality; Nigeria.

1. INTRODUCTION

Nigeria has experienced recent episode of excessive exchange rate volatility leading to a sudden and sharp increase in Nigerian Naira/US Dollar exchange rate in the last two years. International transactions and investment decisions thus became more difficult due to volatile exchange rate because volatility increases exchange rate risk. The exchange rate is defined as the rate at which the currency of one country may be converted into the currency of another country. The exchange rate may fluctuate daily with the changing market forces of supply and demand of currencies from one country to another. A country's relative level of economic health is determined through foreign exchange rate because it provides a window to its economic stability.

Changes in market inflation cause changes in currency exchange rates. A country with a lower inflation rate has greater purchasing power against other currencies and so displays rising currency value or experiences an appreciation in the value of its currency and where the inflation is low, the prices of goods and services will increase at a slower rate. A country with higher inflation typically sees depreciation in its currency and is usually accompanied by higher interest rates. Changes in interest rate affect currency value and dollar exchange rate. Increases in interest rates cause a country's currency to appreciate because higher interest rates provide higher rates to lenders, thereby attracting more foreign capital, which causes a rise in exchange rates.

Exchange rates, inflation and interest rates are closely related to each other. Interest rates are being forged by Central banks to influence exchange rates and inflation which directly affect the inflation and foreign exchange rates. Higher interest rates which are sure to benefit investors attract more foreign investors. This results in the increase in foreign capital with the country and increased foreign exchange rates. There are chances that the effect of increased interest rates is reduced due to other factors. Low-interest rates will create an opposite scenario.

Therefore proper understanding and management of exchange rate determinants such as inflation and interest rate is important in developing sound exchange policies to achieve desired economic growth. Stable exchange rate economies attract foreign investors due to low exchange rate volatility risk associated with such economies. Risk aversion investors never invest in an economy where foreign exchange rate is unstable. To boost up an economy, exchange rate must be managed for this purpose.

A large volume of documented evidence exists in literature concerning the relationship between exchange rate and its determinants. Here we shall look at some of the related works. Looking at the relationship between interest rate and exchange rate, scholars argue that the impact of interest rate differential on exchange rate may be negative or positive, depending on whether the result supports [1] model or the [2] and [3] models. In this regard, the traditional view suggests that an increase in the interest rate would cause a currency to appreciate due to capital inflows for higher returns on domestic assets. While the revisionist view argues that a higher interest rate would cause a currency to depreciate due to a higher default probability, a weaker financial position and a higher exchange rate risk premium [4]. Empirical backings from [5] show that a higher interest rate leads to currency depreciation whereas [6] find that a higher interest rate leads to a currency appreciation. Dekle et al. [4] reveal that a higher interest rate stabilizes depreciating currencies. Gould & Kamin [7] and [8] indicate that no significant evidence in favour of the traditional view that a higher interest rate leads to currency appreciation.

Chowdhury & Hossain [9] conducted a study to analyze the determinants of exchange rates in Bangladesh economy for the period of 1990 to 2011 using simple single-equation linear regression model (SELRM). They used inflation rate, GDP growth rate, interest rate and current account balance as explanatory variables. They found that inflation rate, GDP growth rate, interest rate and current account balance has positive impact on exchange rate. Simon [10] found that exchange rate and current account have a direct and positive relationship with inflation and both exchange rate and current account are the key factors that badly affect the small economies. Eslamloueyan and Kia [11] developed and estimated a model of the real exchange rate for oil-producing countries in the Middle East and North Africa (MENA) for the period 1985–2009. They found that in the long run, money supply, real gross domestic product (GDP), government expenditure, oil price, and external debt influenced the real exchange rate while in the short run, the changes in domestic real GDP, money supply, government expenditure, and U.S. interest rates, as well as the U.S. debt per GDP, were the determinants of the real exchange rate in these countries. Harberger [12] investigated the impact of economic growth on real exchange rate and found no systematic connection between economic growth and real exchange rate.

