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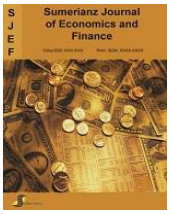

Original Article Open Access

Foreign Exchange Market Efficiency in Nigeria (The Past and Current Exchange Rate Returns)

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Abstract

The foreign exchange market in Nigeria has always been much in contention as to its inefficiency and consequent impact on various sectors of the economy. This study therefore assessed the efficiency of the foreign exchange market in Nigeria, and by extension, test whether the past exchange rate affected the current exchange rate returns. The scope of the study covered the period from 1985 - 2016. The data employed were secondary time-series data. The data were analyzed with two equations and estimated using Fully Modified Ordinary Least Square Approach (FMOLS). The time series properties of the data were tested by the use of ADF unit root test and Co-integration test. The finding of the study revealed that oil price, GDP, inflation rate, and interest rate have positive and significant relationships with exchange rate; while broad money supply (M2) has a negative relationship with exchange rate. Also, previous exchange rate returns has negative and insignificant relationship with current exchange rate returns. The study thereby concluded that the exchange rate market in Nigeria is inefficient. It was therefore recommended the monetary authorities should ensure transparency in determining exchange rate process such that various economic distortions associated with exchange rate can be minimized, and strict monetary policies should be pursued. Also, a properly designed and execution of fiscal and monetary policies should be adopted and diversification of the economy a priority.

Keywords: Foreign exchange rate; Inflation rate; Interest rate; Money supply; GDP.

1. Introduction

The efficiency of the foreign exchange market has been a long standing contentious issue in most literatures, regardless of the economy. This explains the important role of the foreign exchange market in the development of an economy financial and goods markets. The foreign exchange market provides the physical and institutional structure through which the money of one country is exchanged for that of another country, the rate of exchange between currencies is determined, and foreign exchange transactions are physically completed (Mohammad and Zahra, 2013). Foreign exchange market efficiency is an important consideration for all currency market participants in an economy. The evolution of the foreign exchange markets in Nigeria up to its present state has been influenced by a number of factors which include the changing pattern of international trade, institutional changes and structural shift in production (Ochei *et al.*, 2016).

However, the efficiency of the foreign exchange rate markets means the current rate is hypothesized to incorporate all the information in past rates. Especially, market efficiency implies zero serial correlations in exchange rate changes. According to Ahmad *et al.* (2012), a foreign exchange market is efficient if fully reflect all available information. A weaker-form efficient market, according to Jensen (2001), is an efficient market which reflects information up to the point where the marginal benefit of information does not exceed the marginal cost of collecting it.

The Nigerian economy over the years has introduced different foreign exchange rate policies, fixed and flexible exchange rate system. Calvo and Carmen (2000), one of the problems of flexible exchange rates in Nigeria is the inability to tackle the problem of speculation headlong given the level of informal financial sector that powers the economic sector. The flexible exchange rate system has therefore resulted to the emergence of parallel market, increase in the general price level and depreciation of the naira (Ochei *et al.*, 2016). The persistent depreciation of the exchange rate as a result of the inefficiency of the foreign exchange market trended with major economic variables. Accordingly, the available statistics from the central bank of Nigeria (CBN) statistical bulletin indicated that during periods of high inflation rate, volatility in the exchange rate was high, which was also reversed in a period of relative stability. For instance, while the inflation rate moved from 6.9 per cent in 2000 to 18.8 per cent in 2001 and 15.7 per cent in 2016 respectively, the exchange rate moved from ₦101.0 to$1 in 2000 to ₦111.03 in 2001, N253.49 to a dollar in 2016 and 361.12 in 2017. When the inflation rate dropped from 29.27 per cent in1996 to 10.00 per cent and 6.93 per cent, in 1998 and 2000 respectively, and rose thereafter to 18.87 per cent in 2001 and averaged 15.70 per cent in 2016, the exchange rate trended in the same direction. A similar trend was observed with other macro-economic variables like interest rate, and broad money supply (M2). A tentative conclusion emerging from the trend analysis is that exchange rate movements engender inflation and macro-economic indicators. More so, it can be submitted that the foreign exchange market in Nigeria are shrouded in mystery, one reason for it is that a considerable amount of foreign exchange market activity does not appear to be related directly to the needs of international trade and investment, indicating an inefficient exchange rate market in Nigeria.

