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THE EFFECT OF EXCHANGE RATE ON AGGREGATE CONSUMPTION IN NIGERIA

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ABSTRACT

This study investigated the effect of exchange rate on aggregate consumption in Nigeria using time series data from 1981 to 2016. Descriptive statistics were employed to analyze the trend of the variables under study, Johansen co-integration test was used to ascertain the existence of long-run relationship among the variables, and Vector error correction model (VECM) was used to examine the short-run effect of exchange rate on aggregate consumption in Nigeria. Trend analysis showed that aggregate consumption (proxied by final consumption expenditure) rose steadily during the review period while nominal exchange rate (used as a measure of the exchange rate) fluctuated around a generally rising trend throughout the study period. Generally, the exchange rate and aggregate consumption moved in the same direction in the same period. Based on the results of the unit root test which showed that all the variables were integrated of order 1, the Johansen co-integration test was performed. However, as the Johansen co-integration test involved a loss of short-run information, the short run impact of exchange rate on aggregate consumption in Nigeria was ascertained by estimating a Vector Error Correction Model (VECM). The results showed that the exchange rate had a positive effect on aggregate consumption in Nigeria in both the short-run and long-run. But while this effect was statistically significant in the long-run, it was not in the short-run. The positive effect was attributed to the import-dependent nature of consumption in Nigeria. This implies that a high exchange rate is a better predictor of consumption in Nigeria in the long-run than in the short-run. Based on these findings, the study recommended that the Central Bank of Nigeria should strive harder to stabilize the exchange rate so as to minimize fluctuations in the trend; and the pursuance of domestic demand-based exchange rate policies aimed at attaining economic growth through domestic demand. For the purpose of discouraging importation of finished goods, selective protectionism through high import tariffs on finished goods should accompany low exchange rate. This will divert the gains from low exchange rate into the consumption of domestic goods and boost the domestic demand side of aggregate consumption in Nigeria.

Key Words: Exchange rate, Aggregate Consumption, Final Consumption, Nominal exchange Rate.

INTRODUCTION

Exchange rate as an important macroeconomic variable is often used as a benchmark for determining international competitiveness. There are two ways of defining exchange rate- nominal or real terms. The nominal exchange rate refers to the price of a unit of a given foreign currency in the domestic currency. It is negatively related to competitiveness (Danmola, 2013). On the other hand, the real exchange rate (RER), is the ratio of the foreign price level to the domestic price level, with the foreign price level converted into the domestic currency units via the current nominal exchange rate. It is regarded as a concept that measures the relative price of exports and imports in relation to goods and services produced and

consumed locally. Variations in exchange rate influence a country's export and import, cause changes to the trade balance, the levels of prices and output as well as aggregate consumption, which ultimately alter the income distribution of the economy (Kandil, 2004;Kollmann, 2005).

Exchange rate policy in Nigeria has undergone a substantial transformation from independence, when the Naira had a fixed parity with the British pound, through the oil boom of the 1970s, to the floating of the currency in 1986, as a result of the introduction of Structural Adjustment Programme (SAP) (Akpan and Atan, 2012). From 1970 to 1980, the Naira was pegged to other currencies, mainly the United States dollar. The exchange rate policy at that time encouraged over-valuation of the Naira as it swung between 0.71 and 0.89 to a dollar from 1970 through 1985 which encouraged imports of all kinds while discouraging non-oil exports. In the post-SAP period, Nigeria's exchange rate became more volatile owing to its excessive exposure to external shocks (Okorontah and Odoemena, 2016). In recent years, however, exchange rate in Nigeria has been under a managed float arrangement.

According to Peter (1997), countries may manage their exchange rate by deciding the level of flexibility considering the conditions under which they intervene in foreign market. Exchange rate policies fix a real exchange rate that strikes internal and external balance in an economy. Internal balance is looked at in terms of the level of economic activities that are in line with a satisfactory rate of inflation and full employment of resources. On the other hand, external balance embodies balance of payments equilibrium or sustainable deficit current account deficit which is financed permanently by expected capital inflows (Pondexter, 1981), Dernbourg, 1980). Improving the international competitiveness of any country is heavily dependent on the real exchange rates. While any changes in the real exchange rate might lead to distortions in both internal and external balances, the effects of exchange rate changes are also expected to cut across every economic activity in the country, including aggregate consumption. According to Oduh, Oduh and Okeocha (2012), one of the major determinants of aggregate consumption in Nigeria is the exchange rate.

Historical data from the World Bank Statistics (2017) indicates that there was a drastic increase in the Naira exchange rate between 1981 and 2016. For instance, as at 1981, the rate of exchange of the Naira to the U.S. dollar stood at 0.62 in 1981, 0.67 in 1982, 0.72 in 1983, and increased drastically to 17.30 in 1992, 101.70 in 2001, 148.90 in 2009, 192.44 in 2015 and 253.49 in 2016. On the other hand, the growth rate of aggregate consumption has fluctuated at rates well below the exchange rate growth rate. According to the World Bank Statistics (2017), final aggregate consumption in Nigeria grew by 9.51% in 1982 but declined by -0.18% in 1983 before recording a positive growth rate of 8.06% in 1985. Thereafter, the rate of growth fluctuated widely as it declined by -13.74% in 1987 but rose to 11.61% in 1988 before dipping to -3.34% in 1989. For the rest of the period under study, final aggregate consumption behaved erratically, declining from 17.01% in 1990 to -3.16% in 1993 while it increased by 25% in 2001, 0.59% in 2002 and 40.70% in 2004. After declining by -2.75% in 2008, it rose in 2013 (17.24%) and 2015 (0.24%). This trend is inimical to the effort of an economy striving to exit economic recession.