On using different panel cointegration tests [13] found a long-run relationship between nominal exchange rate and monetary differential, output differential, interest rate differential, and price differential in the newly entered ten EU members and Turkey. Edwards [14] investigated the dynamic association between exchange rate regimes, capital flows and currency crises in emerging economies and established that under the appropriate conditions and policies, floating exchange rates can be effective and efficient. Husain et al. [15] found no robust relationship between economic performance and exchange rate regime in the developing economies. They also found that advanced economies may experience durable and slightly higher level of growth rate without higher level of inflation in flexible exchange rate regime. Due and Sen [16] examined the interactions among real exchange rate, level of capital flows, volatility of flows, fiscal and monetary policy indicators and the current account surplus for Indian economy for the period 1993Q2 to 2004Q1. Their results indicate that the variables were cointegrated and each Granger causes real exchange rate.

From the reviewed literature, it is interesting to know that while different research tools were employed by different researchers in different economies on the subject matter, most of their empirical findings suggest a link between foreign exchange rate, inflation rate and interest rate. This study therefore contributes and extends the existing literature by investigating the empirical relationship between naira/USD exchange rate, inflation and interest rate in Nigeria using more sophisticated statistical tools and more recent data.

2. MATERIALS AND METHODS

2.1 Source of Data

The data used in this work are annual time series data covering the fiscal year 1970 to 2017. The data on Naira/USD exchange rate, inflation rate and interest rate are obtained as secondary data from www.factfish.com.

2.2 Unit Root Test

To determine the order of integration of the study variables, we employ Augmented Dickey-Fuller unit root test [17]. The ADF test regressions with drift are given as:

$$\Delta lnXRATE_t = \beta_0 + \beta_1 lnXRATE_{t-1} + \sum_{j=1}^{k} \theta_j \Delta lnXRATE_{t-1} + \varepsilon_t \qquad (1)$$

$$\Delta lnINFR_t = \gamma_0 + \gamma_1 lnINFR_{t-1} + \sum_{j=1}^{k} \vartheta_j \Delta lnINFR_{t-1} + \varepsilon_t \qquad (2)$$

$$\Delta lnINTR_t = \varphi_0 + \varphi_1 lnINTR_{t-1} + \sum_{j=1}^{k} c_j \Delta lnINTR_{t-1} + \varepsilon_t \qquad (3)$$

where Δ is the first difference operator, ε_t is the random error term which is iid. k is the number of lagged differences. The ADF equations test the following pairs of hypotheses:

$H_0: \beta_1 = \gamma_1 = \varphi_1 = 1$ (the series contains a unit root) against

$H_1: \beta_1 \neq \gamma_1 \neq \varphi_1 < 1$ (the series is stationary)

2.3 Johansen Cointegration Test

We employ Johansen Cointegration test to investigate the long-run relationship between the study variables. This test is applicable only to variables that are integrated of the same order. A Vector Autoregressive based cointegration test methodology developed by [18, 19] is as follows. Consider a VAR of order p:

$$Y_t = \beta_1 Y_{t-1} + \beta_2 Y_{t-2} + \cdots + \beta_p Y_{t-p} + BX_t + \varepsilon_t \quad (4)$$

where Y_t is the k −vector of non-stationary I(1) variables, X_t is the d − vector of deterministic variables and ε_t is a vector of innovations. We may rewrite this VAR as:

$$\Delta Y_t = \Pi Y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta Y_{t-i} + BX_t + \varepsilon_t \qquad (5)$$

$$\text{where } \Pi = \sum_{i=1}^{p} A_i - \boldsymbol{I}, \quad \Gamma_i = -\sum_{j=i+1}^{p} A_j \tag{6}$$

Granger's representation theorem asserts that if the coefficient matrix Π has reduced rank $r < k$, then there exist $k \times r$ matrices α and β each with rank r such that $\Pi = \alpha\beta'$ and $\beta' Y_t$ is I(0). r is the number of cointegrating relations (the cointegrating rank) and each column of β is the cointegrating vector. Johansen cointegration test computes two statistics: trace statistic and maximum eigenvalue statistic. The trace statistic for the null hypothesis of r cointegrating relations is computed as:

$$LR_{tr}(r|k) = -T \sum_{i=r+1}^{k} \log(1 - \lambda_i) \tag{7}$$

The maximum eigenvalue test statistic is computed as:

$$LR_{max}(r|r+1) = -Tlog(1 - \lambda_{r+1}) = LR_{tr}(r|k) - LR_{tr}(r+1|k) \tag{8}$$

where λ_i is the i-th largest eigenvalue of the Π matrix in (6), $r = 0, 1, 2, \ldots, k-1$.