However, in Nigerian economy, it has always been much in contention as a result of foreign exchange market inefficiency, volatility and consequent impact on various sectors of the economy, especially, manufacturing and productive sectors that can enhance the growth of the Nigerian economy. Much so, it has equally affected the continuous depreciation of the Naira in recent time, which has played a major role in the financial landscape of the country (Ismail, 2009). All attempts made at ensuring the efficiency of the exchange rate market, much problems still exist. For instance, the Nigerian government's inability to meet the demand for foreign currency for various needs and its interference in the operation of the market has resulted in the creation of parallel markets for foreign exchange (Sanusi, 2004).

The inadequate supply of foreign exchange by the monetary authority (CBN) has promoted the parallel market for foreign exchange and created uncertainty in foreign exchange rates market in Nigeria. Looking at the relationship between the forward rate and the corresponding expected future spot rate, and the methodology for testing the efficiency of the exchange market, previous tests of this relationship have been critically dependent on the assumed model of exchange rate determination used in the tests. As all tests of market efficiency (Kanas, 2007) are really tests of the joint hypothesis of market efficiency and the validity of the assumptions necessary to conduct the tests, uncertainty regarding the true model of exchange rate determination casts doubt upon the results of previous tests. Most previous tests (Boughton, 2003; Moosa, 2007) of this type also have suffered from the additional problems that they have been limited to Small number of independent observations. Hence, previous studies have failed to establish the relationship between the current and past exchange rate returns and limited studies are done on Nigeria economy. Also, most existed studies to tests for the efficiency of the foreign exchange market have focused on use quarterly data which are less reliable time series data for such study and the existing empirical studies about the efficiency of the foreign exchange rate market does not bring to a unique conclusion. The needs for this study is to identified and corrected the cause of the unstable exchange rate of the naira, this is so because if the unstable exchange rate of naira is proved to be affecting the macro- economy major variables badly, including exchange rate, interest rate, inflation rate, gross domestic product and oil price, attempts should be made to stabilize the exchange rate in order to make the market to be efficient. This is because these variables are gauge for the measurement of growth and development of the economy. This study filled this gap and produced the results and identified policies that can bring about realistic exchange rate system in Nigeria. This study therefore assessed the efficiency of the foreign exchange market in Nigeria, and by extension, examined the effect of the current exchange rate returns and past exchange rate returns on the selected macro-economic variables.

2. Literature Review

The Nigeria foreign exchange rate policy objectives are to preserve the value of the domestic currency, maintain a favorable external reserve position and ensure external balance without compromising the need for internal balance and the overall goal of macro-economic stability. In an attempt to achieve optimal level of foreign exchange efficiency, several policy guidelines and requirement were introduced to manage the nation foreign exchange market. Remarkable among the prominent policies emerged in 1986 upward when Nigeria shift to market oriented economy with a view to promoting productive sector and enhance the facilitation of foreign direct investment (FDI) influx into the country. Prior to the introduction of structural Adjustment Program (SAP) in 1986, naira (Nigeria Currency) enjoyed appreciation value against US dollar a factor that creates opportunity for rapid economic growth and stability. With the introduction of new economic programs, the country began to suffer unstable exchange rate that cause a high degree of uncertainty in the Nigeria business environment.

According to Obadan (2006), the spot foreign exchange market is the market where currencies are bought and sold for immediate delivery or delivery within a few working days. According to Paul and Lindert (2002), the spot foreign exchange market is a market for immediate delivery. It serves as a clearing function, permitting payment to be made between entities who want to hold or use different currencies. The exchange rate used in the spot foreign exchange market is called spot exchange rate. According to Jhingan (2007), the spot exchange market is the market where the delivery of foreign exchange has to be made "on the spot" usually within two days of the transaction. The exchange rate at which the transaction takes place is called the "spot rate" the spot exchange rate is determined by immediate market demand and supply for foreign exchange.