Increase in the exchange rate raises the import price of goods relative to those of domestically produced goods. This increase leads consumer to a switch from imported goods which are now more expensive than domestically produced goods. In this way, expenditure on domestically produced goods rises while expenditure on imported goods falls. This reduces foreign exchange demand. On the other hand, the supply of foreign exchange increases as foreigners switch from their relatively more expensive goods to imports from the country whose exchange rate has increased. On balance, it is expected that the country's external balance

position will improve.

At the same time, exchange rate changes can influence the pattern of demand in the country. For a country like Nigeria which depends heavily on both imported finished and capital goods, an increase in the exchange rate can raise the domestic price level and hence aggregate consumption. Certainly, prices are among the factors affecting changes in consumption patterns. As highlighted earlier, the management of the Naira exchange rate has led to wide fluctuations in the rate, rise from N0.62 in 1981 to the US dollar to N306 to the US dollar in 2017.However, how changes in exchange rate influence consumption in Nigeria is an issue that has yet to be settled. This is the problem examined in this study. Thus the study set out to investigate the impact of exchange rate on aggregate consumption in Nigeria during the period 1981 to 2016.

LITERATURE REVIEW

Exchange rate refers to the rate at which one currency exchanges for another, that is, the value of a country's currency expressed in terms of another. In his opinion, Clerk (1993) stated that the term exchange rate is used to refer to the price of a foreign currency measured in units of a local currency or, in other words, the price of a local currency in units of a foreign currency. It is the price of one unit of the foreign currency in terms of the domestic currency (Jhingan, 2003). Like any other commodity, currencies are sold and bought in a market. But while other commodities are exchanged against money, currencies are exchanged against each other in a direct barter system, without any intermediary. In simple terms, the rate at which one currency is exchanged for the other is called the exchange rate.

Pilbeam (1998), defines the exchange rate as the price of one currency in terms of another. In his words, there are two ways of expressing the exchange rate: units of the domestic currency units per unit of a foreign currency and units of a foreign currency per unit of the domestic currency. Each is exactly the reverse of the other. In this study, the exchange rate is defined as the units of the domestic currency per unit of the United States dollar. Thus, an increase in the exchange rate refers to a depreciation of the Naira, the domestic currency, and reflects a fall in the value of the currency.

Among the key macroeconomic determinants of aggregate output, aggregate consumption has attracted the most attention of scholars. As observed by Branson (1989), macroeconomic debate on consumption expenditure and the nature of the consumption dates back to John Stuart Mills and the classical economists of the 18th and 19th centuries as well as economists such as John Maynard Keynes, Milton Friedman, Franco Modigliani, James Duesenberry and Simon Kuznets in the 19th century. This attention has been ascribed to the importance of aggregate consumption as one of the major components of the Gross National Product (GNP) or the Gross Domestic Product (GDP) and a key variable for measuring economic growth, (Branson,1989).

Dernburg (1985) looks at consumption as an act when goods and services are used to satisfy man's insatiable needs. Consumption is therefore fundamental to welfare. The level of aggregate consumption expenditure indicates the state of an economy. Neoclassical economists consider consumption as the final purpose of economic activity and, thus, per capita consumption is considered a central measure of an economy's productive success.

In the context of this study, aggregate consumption is used to refer to the sum of all institutional consumption expenditures by households, firms and government on final goods and services within a period of one year in a particular country. Simply put, aggregate consumption is the value of final consumption in a year.

The study of consumption behaviour plays a central role in macroeconomics. Two reasons define macroeconomists' interested in aggregate consumption. First, aggregate consumption determines aggregate saving which flows through the financial system to create the national supply

of capital. Aggregate consumption and savings powerfully influence an economy's long term productive capacity. Second, since consumption expenditure accounts for a lion share of national output, macroeconomic fluctuations and business cycles can only be understood by understanding the dynamics of aggregate consumption.

From the foregoing, it is important to point out that both the government and household sectors of the economy engage in consumption expenditure. The importance of consumption expenditure has prompted economists like Friedman (1957), Modigliani (1963), Keynes (1936) and Duesenberry (1949), to carry out extensive studies on the factors(both quantitative and qualitative) can influence consumption. Such include income, wealth, interest rate, capital gain and liquid assets. This is due to the fact that whatever influences consumption expenditure, plays a major role in the process of the growth of an economy. (Branson, 1989).

The theoretical interplay between exchange rate and aggregate consumption is expressed in Keynes's theory of consumption and the Gala-Racho hypothesis. Keynes in his General Theory, published in 1936, mentioned several subjective and objective factors which determine consumption in a society. However, according to Keynes, of all the factors it is the current level of income that has the greatest effect on the consumption of an individual and the economy as whole (Keynes, 1936).

Gala and Racho (2001) proposed a theoretical perspective on how a competitive exchange rate may stimulate domestic savings by avoiding consumption booms based on currency overvaluation and by increasing profits in the tradable sector. Their model endogenizes aggregate consumption as a function of real wages, which, in turn, depend on real exchange rate levels.