2.4 Cointegrating Regression Model Specification

To investigate the impact of inflation and interest rate on naira/USD exchange rate in Nigeria, we employ a multiple cointegrating regression models using fully modified ordinary least squares (FMOLS). The model is specified as follows:

$$XRATE = f[INFR, INTR] \tag{9}$$

Exchange rate is a function of inflation and interest rate. Our log transformed linear growth model then becomes

$$XlnRATE_t = \beta_0 + \beta_1 lnINFR_t + \beta_2 lnINTR_t + \varepsilon_t \tag{10}$$

where $lnXRATE_t$ represents the log of naira/USD exchange rate at time t, $lnINFR_t$ represents the log of inflation, $lnINTR_t$ represents the log of interest rate, ε_t is the error term assumed to be normally and independently distributed with zero mean and constant variance, which captures all other explanatory variables that influence exchange rate but are not included in the model. β_0 is the intercept of the regression model which represents the predictive value of the dependent variable when all the independent variables are kept constant. β_1, β_2 are the partial elasticity of naira/USD exchange rate with respect to $lnINFR_t$ and $lnINTR_t$ respectively. The study expects the slope coefficient of lnINFR to be positive $(\beta_1 > 0)$ and the coefficient of lnINTR to be positive $(\beta_2 > 0)$ for them to have positive impacts on exchange rate.

2.5 The Error Correction Model (ECM)

The error correction model which integrates the short-run dynamics in the long-run growth function is given by:

$$\begin{aligned} \Delta lnXRATE_t = \alpha_1 & + \sum_{i=1}^{p} \beta_{2i} \Delta lnXRATE_{t-1} \\ & + \sum_{i=1}^{p} \gamma_{3i} \Delta lnINFR_{t-1} \\ & + \sum_{i=0}^{p} \delta_{4i} \Delta lnINTR_{t-1} \\ & + \lambda_5 EC_{t-1} + \varepsilon_{2t} \end{aligned} \tag{11}$$

where EC_{t-1} is the error correction term which provides the feedback and speed of adjustment that indicates how much of the disequilibrium that is being corrected in the system. For a stable long-run relationship to exist among the study variables, the error correction term must be negative and highly statistically significant. The symbol Δ represents the first-differenced form of the variables in the model. The coefficient of the various explanatory variables, $\beta_{2i}, \gamma_{3i}, \delta_{4i}$ are the impact multipliers which measure the immediate impact that a change in the explanatory variable has on a change in the dependent variable. λ represents the speed of adjustment parameter. The value of λ must lie in the range $-1 \leq \lambda \leq 0$ and must be statistically significant.

2.6 Granger Causality Test Based on Modified Wald Test Procedure

In order to test for Granger causality among the study variables, Toda & Yamamoto test procedure is employed [20]. Toda and Yamamoto procedure uses a Modified Wald (MWALD) test for restrictions on the parameters of the VAR (k) model. The model is specified as follows:

$$A_t = \alpha_1 + \sum_{i=1}^{k+d} \beta_{1i} A_{t-i} + \sum_{t-i}^{k+d} \beta_{2i} B_{t-i} + \varepsilon_{at} \tag{12}$$

$$B_t = \alpha_2 + \sum_{i=1}^{k+d} \varphi_{1i} A_{t-i} + \sum_{t-i}^{k+d} \varphi_{2i} B_{t-i} + \varepsilon_{bt} \quad (13)$$

where k is the optimal lag order; d is the maximal order of integration of the series in the system; ε_{at} and ε_{bt} are error terms which are assumed to be white noise. The usual Wald test is then applied to the first k coefficient matrices using the standard χ^2-statistics. The test checks the following pairs of hypotheses: A_t "Granger causes" B_t if $\beta_{2i} \neq 0$ in equation (12) against B_t "Granger causes" A_t if $\varphi_{1i} \neq 0$ in equation (13).