Authors like Dornbush (2008), and Frenkel (2001), concluded that the best way to estimate the foreign exchange rate market efficiency is to presume that the behaviour is due to interest rate differentials and any difference between forward and spot exchange rates at a time which resulted from the arrival of new information which agents have not predicted to test the efficiency of the exchange rate market. Baillie (2011), on the other hand estimated the presence of news in the exchange rate market in some developing countries, including Nigeria. The study used a different approach that specified a complete multivariate time-series model with OLS regression technique, rather than single equation estimation. The analysis on Nigeria revealed a negative relationship between exchange rate and inflation rate, interest rate, but a positive relationship with GDP and concluded that the exchange rate market was not efficient.

Sarno (2005), using multiple regression analysis in some selected African countries like Ghana, Guinea, Morocco, Nigeria, and Ethiopia. The study found out that in an efficient market, forward exchange rate happened to be an unbiased predictor of future spot exchange rates. The underlying theory behind this relationship is the uncovered interest-rate parity (UIP). Under the UIP theory, the interest rate advantage of one currency over another is expected to be offset by an opposing movement in the exchange rate of similar quantum as the interest-rate differential between the two currencies. As dictated by the covered interest-rate parity (CIP), the interest-rate differential between two currencies is reflected in the difference between the spot and forward exchange rates of the

particular pair of currencies (also known as the forward premium). Hence the foreign exchange market efficiency was tested and justified by regressing the changes in spot exchange rates on the corresponding lagged forward premium.

Ahmad *et al.* (2012), conducted an efficiency test on 12 Asia Pacific currency markets using both the Fama regression and Johansen (1991), cointegration technique. Their results were generally consistent with the literature and following these conflicting findings, reconciliation is provided through the adoption of Pilbeam and Olmo (2011), models. Once all the results are put into perspective, the study concluded that the foreign exchange markets are generally efficient in the whole period but there are signs of inefficiency in certain intermediate periods. The finding of changing market efficiency condition is supportive of the adaptive market hypothesis which states that the state of market efficiency is never constant but ever-changing.

Aroskar *et al.* (2004), with the use of cointegration technique extensively tested for the across-country market efficiency in which the spot exchange rate series of several currencies were tested for cointegration. In contrast to the within-country efficiency test, the finding of study in an across-country setting implied market inefficiency as a cointegrated system indicating predictability of one currency from another currency.

Phengpis (2006), compareed between the EMSC of 1992 and the AFC of 1997 and reports that the disturbance to foreign exchange markets efficiency seems stronger in the former period. However, the study cautioned that the results are not stable and cointegration may not be a useful test for market efficiency. Instead of focusing on market efficiency, Phengpis and Nguyen (2009), use the cointegration technique to infer monetary relationship among different countries. They find that the British pound (GBP) and Danish krone (DKK) are informal members of the European Monetary Union (EMU) as evidenced by strong cointegrating relationship of these two currencies with the EURO. Kühl (2010), attributed the finding of cointegration in major exchange rates followed the introduction of the EURO. Even though cointegration is identified in some of the Euro exchange rates, the no-arbitrage condition usually holds and this is testament to market efficiency.

Aroskar *et al.* (2004), investigated the impact on foreign exchange market efficiency of the European financial market crisis in 1992 by studying pre-crisis, crisis, and post-crisis periods. The results above show that market inefficiency is strong. Giannellis and Papadopoulos (2009), propose an alternative way of testing FOREX efficiency for developing countries. The paper finds that no evidence of nonlinear adjustment in the misalignment series. Beside, linear unit root tests imply that the Poland/Euro FOREX market is efficient; the Czech/Euro FOREX market is not, while the Slovak/Euro FOREX market is quasi-efficient.

Chiang (2010), used three methods to re-examine the validity of the weak-form efficient market hypothesis for foreign exchange markets in four floating-rate markets in Asian economies (Japan, South Korea, Taiwan and the Philippines). The study showed that the random walk patterns of the exchange rate return rate series cannot be rejected, except Taiwan, where inefficiency is shown to be most prominent. The paper concludes that the foreign exchange markets in Japan, South Korea and the Philippines are weak form efficient, while the foreign exchange market of Taiwan is inefficient.

From the foregoing review of empirical literature, some conclusions were drawn, the analyses of the test of exchange rate market efficiency were ambiguous due to the diversity of theoretical foundations employed in the studies. However, differences in the analytical framework made the results to be diverse and led to inconclusive findings. The gap in the literatures is considered to be wide and perhaps there are little studies conducted on the subject matter in Nigeria.