Thus, Keynes's theory of consumption provides the theoretical underpinning for the analysis of consumption changes and it is upon this theory that this study is anchored. The theory states that consumption depends directly on income and changes in consumption are strongly related to changes in income. Thus a fall or a rise in income will reduce or increase the level of consumption. But according to the Gala-Racho hypothesis, the change in income itself is dependent on the extent of exchange rate appreciation/depreciation Gala and Racho, 2001). An exchange rate appreciation is expected to impact positively on wealth or income while a depreciation of the exchange rate will have a negative impact on income.

Empirically, *there is a dearth of literature on the relationship between the exchange rate and aggregate consumption in Nigeria. Although there are many empirical studies on the exchange rate, most of these studies are generalistic as they focus on the effect of the exchange rate and economic growth (these include Danmola, 2013; Eze and Okpala, 2014; Okorontah and Odoemena, 2016; Tarawaile, Sissoho, Conte and Ahortor, 2012; Alagaidede, and Ibrahim, 2016; Olajide, 2016). A few other studies relate primarily to the effect on the effect of exchange rate fluctuation on the domestic price level (Enoma, 2011; Abiodun, Ajibola, Inuwa, Idowu, Sani, Anigwe and Udoko, 2016) without any of the studies exploring the possible effects of exchange rate on aggregate consumption.*

Ezeji and Ajudua (2015) investigated the determinants of aggregate consumption in Nigeria from 1981 to 2015. However, the primary focus of the study was not on exchange rate. As a result, the relationship between exchange rate and aggregate consumption was not properly investigated. These therefore make this study unique as it represents the first attempt to empirically investigate the impact of exchange rate on aggregate consumption in Nigeria in trying to find out how changes in exchange rates impact on aggregate consumption in Nigeria.

METHODOLOGY

Research Design

According to Ogunleye (2000), a research design is a strategy which a researcher adopts to enable him carry out his problem of investigation. This

study will adopt the *ex-post facto* design. This is a type of design whereby the researcher attempts to establish a cause-effect relationship among variables and/or group of individuals. In this case, both the effect and the alleged cause(s) have already taken place, but the investigator only decides to establish their link in retrospect (Ogunleye, 2000). The choice of *ex-post facto* design is necessitated by the fact that it allows the researcher the privilege of observing the effect of one or more variables on another variable (usually a dependent variable) over a period of time.

Sources of Data

The study employed only time series data obtained from secondary. Data relating to final consumption expenditure, gross income, interest rate, domestic prices (represented by the consumer price index) and the exchange rate were sourced from the Central Bank of Nigeria's **Statistical Bulletin**.

Method of Data Analysis

The data were analysed with econometrics techniques (such as the Augmented Dickey Fuller (ADF) test, cointegration procedure and Error Correction Model), and descriptive statistics (tables, percentages and charts). These are discussed in greater detail below.

(a) Unit Root Test (Stationarity Test)

According to Gujarati (2003), it is desirable that variables in a time series regression model be stationary in order to avoid spurious regression thereby ending with a Type I or II Error. Consequently, this study conducted the Augmented Dickey-Fuller test for stationarity as set out below.

When the regression equation has been estimated and stationarity is established at level form, then the result of the long-run model would give non-spurious slope parameters and standard errors. However, if the estimation is carried out and stationarity is not found at level form, the standard errors will not give reliable parameters for making any informed decision. Moreover, researchers such as Idalu (2015) assert that a stationarity test helps to identify if there are long-run combinations among variables within a system of equations. This means that if all the variables are integrated after first differencing, i.e., they are integrated of order I(1) (signifying the presence of unit root), it means the series would have been transformed to their short-run movements. Then the possibility that they all converge in the long-run is high.

Different techniques have been developed for the unit root test which is the standard approach for investigating the stationarity properties of time series data. In this study, the Augmented Dickey–Fuller test for stationarity was used. This test was proposed by Dickey and Fuller in 1981. It fundamentally seeks to establish whether a particular time series variable is stationary or not. If a timeseries variable is non-stationary, then it has to be differenced either once or twice. To conduct this test, a null hypothesis of a difference stationarity is tested as against its alternative hypothesis of a trend stationary (Ismaila & Imoughele, 2015).

(b) Test for Co-Integration

A strong likelihood exists that when tested for stationarity, sometimes series variables may not be stationary at levels. This is very often the case of macroeconomic time series variables such as the inflation rate, the consumer price index, real Gross Domestic Product and the exchange rate. Therefore, in order to analyse the long-run equilibrium relationship between the time-series variables, econometricians use the co-integration test. The co-integration test allows one to identify the long-run interaction between the variables. There are severe implications when the times series variables are non-stationary. Granger (1981) identified some of these implications to include: spurious regression estimates and problems arising in the regression model when different orders of integration of the variables are regressed. These being the case, econometricians such as Granger (1986) Engel and Granger (1987), Johansen (1988, 1991) amongst others developed techniques of testing for cointegration in order to ascertain the long-run relationship

between time-series variables. In this study, the Johansen cointegration procedure was chosen. This is based on the results of the unit root test.

(c) Vector Error Correction Model

In the wake of co-integration, it is also expected to complete the estimation process with the short run equation models. The Vector Error Correction Model (VECM) shows the speed of adjustment from short-run to long run equilibrium. The a priori expectation is that the VECM coefficient must be negative and significant for errors to be corrected in the long run. The higher the VECM, the higher the speed of adjustment.