3. RESULTS AND DISCUSSION

3.1 Unit Root Test Results

Unit root test is a modern technique employ in time series to convert nonstationary series to stationary one. Here, we use the Augmented Dickey Fuller (ADF) unit root test procedure. The result is reported in Table 1.

Table 1 report the ADF unit root test result of exchange rate, inflation and interest rate both in levels and in first differences. The test is conducted with intercept (constant) only and with intercept and linear trend. The result shows that exchange rate, inflation and interest rate are all non-stationary in levels. This is indicated by their ADF test statistics being greater than their corresponding critical values of the test at the conventional test sizes, and the P-values in parentheses are not statistically significant as indicated in Table 1.

However, the ADF unit root test of the first differences of the series reveals that exchange rate, inflation and interest rates are all stationary in their first differences. This is indicated by their ADF test statistics being less than the corresponding critical values of the test at 1%, 5% and 10% significance levels, and the P-values in parentheses are highly statistically significant at all the conventional test sizes as reported in Table 1. This means that the study variables are integrated of order one, I(1).

Table 1. Summary of ADF unit root test results

Variable	Intercept only	Intercept and trend	Remark
Log of exchange rate			
Level	-0.2034 [0.9302]	-1.9361 [0.6181]	Non-stationary
1st Difference	-3.7566 [0.0066]**	-5.1902 [0.0007]**	Stationary
Log of inflation rate			
Level	-2.5875 [0.1039]	-2.6917 [0.2451]	Non-stationary
1st Difference	-6.6369 [0.0000]**	-6.6036 [0.0000]**	Stationary
Log of interest rate			
Level	-1.4428 [0.5523]	-1.1399 [0.9097]	Non-stationary
1st Difference	-9.8892 [0.0000]**	-5.3893 [0.0004]**	Stationary

Note: *** denotes significance of the ADF test statistics at 1%, 5% and 10% significance levels. P-values are in parentheses*

Table 2. Johansen cointegration test result

			Trace test		
Hypothesized No. of CE(s)	**H_0**	**H_1**	**Trace statistic**	**Critical value**	**P-value**
None *	$r = 0$	$r \geq 1$	78.74343	29.79707	0.0000
At most 1	$r \leq 1$	$r \geq 2$	9.90962	5.49471	0.0947
At most 2 *	$r \leq 2$	$r = 3$	15.01006	3.841466	0.0001
			Maximum eigenvalue test		
Hypothesized No. of CE(s)	H_0	H_1	$\lambda_{\max}$ Statistic	Critical Value	P-value
None *	$r = 0$	$r = 1$	43.83382	21.13162	0.0000
At most 1	$r \leq 1$	$r = 2$	9.89956	4.26460	0.0958
At most 2 *	$r \leq 2$	$r = 3$	15.01006	3.841466	0.0001

Note: ** denotes rejection of the null hypothesis at the 0.05 level*

3.2 Johansen Cointegration Test

Since the study variables have the same order of integration, we conduct cointegration test using Johansen Cointegration test procedure to determine the long-run relationship between the variables under study. The result of the test is reported in Table 2.

Table 2 reports the summary of Johansen cointegration test result of exchange rate, inflation and interest rate. The result shows that the statistical hypotheses of no cointegration are rejected at $r = 0$ and $r \leq 2$ for both trace and maximum eigenvalue tests. This result confirms the existence of long-run relationship between exchange rate, inflation and interest rate. Both the trace statistics and maximum eigenvalue statistics indicate two cointegrating equations at 5% significance level. This implies that there are two cointegration vectors appearing in the data. It can be concluded that the individual data series are found nonstationary while their linear combinations are found stationary. This also means that exchange rate; inflation and interest rate shared a common stochastic drift and will not wander away from each other in the long-run. They are also bound to vary in sympathy with one another.

3.3 Cointegrating Regression Equation Result

To investigate the long-term impacts of inflation and interest rate on exchange rate, we employ cointegrating regression model of the study variables which explain the relationship. The result of the estimated regression equation is reported in Table 3.