3. Theoretical Framework and Methodolgy

The framework of the study was built on the flexible-price monetary model (FPMM) attempts to demonstrate how changes in the supply of and demand for money both directly and indirectly affect exchange rates. In line with Rosenberg, assume the following: a two-country global economy -- a domestic country (Nigeria) and a foreign country (USA); money supplies (m) in the two countries are exogenously determined by the respective central banks; real demand for money (m-p) is determined by the level of income (y) and the level of interest rate (i) and that their respective elasticities are the same in both countries. Following Sarno and Taylor in discrete time and utilizing time subscripts for emphasis, and asterisks to denote foreign variables and parameters, monetary equilibrium is achieved when the supply of and demand for money in each country are equalized as given by:

$$m_t = p_t + \beta y_t - \theta i_t \quad \ldots\ldots (1)$$
$$m^*_t = p^*_t + \beta^* y^*_t - \theta^* i^* t \quad \ldots\ldots (2)$$

Further, it is assumed that the domestic interest rate is predetermined in the world markets because of the implicit assumption of perfect capital mobility. In addition, assume that purchasing power parity (PPP) holds continuously:

$$e_t = p_t - p^*_t \quad \ldots\ldots (3)$$

Equating (1) and (2) would suggest the quantity theory of money which postulates that a country's price level is determined by the supply of money relative to the demand for money. Thus, if equations (1), (2), and (3) are combined, the result is the solution for the nominal exchange rate of the FPMM version:

$$et = \alpha (m - m^*)_t - \beta(y - y^*)_t + \theta(i - i^*)_t \quad \ldots\ldots (4)$$

where, α, β, θ are parameters.

Expectations could be introduced in equation (4) since the nominal interest rate consists of real interest rate and the expected inflation rate:

$$i_t = r_t + \pi^e_t \quad \text{.....(5)}$$
$$i^*_t = r_t^* + \pi^e{}^*_t \quad \text{.....(6)}$$

where r_t and rt* are the domestic and foreign real interest rate and π^e_t and $\pi^e{}^*_t$ are the expected rates of domestic and foreign inflation, respectively. Supposing that real interest rates are equalized in both Nigeria and USA for instance, then

$$i_t - i^*_t = \pi^e_t + \pi^e{}^*_t \quad \text{.....(7)}$$

Thus, substituting equation (7) in equation (4) provides a more specified flexible-price monetary model (FPMM) of exchange rate determination in the form of:

$$e_t = \kappa + \alpha\,(m - m^*)_t - \beta(y - y^*)_t + \theta(\pi^e_t - \pi^e{}^*)_t + u_t \quad \text{.....(8)}$$

where κ is an arbitrary constant and u_t is a stochastic term.

Equation (8) implies that an increase in the domestic money supply relative to the foreign money stock induces a depreciation of the domestic currency relative to the foreign currency (a rise in e_t). Also, ceteris paribus, an increase in domestic real income produces an excess domestic money demand. In order to increase their real money balances, spending by domestic residents decreases and prices fall until the market clears. Given the PPP, the fall in domestic prices assuming foreign prices constant, suggests an appreciation of the domestic currency relative to the foreign currency.

In equation (8), a relative rise in domestic interest rates which reflects an increase in domestic inflationary expectations, will lead to a depreciation of the domestic currency

3.1. Model Specification

The model adopted for the study was specified in line with the Flexible-Price Monetary Model (FPMM), and the empirical work of Baillie (2011). The analysis follows a two-stage approach. The first is to analyze the relationship between the current and past exchange rate returns. The model for the analysis is presented as:

$$EXR_t = X_0 + X_1 EXRt_{-1} + X_2 EXR_{mt} + X_3 EXR_{mt-1} + U \quad \text{.....(9)}$$

Where:
EXR_t = current exchange rate returns on selected trading currencies at period‘t’
EXR_{t-1} = previous exchange rate returns on selected trading currencies at period‘t-1’
EXR_{mt} = return on the aggregated foreign exchange market transaction at period‘t’
EXR_{mt-1} = previous return on the aggregated foreign exchange market transaction at period‘t-1’
X_{0-3} = regression parameters
U = error term

The a priori expectation from this model is that all the independent variables, EXR_{t-1}, EXR_{mt} and EXR_{mt-1}, be positively related to the dependent variable (EXR_t).