The reformulated VAR into VECM is given as:

$\Delta Y_t = \alpha \beta^t Y_{t-1} + \sum^{p=1}_{i=1} r \Delta Y_{t-1} + \pi + \lambda t$ ..... (1)

Where:

Y_t = vector of endogenous variable

α = parameter which measures the speed at which the variables in the system adjust to their long run values.

β^t= estimates of the long run co-integrating relationship between the variables in the model

π= the parameter associated with exogenous variables.

r = the drift parameter

λt = the stochastic error term.

Model Specification

This study adopted and modified the model used by Ezeji and Ajudua (2015). In order to capture the determinants of aggregate consumption expenditure in Nigeria, the Ezeji-Ajudua model was specified as

$$GCE = f(Y, INT, INF, EXR) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Where

GCE = Gross Consumption Expenditure

Y = Income (proxied by GDP)

INT = Interest Rate

INF = Inflation Rate

EXR = Foreign Exchange Rate

The model was stochastically expressed as;

$$GCE = \beta_0 + \beta_1 GDP + \beta_2 INT + \beta_3 INF + \beta_4 EXR + \mu \ldots (3)$$

However, for the purpose of this study, final consumption expenditure (FCONS) was used in place of gross consumption expenditure (GCE) and taken as proxy for aggregate consumption. GDP, INT and EXR were all maintained while consumer price index (CPI) was used to replace inflation rate and as proxy for domestic prices. Thus, following the study by Ezeji and Ajudua (2015), the modified version of the consumption-exchange rate model for this study is specified as follows:

$$FCONS = f(EXR, GDP, INTR, CPI) \ldots\ldots\ldots\ldots (4)$$

Where

FCONS = Final Consumption Expenditure

EXR = Official Exchange Rate

GDP = Gross Domestic Product (LCU)

INTR = Deposit Interest Rate; and

CPI = Consumer Price Index

Taking the natural logarithms and expressing equation (2) in functional form, the model for this study becomes;

$$lnFCONS_t = f(lnEXR_t, lnGDP_t, lnINTR_t, lnCPI_t) \ldots\ldots\ldots\ldots (5)$$

Converting equation (3) to a probabilistic mathematical form, it can be restated as:

$$lnGDP_t = \beta_0 + \beta_1 lnEXR_t + \beta_2 lnGDP_t + \beta_3 lnINTR_t + \beta_4 lnCPI_t \ldots\ldots (6)$$

Based on the interdependence between final consumption and exchange rate, the transmission of exchange rate changes through prices to aggregate consumption can be effectively examined through a system of equations so as to avoid simultaneous equations bias. Hence, a Vector Autoregressive (VAR) structure was used for the growth model. Due to the fact that the series were stationary; that is, they were I(0) series, the VAR structure was applied.

$$lnFCONS_t = \beta_0 + \sum_{i=1}^{p} \beta_{1i} lnFCONS_{t-i} + \sum_{i=1}^{p} \beta_{2i} lnEXR_{t-i} + \sum_{i=1}^{p} \beta_{3i} lnGDP_{t-i} + \sum_{i=1}^{p} \beta_{4i} lnINTR_{t-i} + \sum_{i=1}^{p} \beta_{5i} lnCPI_{t-i} + \mu_{1t} \ldots\ldots\ldots (7)$$

$$lnEXR_t = \partial_0 + \sum_{i=1}^{p} \partial_{1i} lnFCONS_{t-i} + \sum_{i=1}^{p} \partial_{2i} lnEXR_{t-i} + \sum_{i=1}^{p} \partial_{3i} lnGDP_{t-i} + \sum_{i=1}^{p} \partial_{4i} lnINTR_{t-i} + \sum_{i=1}^{p} \partial_{5i} lnCPI_{t-i} + +\mu_{2t} \ldots\ldots\ldots (8)$$

$$lnGDP_t = \emptyset_0 + \sum_{i=1}^{p} \emptyset_{1i} lnFCONS_{t-i} + \sum_{i=1}^{p} \emptyset_{2i} lnEXR_{t-i} + \sum_{i=1}^{p} \emptyset_{3i} lnGDP_{t-i} + \sum_{i=1}^{p} \emptyset_{4i} lnINTR_{t-i} + \sum_{i=1}^{p} \emptyset_{5i} lnCPI_{t-i} + +\mu_{3t} \ldots\ldots (9)$$

$$lnINTR_t = \gamma_0 + \sum_{i=1}^{p} \gamma_{1i} lnFCONS_{t-i} + \sum_{i=1}^{p} \gamma_{2i} lnEXR_{t-i} + \sum_{i=1}^{p} \gamma_{3i} lnGDP_{t-i} + \sum_{i=1}^{p} \gamma_{4i} lnINTR_{t-i} + \sum_{i=1}^{p} \gamma_{5i} lnCPI_{t-i} + \mu_{4t} \ldots\ldots (10)$$

$$lnCPI_t = \delta_0 + \sum_{i=1}^{p} \delta_{1i} lnFCONS_{t-i} + \sum_{i=1}^{p} \delta_{2i} lnEXR_{t-i} + \sum_{i=1}^{p} \delta_{3i} lnGDP_{t-i} + \sum_{i=1}^{p} \delta_{4i} lnINTR_{t-i} + \sum_{i=1}^{p} \delta_{5i} lnCPI_{t-i} + \mu_{5t} \ldots\ldots (11)$$