Table 3 depicts a cointegrating regression equation result for the relationship between exchange rate, inflation and interest rate. The estimated regression equation is given by:

$$lnXRATE_t = -6.014076 - 1.150034 lnINFR_t + 4.384197 lnINTR_t \quad (4.1)$$

Equation (4.1) shows that for every 1 unit increase in inflation, exchange rate is predicted to decrease by 1.15 units in log form. Also for a 1 unit increase in interest rate, exchange rate is predicted to increase by 4.38 units in log form. This means that as inflation increases exchange rate decreases and as interest rates increase so does the exchange rate. This also implies that any increment in exchange rate will cause inflation to decrease and interest rate to increase. The intercept has a negative value implying that the predicted value of exchange rate will be less than zero when the values of inflation and interest rates are held constant. The values of the intercept, slope coefficients of inflation and interest rate are all found to be statistically significant at 5% level of significance.

The R^2 value of 0.7081 indicates that about 70.81% of the total variations in exchange rates have been explained by the independent variables. The remaining 29.19% unexplained variability has been accounted for by the error term or by factors not included in the model. The goodness of fit of the regression remained high after adjusting for degree of freedom as indicated by the adjusted R^2 (R^2 adjusted $= 69.35\%$). Durbin Watson statistic value of 2.376112 indicates the absence of serial correlation in the model and that the model is non-spurious. This study has found inflation to have negative impact on exchange rate while interest rate is found to have positive and significant impact on exchange rate in Nigeria.

3.4 The Error Correction Model

Using the residuals obtained from cointegrating regression equation in Table 3, we estimate the error correction model (ECM) which adjusts the speed of disequilibrium in the system. The result is presented in Table 4.

From the estimated ECM the slope coefficients of ΔlnXRATE(-1), ΔlnINFR(-1) and ΔlnINTR(-1) are the short-run equilibrium coefficients whereas the slope coefficient of EC(-1) is the long-run equilibrium coefficient known as the error correction coefficient. Theory expects that this coefficient should be negative and significant.

Table 3. Parameter estimates of long-term relationship

Dependent Variable: lnXRATE		**Method: Fully Modified Least Squares (FMOLS)**			
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**	
C	-6.014076	1.700713	-3.536209	0.0010	
lnINFR	-1.150034	0.389565	-2.952095	0.0053	
lnINTR	4.384197	0.591746	7.408914	0.0000	
R-squared	0.7081	Adjusted R-squared	0.6935	Durbin Wat.	2.376112

Table 4. OLS estimate of error correction model

Dependent variable: ΔlnXRATE				
Variable	**Coefficient**	**Std. error**	**t-Statistic**	**Prob.**
C	0.114367	0.046262	2.472144	0.0182
ΔlnXRATE(-1)	0.156450	0.164611	0.950423	0.3481
ΔlnINFR(-1)	0.072160	0.060633	1.190112	0.2416
ΔlnINTR(-1)	-0.463819	0.359665	-1.289586	0.2052
EC(-1)	-0.503915	0.401143	-2.525715	0.0160
R-squared	0.783825	Adjusted R-squared		0.695590
F-statistic	12.083357	Prob(F-stat.) 0.00102	Durbin Watson	1.952072

The short-run equilibrium coefficients tell us the rates at which the previous period's disequilibrium in the system is being corrected. In our case, the system corrects its previous period's disequilibrium at the speed of 15.65% between exchange rate and exchange rate lag one year, 7.22% between exchange rate and inflation lag one year and 46.38% between exchange rate and interest rate lag one year. All the study variables are not significant at lag one year indicating that the effect of inflation and interest rate on exchange rate is temporal and not long lasting in the short-run.

The one lagged period error correction model is represented by EC(-1). It guides the independent variables in the system to restore back to equilibrium when it is negative and statistically significant. In our case, this coefficient is negative and significant at 5% level indicating that the system corrects its previous period disequilibrium at a speed of 50.39% annually. This means that the ECM model has identified a moderate speed of adjustment by 50.39% for correcting disequilibrium annually for reaching long-term equilibrium steady-state position.

3.5 Granger Causality Test

This section looks at the direction of causality between exchange rate, inflation and interest rate. This has become necessary due to the fact that in some cases an increase in one variable may lead to an increase in another variable but actually, there may be no causal relationship between them. In a bivariate distribution, if the variables have the cause and effect relationship they are bound to vary in sympathy with each other and therefore, there is bound to be a high degree of correlation between them. In other words, causation always implies correlation but the converse is not always true.

