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**EXCHANGE RATE FLUCTUATIONS AND HOUSEHOLD WELFARE IN NIGERIA**

**Richardson Kojo Edeme<sup>1</sup>, Chinononyelum Joan Okafor<sup>2</sup>**

<sup>1</sup>Department of Economics, Faculty of the Social Sciences, University of Nigeria, Nsukka, Enugu state, Nigeria

Email: [richard.edeme@unn.edu.ng](mailto:richard.edeme@unn.edu.ng), [kojodynamics@yahoo.com](mailto:kojodynamics@yahoo.com)

<sup>2</sup>Department of Business Administration & Management, Abia State Polytechnic, Aba-Abia State

**ABSTRACT**

The study investigates the impact of exchange rate fluctuations on household welfare as well as the causal relationship between exchange rate fluctuation and household welfare in Nigeria. Household welfare was captured with household consumption expenditure per capita while exchange was defined as the price of a dollar in terms of naira. The study employed the linear regression methodology and Ordinary Least Squares (OLS) estimation technique and Granger causality test on annual time series data from 1980-2014. The result of the analysis revealed that household welfare responds positively and significantly to fluctuations in exchange. The result of the Granger causality test also revealed that exchange rate Granger-causes household welfare. Although the impact of exchange rate fluctuation is positive, it depletes household welfare since fewer goods can be bought with more units of naira. Thus, the overall impact of exchange rate fluctuations on the household welfare in Nigeria is negative. Given the positive impact of the exchange rate on household consumption expenditure and its attendant consequence of depleting savings in order to smooth consumption, the government therefore should evolve exchange rate management approach that will strengthen the naira against the dollar.

**Keywords:** Exchange rate fluctuation, Household welfare, Household consumption expenditure per capita

**JEL Classification:** C22, C32, O11, O19

**1.INTRODUCTION**

The effects of exchange rate fluctuations in developing countries have raised much contention among economists and other policy makers. In Nigeria as in other countries, the contention has always been on the degree of fluctuations in the exchange rate which has in turn developed internal and external shock in the economy. Scholars have come to terms that exchange rate

volatility has a far reaching effect on several economic indices like the consumer price index, household welfare or standard of living, balance of payment, etc because of the interconnectedness amongst these variables. According to Oladipupo and Onotaniyohuwo (2011), movements in the exchange rate have domino effects on other economic variables such as interest rate, inflation rate, unemployment, money supply, etc. These actually emphasize the importance of exchange rate to the standard of living and overall well-being of the economy of any country that engages in international trade. The significance of exchange rate emerges from the argument that it links up the price systems of two or several countries creating an avenue for direct comparison of prices of traded goods. That is to say, exchange rate allows for comparison between domestic prices and international prices. After the somersaulting of the Breton woods fixed exchange rate system in 1973, the naira began to fluctuate and since then from every indication it has not found its footings. Exchange rate volatility has stirred much concern in various quarters in Nigeria; this is according to Opaluwa (2010), the goal of every economy is to have a stable rate of exchange with its partners in trade. However, it is obvious that in Nigeria, this goal has remained a mirage regardless of the fact that the country has embarked on countless devaluation exercises in order to promote export and also stabilize the exchange rate. The inability of the country to bring this goal to fruition has continually diminished the welfare and standard of living of households and in fact affected the macro economy adversely. Exchange rate policies in developing countries according to Dada and Oyeranti (2012) are often sensitive and controversial, mainly because of the kind of structural transformation required, such as reducing imports or expanding non-oil exports, invariably imply a depreciation of the nominal exchange rate. Regardless of efforts by the government through its monetary authority to maintain a stable exchange rate, the official exchange rate of naira has continued to depreciate against the US dollar from N0.7143 in 1970 to N2.02 in 1986, N7.901 in 1990. The policy of managed floating exchange rate put the naira at N21.886 in 1994, N86.322 in 1999 and N135.50 in 2004. Thereafter, the naira depreciated to N132.15 in 2005 and later appreciated to N118.57 in 2008. Towards the end of the year, the naira depreciated to N150.0124 in 2009 and in August, 2013 the exchange rate of one US dollar to naira is N160.14756 (or N160.15). However, the naira reached an all time low against the dollar in 2015 when it recorded N204 per dollar in February 2015 and later by December the same year averaged 199.127.