Vector Error Correction Models (VECM)

Due to the fact that the time series were non-stationary (that is, they are I(1) series) but were

cointegrated on the Johansen Cointegration test, the following VEC model was considered.

$$\Delta lnFCONS_t = \beta_0 + \sum_{i=1}^{p} \beta_{1i} \Delta lnFCONS_{t-i} + \sum_{i=1}^{p} \beta_{2i} \Delta ln\text{EXR}_{t-i} + \sum_{i=1}^{p} \beta_{3i} \Delta ln\text{GDP}_{t-i} + \sum_{i=1}^{p} \beta_{4i} \Delta ln\text{INTR}_{t-i} + \sum_{i=1}^{p} \beta_{5i} \Delta lnCPI_{t-i} + \omega_1 ECM_{t-1} + \mu_{1t} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (12)$$

$$\Delta ln\text{EXR}_t = \partial_0 + \sum_{i=1}^{p} \partial_{1i} \Delta lnFCONS_{t-i} + \sum_{i=1}^{p} \partial_{2i} \Delta ln\text{EXR}_{t-i} + \sum_{i=1}^{p} \partial_{3i} \Delta ln\text{GDP}_{t-i} + \sum_{i=1}^{p} \partial_{4i} \Delta ln\text{INTR}_{t-i} + \sum_{i=1}^{p} \partial_{5i} \Delta lnCPI_{t-i} + \omega_2 ECM_{t-1} + \mu_{2t} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (13)$$

$$\Delta ln\text{GDP}_t = \emptyset_0 + \sum_{i=1}^{p} \emptyset_{1i} \Delta lnFCONS_{t-i} + \sum_{i=1}^{p} \emptyset_{2i} \Delta ln\text{EXR}_{t-i} + \sum_{i=1}^{p} \emptyset_{3i} \Delta ln\text{GDP}_{t-i} + \sum_{i=1}^{p} \emptyset_{4i} \Delta ln\text{INTR}_{t-i} + \sum_{i=1}^{p} \emptyset_{5i} \Delta lnCPI_{t-i} + \omega_3 ECM_{t-1} + \mu_{3t} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (14)$$

$$\Delta ln\text{INTR}_t = \gamma_0 + \sum_{i=1}^{p} \gamma_{1i} \Delta lnFCONS_{t-i} + \sum_{i=1}^{p} \gamma_{2i} \Delta ln\text{EXR}_{t-i} + \sum_{i=1}^{p} \gamma_{3i} \Delta ln\text{GDP}_{t-i} + \sum_{i=1}^{p} \gamma_{4i} \Delta ln\text{INTR}_{t-i} + \sum_{i=1}^{p} \gamma_{5i} \Delta lnCPI_{t-i} + \omega_4 ECM_{t-1} + \mu_{4t} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (15)$$

$$\Delta lnCPI_t = \delta_0 + \sum_{i=1}^{p} \delta_{1i} \Delta lnFCONS_{t-i} + \sum_{i=1}^{p} \delta_{2i} \Delta ln\text{EXR}_{t-i} + \sum_{i=1}^{p} \delta_{3i} \Delta ln\text{GDP}_{t-i} + \sum_{i=1}^{p} \delta_{4i} \Delta ln\text{INTR}_{t-i} + \sum_{i=1}^{p} \delta_{5i} \Delta lnCPI_{t-i} + \omega_5 ECM_{t-1} + \mu_{5t} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (16)$$

Results and Discussions

Descriptive Statistics

Table 1 presents a summary of the descriptive statistics of the variables used in the study.

Table 1: Summary of Descriptive Statistics

	FCONS*	EXR	GDP*	INTR**	CPI**
Mean	1.59E+13	76.46667	2.00E+13	11.54776	46.66528
Median	2.73E+12	57.20175	3.11E+12	11.11167	27.06562
Maximum	9.01E+13	253.4923	1.03E+14	23.24167	183.8926
Minimum	3.62E+10	0.617708	5.17E+10	5.699167	0.493799
Std. Dev.	2.55E+13	71.94628	3.16E+13	4.009619	52.58075
Skewness	1.696581	0.426107	1.556776	0.790535	1.072119
Kurtosis	4.603402	1.991859	3.911247	3.520163	3.049785
Jarque-Bera	21.12668	2.613925	15.78687	4.155530	6.900354
Probability	0.000026	0.270641	0.000373	0.125210	0.031740

Source: *Author's computations using Eviews 9.0*

*These figures are in Trillions of Naira.

**These figures are in percentages.

Table 1 shows that between 1981 – 2016 Final consumption (FCONS), exchange rate (EXR) Gross Domestic Product (GDP), Deposit interest rate (INTR) and the Consumer Price Index (CPI) averaged N15.9 trillion, 76.46667, N20 trillion, 11.55%, 46.67 respectively. The maximum values for final consumption, the exchange rate, the GDP, the interest rate and the consumer price index shown in the table were attained in 2016 respectively, except 1994 for interest rate, while the minimum values for the same variables were achieved in 1981 for all the series.