To conduct Granger causality test based on Toda-Yamamoto procedure, a two-equation in VAR model is set up in the levels of the data including an intercept in each equation. The various information criteria suggest that we should include a maximum lag length of 4 for each variable as shown in Table 5.

The residuals of the estimated VAR model are tested for serial correlation. The result is presented in Table 6. The null Hypothesis of no serial correlation at lag order 12 is accepted since all p-values are not significant.

This means that the estimated VAR model is dynamically stable. This in effect means that the estimated VAR model can be used to estimate Granger causality test based on Toda-Yamamoto procedure. The result of Granger causality test is presented in Table 7.

Table 5. VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-18.5022	NA	0.0011	1.6946	2.2224*	1.8788*
1	-10.5130	12.8714	0.0012	1.7507	2.6744	2.0731
2	3.2039	19.8133	0.0009	1.4887	2.8083	1.9493
3	10.7502	9.64252	0.0011	1.5694	3.2849	2.1682
4	49.2028	17.5663*	0.0009*	0.9332*	3.8363	1.9464
5	26.6176	10.3380	0.0016	1.6879	4.1952	2.5630
6	15.6715	5.46813	0.0015	1.7960	3.9074	2.5329

Note: ** indicates lag order selected by the criterion*

Table 6. VAR residual serial correlation LM tests

Lags	LM-Stat	P-value
1	5.368282	0.8011
2	3.524338	0.9398
3	2.478073	0.9815
4	9.097188	0.4284
5	9.769742	0.3694
6	8.510433	0.4836
7	2.334584	0.9850
8	14.81229	0.0962
9	2.664028	0.9761
10	9.146214	0.4239
11	3.265785	0.9528
12	7.625370	0.5723

Table 7. Granger causality test result based on toda-yamamoto procedure

Variable	Modified Wald Test		
	lnXRATE	LnINFR	lnINTR
lnXRATE	---	4.491536 [0.6105]	10.25424 [0.1143]
LnINFR	17.81386 [0.0067]**	---	19.904504 [0.0087]**
LnINTR	19.73555 [0.0037]**	6.554093 [0.3641]	---

*Note: ** denotes significant of the test statistic at 5% and 10% levels. Numbers in parenthesis are p-values.*

The result of Table 7 shows a one-way causation that runs from exchange rate to inflation and from exchange rate to interest rate. This means that exchange rate Granger causes inflation and interest rate in Nigeria but not the other way round. There is also a unidirectional causality that runs from interest rates to inflation meaning that inflation is Granger caused by interest rates in Nigeria.

4. CONCLUSION

This paper investigated the empirical relationship between naira/US dollar exchange rate, inflation and interest rate in Nigeria. The study uses annual time series data from 1970-2017. Augmented Dickey-Fuller unit root test was used to determine the unit root and stationarity properties of the series. Johansen cointegration was employed to examine the existence of a long-run relationship among the study variables. Fully modified least squares was applied to investigate the impact of inflation and interest rate on exchange rate; error correction model was used to determine both the short-term and long-term dynamics and Granger causality test based on Toda-Yamamoto procedure was employed to find the direction for causality among study variables. The results of unit root test reveals that all variables are integrated of order one. Johansen cointegration test showed the existence of long-term relationship among variables. The study finds inflation as having negative and significant impact on exchange rate while interest rate was found to have positive and significant impact on foreign exchange rate in Nigeria in the long-run. The economic impacts of inflation and interest rate on exchange rate in the short-run are found to be low, temporal and not long lasting. The ECM model has identified a moderate speed of adjustment by 50.39% for correcting disequilibrium annually for achieving long-term equilibrium steady-state position. The Granger causality test result shows statistical evidence of unidirectional causality between exchange rate and inflation and between exchange rate and interest rate in the short-run. There is also a unidirectional causality that runs from interest rates to inflation meaning that inflation is Granger caused by interest rates in Nigeria. The study recommends that lowering the lending interest rate and targeting inflation to single digit is a better exchange policy strategy for Nigeria.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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