In the same vein, the relationship between exchange rate and other macroeconomic variables are estimated using the following model:

$$EXR = f(Oil, GDP, INF, INTR, M_2) \quad \text{.....(10)}$$

This model is further specified in log-linear form so as convert the variables to the same unit, and ensure robustness of the model as follow:

$$LEXR = \beta_0 + \beta_1 LOil + \beta_2 LGDP + \beta_3 LINF + \beta_4 LINTR + \beta_5 LM_2 + \mu \quad \text{.....(11)}$$

Where:
LEXR = log of exchange rate
LOil = log of oil price
LGDP = log of gross domestic product
LINR = log of interest rate
LM_2 = log of broad money supply
β_0 - shift/ constant parameter β_1, $\beta 2$, β_3, $\beta 4$ and $\beta 5$ are parameters co-efficient of the respective independent variables
μ = error term

3.2. Estimation Technique

This study employed the use of the Fully Modified Ordinary Least Square method (FMOLS). This econometrics technique FMOLS was originally proposed by Phillip and Hansen (1990). The method employs the semi-parametric

correction to eliminate the long-run correlation between the cointegrating equation and the innovations. Fasoranti and Akindele (2015), the FMOLS is to provide optimal estimates of Co-integration regression. The basic idea of the FMOLS approach is to account for the serial correlation and test for the endogeniety in the regressors that result from existence of cointegrating relationship. Chaifik and Younce (2012), to apply the FMOLS for estimating long-run parameters, the condition that there exists a Cointegration relation between a set of 1(1) variables must be satisfied. Therefore we have to confirm the presence of the unit root and test the Cointegrating relationship.

The co-integration techniques demonstrate the long run relationship of the estimated equations, the techniques will also demonstrated that, if two time series variable are co-integrated after differencing, that is, there is a meaningful long-run relationship between them. The Johansen (1991), cointegration approach can determines the number of cointegrated vectors for any given number of non-stationary variables of the same order (Fasoranti and Akindele, 2015). The augmented Dickey-Fuller unit root test (ADF) is an approach for testing the existence of unit root in the time series. The objective of applying the Augmented Dickey-Fuller unit root test(ADF) for individual series included in the model is provide evidence as to whether or not the variables used in the regression process are stationary and to indicate the order of integration.

3.3. Sources of Data

The data used in this study is a group of selected economic and financial indicators in Nigeria from already processed data (secondary source of data), CBN (central bank of Nigeria) statistical bulletin (2016), CBN annual reports and CBN online data base. The major limitation of this study is the inaccuracy and inconsistency associated with data generated from Nigeria agencies. This is because data generation and processing is still at its fancy in Nigeria.

4. Empirical Results

The part of the study presents the result and interpretations of our analyses. The empirical analysis of the study began the stationarity test (unit root test) of the variables in the model, then followed by others econometrical tools (Cointergration and Fully modified ordinary least square method).

4.1. Unit Root Test

Table-4.1. Unit Root Test

Variable	Augumented Dickey Fuller Test	1% Level Critical value	5% Level Critical value	Probability value	Level of Integration
EXR	-5.449313	-3.646342	-2.954021	0.0001	1(1)
Oil	-6.102686	-3.646342	-2.954021	0.0002	1(1)
GDP	-4.716722	-1.953858	-2.653401	0.0000	1(1)
INR	-3.380936	-3.689194	-2.971853	0.0205	1(1)
M2	-5.370168	-2.650145	-1.953381	0.0000	1(1)

Source: Author's computation

Table 4.1 reports the result of the Augmented Dickey-Fuller (ADF) unit root test. The result revealed that the ADF value is greater than the critical t-value at 95% level of significance for the five (5) of the variables (EXR, Oil, GDP, INR and M2) in their first differenced, 1(1). In summary, the implication of these is that the five variables are integrated together in the same order, as this is the first sign of a long run relationship between the variables and the condition for a cointegration test is met.

4.2. Cointegration Test Result

Since, the condition to carry out the cointegration test was statisfied after determined the number of cointegration vector for the number of non-stationary variables of the same order, it examined whether or not there is at least one linear combination of cointegation in the long run.