The results of Skewness in Table 1 show that all the series are positively skewed indicating that the data for the series are all tilted towards large values. However, none of the series is highly skewed, indicating that they do not differ substantially from a normal distribution, especially for the transformed data. The Kurtosis statistic measures the peakedness of distribution. For a normal distribution the Kurtosis is 3 (Mesokurtic). Table 1 shows that FCONS, GDP and INTR have a leptokurtic (KSS) shape as their kurtosis exceeds 3. The EXR, however, has has a platykurtic shape (K<3) while CPI exhibits the characteristic of a normal distribution with a mesokurtic shape (k=3). This suggests that only CPI has a normal distribution based on the results of kurtosis.

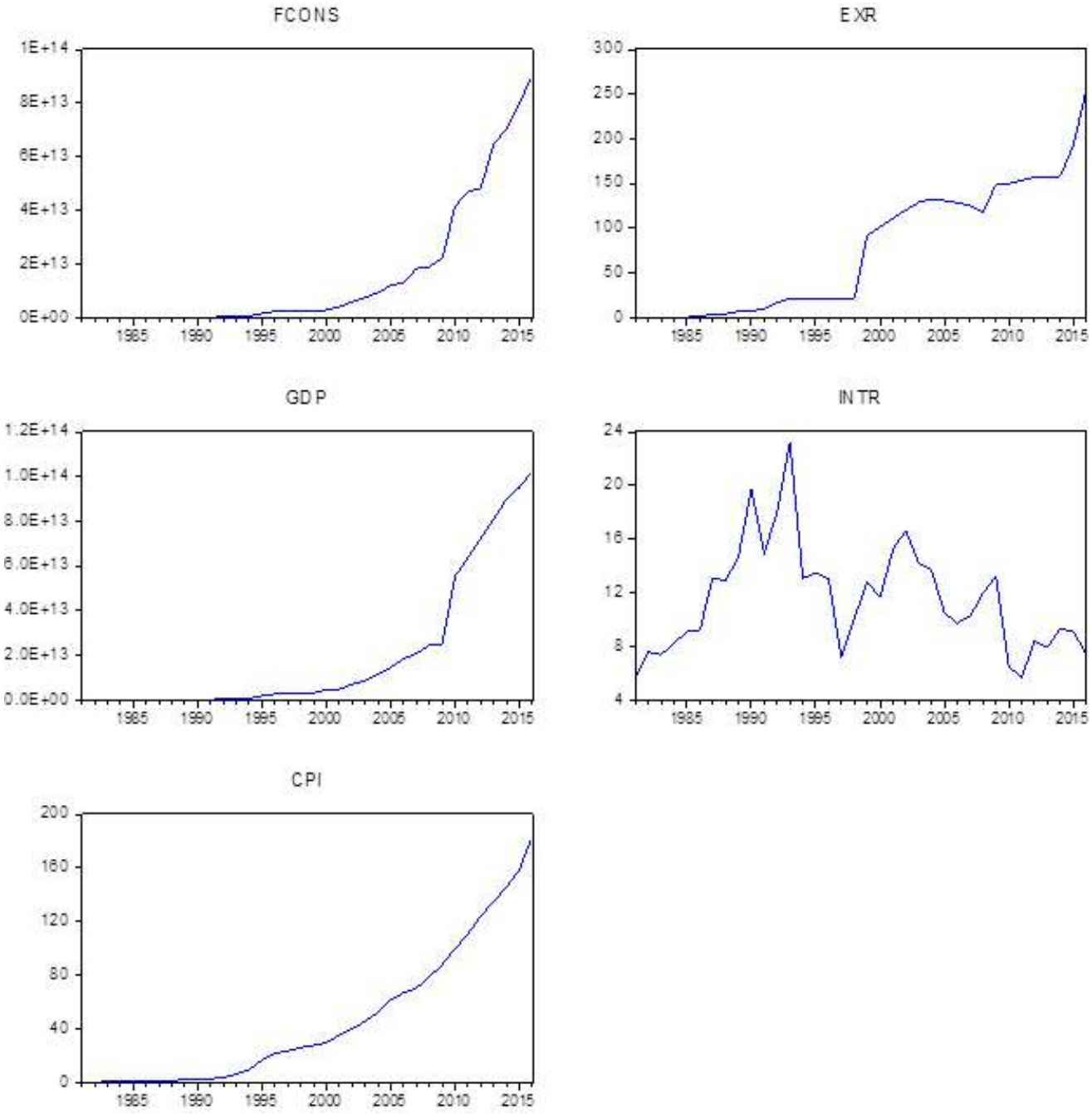
The Jarque-Bera test as proposed by Jarque and Bera (1997), is used for testing whether series are normally distributed as established earlier. The reported probability value is the probability that a Jarque-Bera statistic exceeds (in absolute terms) the observed value at a specific level of significance. Employing the 5% level of significance, the decision rule is to reject the null hypothesis that the series are normally distribution if the reported statistic exceeds 0.05. Based on this test, Table 1 shows that the distribution of FCONS, GDP and CPI are non-normal. On the other hand, EXR and INTR have exhibited the characteristics of series with normal distribution. This is because by virtue of the probability values of the Jarque-Bera statistics, the null hypotheses could not be rejected.

The results of the various normality tests therefore called for the transformation of the data for all the variables in the study. The variables indeed became normally distributed after the transformation. Natural logarithms were therefore applied in other to yield robust estimation.

Trend Analysis

The trends for all the variables incorporated in the model used in this study are presented in Figures 1(a) – 1(e). The trend analysis explains the behaviour of the variables incorporated in the model over time.