The households' income (per capita income) is a clear indication that the welfare of the populace and their standard of living is far below expectations. The growth per capita ever since the 1970s have being below average and have only increased sluggishly. The per capita of the Nigeria's GDP were \$418, \$492, \$620, \$714, \$1051, and \$1281 for years 1970, 1971, 1972, 1973 1974 and 1975 respectively. There was an upward but sluggish movement in the in the GDP per capita from 1970-1985. But the period 1986, through 2003 witnessed a great decline. However, the per

capita income began to witness a rise from 2004. Although there has been an upward trend especially from 2004; the movement was characterized by intermittent fluctuations and sluggish. The Nigeria's per capita income and household's consumption per capita was put at \$3561 \$615 respectively in 2014. These instabilities, low and sluggish growth in the households' income and consumption amongst other things have been blamed upon the continuous depreciation of the naira in the foreign exchange market which has resulted in declines in the standard of living of the populace.

According to World Bank (2014), Nigeria's poverty rate rose from 36 percent to about 65 percent between 1970 and 2000, it dropped to 54 percent in 2004 and again rose to 61 percent in 2010 (61% of Nigerians were living in absolute poverty) although the Bank stated that Nigeria's poverty rate dropped to 33.1 percent in 2013, it is believed that oil revenue has not seemed to add to the standard of living but obviously has caused the standard of living to decline.

Fluctuations in the exchange rate have been given an important attention for the presumed influence it has on macroeconomic variables. Sachs and Warner (2005) stated that instability of the exchange rate can reduce the standard of living of household by unnecessarily increasing the cost of living and making the domestic currency to lose its purchasing power. In Nigeria where most of heavy equipments and raw materials are imported, unfavorable exchange rate can discourage investment and hence diminish welfare. Mckillop (2004) also posited that higher exchange rate leads to higher interest rates and capable of plunging an economy into recession. The discussion so far is taken further by the analysis of the trend of the exchange rate and the household welfare captured by the household consumption per capita with the aid of the figures below; figure 1 reveals that the exchange rate was relatively low and stable in the 1970s which could be as a result of the fixed exchange rate system around the early 70s until the Breton wood institutions introduced the managed floating exchange rate system from the 1973. Between 1970 and 1984 the naira was at par with the US dollar as shown in the figure 1 with just a slight difference. But by 1987 the exchange rate of naira to dollar began to widen and since then the naira has continued to fall. The naira/dollar exchange rate however was relatively low around the 1990s compared to the periods from 2000 till 2015. The exchange rate witnessed a sharp rise in 1998, reaching an all time high in 2015. Around the 1970 when the exchange rate was fairly stable, the standard of living was rising as shown in figure 3 this being as a result of the naira having retained a great deal of value prior to its collapse in the subsequent period. The per capita income was very high in 1980; however this bliss was not enjoyed for too long and declined. The household consumption per capita continued to decline from 1986 and at this point the exchange rate between naira and dollar also went high. The household consumption per capita declined reaching an all time low \$347 in 1994. From 1996 to 2015, the exchange rate has been fluctuating and at the same time there has been inconsistency in the household consumption per

capita. Therefore, it could be concluded from the foregoing that the fluctuations in the exchange rate have resulted to inconsistency in the household consumption per capita income and consequent reduction in the household welfare and standard of living. Furthermore, the inconsistency in the household consumption per capita per capita has been blamed upon the exchange rate volatility. Arising from the above, it becomes necessary to ascertain empirically the impact of exchange rate fluctuations household welfare in Nigeria. Specifically, the objective of this study is to estimate the impact of exchange rate fluctuations on household consumption in Nigeria. The main focus of this research work is to elicit information on the effect of exchange rate fluctuations on household welfare captured by per capita income and also to ascertain the kind of relationship that exist between them. It is believed that the outcome of this research of help government and monetary authority to come up with appropriate fiscal and monetary measures that will help tackle the macroeconomic instabilities orchestrated by fluctuations in the exchange rate and improve the standard of living of the country's teeming population.

## **2. REVIEW OF PREVIOUS STUDIES**

Bacchetta and Van Wincoop (2000) examine the impact of volatility on trade and welfare in the context of both fixed and flexible exchange rate regimes, employing the general equilibrium model on the assumption that uncertainty arises only from monetary and fiscal policy. An interesting finding from their study is that the monetary stimulus in a country that causes depreciation of its currency may not have much impact on its trade as depreciation of the exchange rate on one hand reduces imports but on the other hand, the increase in domestic demand relating to the monetary stimulus may increase imports in the same magnitude. Arize (2000) used different robust cointegration and error correction techniques to estimate a 4-variables model where exports re regressed against world demand conditions, relative prices and exchange rate. In their cross-country panel study, the results reveal a robust evidence of significant and negative, short run and long run effects of exchange rate volatility on export flows in eight Latin American Countries for a quarterly period 1973-2004. Using a sample of 33 developing countries, Pallage and Robe (2003) however argued that in many poor countries, the welfare gain from expunging volatility could far outweigh the welfare gain from percentage-point increase in growth.