Table-4.2. Cointegration Test

Hypothesized N0. Of CE(s)	Eigenvalue	Trace Statistic	0.05 Ctitical Value	Prob ***
None *	0.781115	109.4335	59.56661	0.0000
At most 1 *	0.546731	53.01357	44.92812	0.0126
At most 2 *	0.421974	39.52116	27.60149	0.0274
At most 3*	0.312886	19.84135	13.66825	0.1322
At most 4	0.004221	0.017915	2.197633	0.7911

Source: Author's computation

The table 4.2 represents the cointegration test as it shown that there were four (4) cointegrated equations in the model at 5% critical value based on the fast that the trace statistic is greater than the critical value at 5%. This is now the confirmation of the unit root test in order of integration that exchange rate, oil price, gross domestic product, interest rate and money supply cointegrated in the long run at the same speed, and so, there exist a long run equilibrium relationship between all the variables in the model.

4.3. Fully Modified Ordinary Least Square Method Result (Fmols)

The condition to apply FMOLS for estimating long-run parameters was satisfied as there existed cointegration relations between a set of 1(1) variable. As the condition was satisfied with the result of the unit root and cointegration test, this is when is appropriate to proceed for the FMOLS analysis.

4.4.1. Relationship between Exchange Rate and Macro-Economic Variables

Table-4.4.1. Relationship between Exchange Rate and Macro-Economic Variables

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-49.18969	27.88284	-1.764156	0.0830
LOIL	0.377072	0.230638	1.634907	0.1075
LGDP	0.210105	6.081306	3.631155	0.0006
LINF	0.819668	0.623545	2.918262	0.0050
LINTR	0.595611	0.982252	3.660578	0.0005
LM2	-0.613305	3.648306	-2.919111	0.0050
R-squared	0.693117	Mean dependent var	116.0498	
Adjusted R-squared	0.652053	S.D. dependent var	39.78735	
S.E. of regression	24.71676	Sum squared resid	9.341900	
Durbin-Watson stat	1.470337	Long-run variance	0.051629	

Dependent Variable: LEXR
Method: Fully Modified Least Squares (FMOLS)
Source: Author's computation

$$LEXR = -49.18969 + 0.377072LOil + 0.210105LGDP + 0.819668LINF + 0.595611LINTR - 0.613305LM_2 + \mu \quad \text{..........} (12)$$

According to the long-run result, it was revealed that crude oil price (LOil), Gross Domestic Product (LDGP), inflation rate (LINF), and interest rate (LINTR) have positive elasticity with exchange rate (LEXR) which implied a positive relationships. The result revealed that a percentage (1%) change in oil revenue, gross domestic product, inflation, and interest rate led to about 38 %, 21%, 81%, and 59% percentage increase in exchange rate respectively, these effects were also statistically significant. The relationship exhibited between the gross domestic product and exchange rate was against the expected a-priori. However, broad money supply (LM_2) has a negative relationship with exchange rate, as 1% increase in the volume of money supply led 61% increase in exchange rate, which is contrary to the a-priori expectative. This forward revealed that injection of more money into the economy has led to the depreciation of the naira currency in the exchange rate market within the period under study. The coefficient of multiple determinations (R^2) is given as 0.69 which indicated the goodness of fit and it implied that about 69% systematic total variation in exchange rate were caused by the explanatory variables in the model and the long run . The long-run variance value of 0.051629 implied a change of deviation from the long-run equilibrium relationship among the variables was minimal at 5% rate and it therefore further explained that about 95% assurance that a long-run equilibrium relationship existed was assured.

4.4.2. Relationship between Current and Past Exchange Rate Returns

Table-4.4.2. Relationship between Current and Past Exchange Rate Returns

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.034345	0.023134	1.268511	0.2096
EXR_{t-1}	-0.040692	0.130988	-0.028036	0.1287
$EXRm_t$	0.052372	0.079416	1.251291	0.1918
$EXRm_{t-1}$	0.033716	0.081498	0.489691	0.4432
R-squared	0.046417	Mean dependent var		0.031227
Adjusted R-squared	-0.039436	S.D. dependent var		0.178420
S.E. of regression	0.180485	Sum squared resid		0.524954
Durbin-Watson stat	2.007661	Long-run variance		-0.388882