For the analysis in this study, therefore, the trends of aggregate consumption (FCONS), Exchange Rate (EXR), Gross Domestic Product (GDP), Deposit Interest Rate INTR) and Domestic Prices (CPI) are presented. The trending patterns are presented in Figures 1(a) to 1(e).



Figures 1(a) – 1(e): Trends of the Series

Figure 1(a) shows that all the variables followed a generally rising trend between 1981 and 2016 except the interest rate which fluctuated widely during the period. Apart from the CPI which started rising sharply at the beginning of the period and continued to do so to the end, the other variables were stable in the first ten years or so of the review period before rising rapidly. The four upwardly trending variables maintained their steep ascent to the end of the period with the consumer price index recording the fastest growth.

The movement of the interest rate shows no clear trend, with the most violent fluctuations occurring between 1990 and 2000.

Clearly, all the variables in the model except the interest rate (that is, the exchange rate, domestic prices, economic growth and aggregate consumption) moved in the same direction over the study period. In particular, aggregate consumption and the exchange rate displayed a strikingly similar trend.

Regression Analysis

(a) Result of Unit Root Test

As is conventional with time series, the augmented Dickey-Fuller (ADF) test was used to test the null hypothesis that data on the variables under

consideration in this study have unit root. Results of the ADF unit root test are presented in Table 2

Table 2: Results of Unit Root Test

Variable	ADF	5% critical Value	Prob.	Order of Integration	Stationary
FCONS	-4.890967	-2.951125	0.0004	I(1)	Stationary
EXR	-5.026540	-2.951125	0.0002	I(1)	Stationary
GDP	-5.474375	-2.951125	0.0001	I(1)	Stationary
INTR	-3.876208	-2.960411	0.0059	I(1)	Stationary
CPI	-3.428942	-2.954021	0.0170	I(1)	Stationary

Source: *Author's Computations Using Eviews*9.0

None of the variables was stationary at levels. However, as Table 2 shows, all the series became stationary after the first difference. This is evident in the probability values of the ADF statistics which are less than 0.05. Thus, the series are all stationary and integrated of order I(1). Based on the Unit root test result, there is enough evidence to assume that the series are cointegrated. To empirically verify the claim, the Johansen test of cointegration was applied to the time series.

(b) Cointegration Test

The Johansen test of cointegration was carried out on the series to ascertain the existence of a long run relationship between the exchange rate and aggregate consumption in Nigeria. The cointegration test was based on the Trace statistic and the Maximum Eigen value statistics. Results of the unrestricted cointegration Rank Test for Trace statistic and Maximum Eigen Value are present in Tables 3a and 3b.

Table3a: Johansen Unrestricted Rank Cointegration Test (Trace)

Hypothesized No. of Cointegrating Equations	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.646727	79.09478	69.81889	0.0076
At most 1	0.415177	43.71725	47.85613	0.1160
At most 2	0.367649	25.47808	29.79707	0.1451
At most 3	0.203261	9.895525	15.49471	0.2889
At most 4	0.061823	2.169750	3.841466	0.1407

Source: *Author's computation using Eviews 9.0*

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) pvalues

Table 3b: Johansen Unrestricted Rank Cointegration Test (Maximum Eigenvalue)

Hypothesized No. of Cointegrating Equations	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.646727	35.37753	33.87687	0.0329
At most 1	0.415177	18.23917	27.58434	0.4753
At most 2	0.367649	15.58256	21.13162	0.2502
At most 3	0.203261	7.725775	14.26460	0.4073
At most 4	0.061823	2.169750	3.841466	0.1407

Source: *Author's computation using Eviews 9.0*

Maximum Eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

The trace statistics test result in Table 4.3a shows that there is 1 cointegrating equation at 5% level of significance. Similarly, result of the maximum Eigen Value presented in Table 4.3b indicates 1cointegrating equation at 5% significance level. The trace statistics and the Maximum Eigen Values therefore denote the rejection of the null hypothesis of no cointegrating equations.

Thus, the Johansen test of cointegration reveals the existence of a long run relationship between exchange rate and aggregate consumption in Nigeria.

(c) Impact of Exchange Rate on Aggregate Consumption in Nigeria.

Given the existence of a long run relationship among the variables considered in this study the impact of the exchange rate on aggregate consumption in Nigeria in the long run was evaluated. The estimates of the long run equation are presented below:

InFCONS =3.150217EXR- 1.452725InGDP- 4.946322In INTR- 2.519955InCPI

SE = (0.45787) (0.40664) (0.83528) (0.54365)

t = [6.88022] [-3.57254] [-5.92175] [-4.63522]

The results show that the coefficient of the exchange rate is positive as expected. It is also statistically significant as its t-value of 6.88 exceeds its critical value of 2.042 at 5% level of significance. Thus, in the long run, the exchange rate had a positive and statistically significant effect on aggregate consumption in Nigeria during the review period.

The coefficients of GDP, interest rate and domestic prices are negative. They are however statistically significant. The sign of GDP contradicts the finding by Ezeji and Ajudua (2015). This is because increase in GDP (income) and deposit interest rate raise the marginal propensity to save (MPS) which directly leads to increase in savings. On the other hand, continuous increase in domestic prices raises the level of inflation. Thus, in the long run, GDP, deposit interest rate and domestic prices had negative and statistically significant

effect on aggregate consumption in Nigeria.

(d) Error Correction estimates (Short Run Dynamics)

In the short run, the error correction model is expected to confirm the co-integration in the Johansen Cointegration Test. The result of the short run relationship is presented in Table 4

Table 4: Error Correction Estimates

	Coefficient	Std. Error	t-Statistic	Prob.
ECM(-1)	-0.011972	0.00362	-3.308206	0.0003
lnFCONS(-1)	-0.055813	0.296387	-0.188312	0.8520
lnEXR(-1)	0.068292	0.127606	0.535179	0.5969
lnGDP(-1)	-0.079224	0.279272	-0.283679	0.7788
lnINTR(-1)	-0.104925	0.150031	-0.699355	0.4903
lnCPI(-1)	0.616382	0.302964	2.034504	0.0518
C	0.062253	0.025195	2.470855	0.0201

Source: *Author's computations using Eviews 9.0*

Critical to the analysis of the short run relationship is the significance and sign of the Error Correction Mechanism (ECM). It is expected to be negative and statistically significant. From the result in Table 4.4, the coefficient of the ECM term is appropriately signed and statistically significant at the 5% level of significance. Given the magnitude of -0.011972, any disequilibrium between the short run and long run will be automatically cleared by 1.2% yearly. Thus, the speed of adjustment between the short run and long run is 1.2%.

The coefficient of the exchange rate is positive but is statistically insignificant. Therefore, in the short run, it exerts a positive but insignificant effect on aggregate consumption.

As in the long run, the coefficients of the GDP and deposit interest rate are negatively signed. But unlike in the short run, they not statistically significant. This means that GDP and INTR have negative and insignificant impact on aggregate consumption in Nigeria. This is probably because an increase the deposit interest rate would raise the marginal propensity to save (given that the interest rate and savings are positively related), thereby leading to a fall in consumption.

Domestic prices, however have a positive and statistically significant impact on aggregate consumption in Nigeria. This is because aggregate consumption includes domestic and foreign consumption and an increase in domestic prices is likely to spur the foreign component of aggregate consumption. Thus, the increase in domestic prices would significantly impact on aggregate consumption in Nigeria.

The robustness of the results of the model was checked for serial correlation, heteroscedasticity and normality using Breusch-Godfrey, Breusch-Pagan-Godfrey and Jaque-Beratests respectively. The results are presented in Table 5.

Table 5: Diagnostic Test Results

Test	Probability of Fstatistic
Breusch-Godfrey serial correlation LM test	0.2916
Breusch-Pagan-Godfrey Heteroscedascity	0.6248
Jague-Bera normality test	0.129823

Source: *Author's Computation using Eviews 9*

The results shown in Table 5 provide reasons to conclude that the residuals of the model are free from serial correlation and are homoscedastic,and the series follow the normal distribution (that is, the residuals are multivariate normal). This is because the probability values of the F-statistic for the various tests are greater than the cut-off mark of 0.05, leading to the acceptance of the null hypothesis. The CUSUM which calculates the D-W statistic is situated inside the critical boundaries (the dotted lines) at 5% level of significance. This indicates that the model's estimates are econometrically stable. The result is shown in Figure4.2.

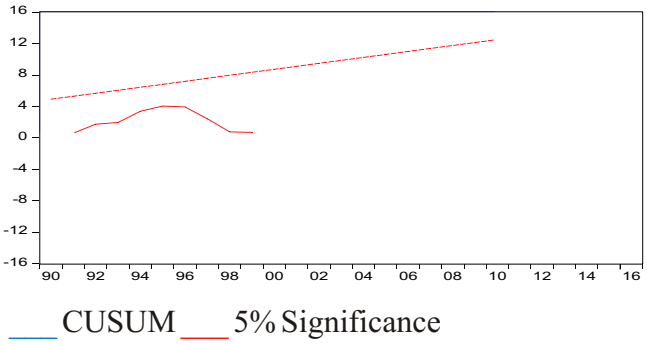


Figure 2: CUSUM of the Model

Conclusion and Recommendations

Based on these findings the study concluded that in the short run, the exchange rate had a negative but statistically not significant effect on aggregate consumption in Nigeria. In the long run, this effect is both positively and statistically significant. This is because, as stated earlier, an increase in the exchange rate will raise the domestic component of aggregate consumption, resulting into long run

increase in aggregate consumption. The impact of exchange rate on aggregate consumption in the short run is not significant because in the short run, exchange rate extents its impact on prices while prices impact on aggregate consumption. Thus, the influence of exchange rate on aggregate consumption in Nigeria is a pass through prices to aggregate consumption.

Based on these findings, the following recommendations are made: first, the Monetary Authority (CBN) should put in more efforts to stabilize the exchange rate so as to correct the fluctuations in the trend. This will go a long way in smoothening the level of inflation and domestic prices in Nigeria.

Second, since exchange rate has a positive impact on imports-influenced aggregate consumption in Nigeria, domestic demand based policies should be put in place such as short term devaluation of the Naira so as to discourage imports and foster economic growth through domestic demand.

Third, commercial and deposit money banks should lower deposit interest rate so as to discourage savings. This is because deposit interest rate has a negative relationship with aggregate consumption. Thus, a decrease in deposit interest rate will spur increase in consumption expenditure and raise the marginal propensity to consume above the marginal propensity to save.

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