Dependent Variable: EXRt
Method: Fully Modified Least Squares (FMOLS)
Source: Author's computation

The relationship between current and past exchange rate returns was estimated in Table 4.4.1.

$$EXR_t = 0.034345 - 0.040692EXR_{t-1} + 0.052372EXR_{mt} + 0.033716EXR_{mt-1} + U \quad \text{..........} (13)$$

From equation (22), current exchange rate returns (EXR_t) has a negative relationship with past exchange rate returns (EXR_{t-1}). This implies that, an increase in the return on past exchange rate returns will lead to a decrease in the value of current foreign exchange rate returns. This result was in contrast with the time series properties of variables which imply the past value of a variable was to positively impact the current value of the variable. More so,

the current returns on aggregated foreign exchange market transaction ($EXRm_t$) and previous returns on aggregated foreign exchange market transaction ($EXRm_{t-1}$) have positive relationships with current exchange rate returns. This implies that an increase in the current returns on aggregated foreign exchange market transaction and previous returns on aggregated foreign exchange market transaction led to an increase in the current exchange rate returns.

5. Summary, Conclusion and Policy Recommendations

This empirically investigated the foreign of exchange rate market efficiency in Nigeria, and, the effect of the past exchange rate returns on the current exchange rate return was investigated. The objectives of the study were met through the series of analyses carried out and time series data employed from the year 1985 -2016 which were sourced from the Central bank of Nigeria (CBN) statistical bulletin 2017 edition. The study revealed intrigued results. Firstly, the relationship between foreign exchange rate and some macroeconomic variables, oil price was found to be positively related with exchange rate, this could be because of monoculture economy Nigeria is, one who depends majorly on crude oil as a source of revenue and the fluctuation of the foreign exchange rate is a major concern to revenue and financial agencies of government. Gross domestic product GDP was revered to be have positively impacted on foreign exchange rate, the result is not surprising though, if the country's GDP increases by mainly a sector, thereby making the country to import more consumers' goods, such as the case of Nigeria, the high importation will make the naira currency to depreciate against other competing currencies in the foreign exchange market. The study found that Inflation rate have positive relationship with exchange rate in Nigeria, the result is not strange as expected because inflation and exchange rate having a bi-directional relationship as submitted by Ochei *et al.* (2016). The relationship between interest rate and exchange rate was also positive. The money supply has a negative and relationship with exchange rate in Nigeria. However the result could be as a result of various government intervention funds available to the private sector in recent years in an attempt to scale up local production in the economy could have helped reduce the amount of imported goods into the economy and by way have had a multiplier effect on the appreciation of the local currency (naira). The study further revealed that the previous exchange rate returns was negatively related to the current exchange rate return, also, the findings was in line with literature reviewed of Baillie (2011), who concluded that the exchange market was not efficient in the Nigerian economy because of the presence of irregularities in the market. Also, it is of the opinion that the biasedness of past exchange rates in predicting future exchange rates has become a persistent phenomenon called "the forward bias puzzle" According to (Chiang, 2010).

Conclusively, it can be submitted that the foreign exchange rate market in Nigeria is inefficient as it was revealed by the behavior of the macroeconomic variables to foreign exchange rate, and the influence of the previous value of exchange rate returns on the current exchange rate returns. The reasons for the inefficiency of the foreign exchange rate market are not far-fetched. Hence, the dual exchange rate market in operation in Nigeria made has made it difficult to account for returns on the foreign exchange rate market. More so, ineffective management of foreign exchange market by the monetary authorities in Nigeria which is the Central bank has led to the dominance of the parallel market which has contributed to this inefficiency.

On policy recommendations, the monetary authorities should ensure transparency in determining exchange rate process such that various economic distortions associated with exchange rate can be minimized, and strict monetary policies should be pursued to ensure that money in circulation are not in excess, and that funds should be channeled to productive activities. Also, government should try to ensure stability of the domestic currency (the Naira), so as to reduce the susceptibility in the foreign exchange rates market since it vulnerability to fluctuations in the foreign exchange rate market negatively impact on the economy at large .This can be achieved through a proper designed and execution of fiscal and monetary policies, diversification of the economy from a mono product one to a multi-product base economy.

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