Boar (2010) analyzed the influence of nominal and real effective exchange rate volatility on growth in a panel of six developing European countries, employing two measures of volatility and tested their influence on growth using GLS and GMM estimation techniques. The findings revealed that there is a negative influence of exchange rate volatility on economic growth. This outcome was further confirmed by Holland (2011), Márcio and Flávio (2011), Ndambendia and

Alhayky (2011), Feldmann (2011) and Toulaboe (2011) when they conclude that inappropriate exchange rate policies result in poor economic performance that many developing countries have experienced.

Adu-Gyamfi (2011) employed co integration and an error correction model to study the Ghanaian Economy and noted that there existed a significant short-term negative relationship between economic growth and exchange rate volatility in Ghana. Conversely, an insignificant long-term negative relationship existed between economic growth and exchange rate volatility in Ghana.

In a similar study, Enekwe, Ordu and Nwoha (2013) investigated the effects of exchange rate fluctuations on manufacturing sector in Nigeria from 1985-2010). Manufacturing gross domestic product (MGDP) stands as dependent variable while manufacturing foreign private investment, manufacturing employment rate and exchange rate as independent variables. The results of the analysis showed that all the independent variables have significant and positive relationship with dependent variable. It also indicates that manufacturing foreign private investment and exchange rate have positive effect on manufacturing gross domestic product. The study by Ettah, Akpan and Etim (2010) focused on the effects exchange rate fluctuations on Agricultural exports (cocoa) in Nigeria. An export supply function for cocoa was specified and estimated using the Ordinary Least Squares Regression. Result shows that exchange rate fluctuations positively and significantly affect cocoa exportation in Nigeria

Oyovwi (2012) evaluated the effect of exchange rate volatility on economic growth in Nigeria. He noted that in the short run, economic growth was positively related to exchange rate volatility while in the long run, a negative relationship existed between the two variables. His findings contradict that by Adu-Gyamfi (2011) for Ghana. Shehu (2012) quantitatively assess the impact of exchange rate volatility on non-oil export flows in Nigeria. Employing quarterly data for twenty years, vector co-integration estimate revealed that the naira exchange rate volatility decreased non-oil exports and recommended measures that would promote greater openness of the economy and exchange rate stability in the economy. Akinlo and Adejumo (2014) investigated the impact of exchange rate volatility on non-oil exports in Nigeria and found that exchange rate volatility has positive and significant effects on non-oil exports in the long run while the short run impact of the exchange rate volatility is statistically insignificant. The policy implication is that the exchange rate volatility is only effective in the long run but not in the short run in the Nigerian economy. Oluwaseyi, Adesoye and Oluwakemi (2015) examined the effect of exchange rate volatility on investment and growth in Nigeria. Nnanna and Nasiri (2015) ascertain the relationship between real exchange rate and economic growth applying those

variables that adjudged to make up equilibrium exchange rate thereby exploring the interrelationship that exist among rear exchange rate, gross domestic product, export, import and foreign direct investment. Analyzing the data using VAR technique, it was found that real exchange rate fluctuation was significantly controlled by its positive relation with import as well as its negative relation to real GDP and foreign direct investment. Similarly, gross domestic product is positively controlled by depreciating exchange rate, increasing previous GDP and FDI. Nigerian economic growth within this period was characterized by sustainable growth enhanced by sustainable increase in these factors.

### 3. METHODOLOGY

This study adopt the popular Keynesian model of consumption which states that consumers are disposed as a rule and on the average to increase consumption as income increases but not at the same rate as the increase in income. Keynes isolated disposable income as the major determinant of consumption level and stated his consumption model as:

$$C = a + \beta Y \quad \dots\dots\dots (3.1)$$

where: C = consumption, a=autonomous consumption,  $\beta$ =marginal propensity to consume, Y=disposable income.

Acknowledging disposable income as a basic determinant of consumption, the Keynesian model is expanded to include various other variables that determine consumption level of households in an open economy. Although, the major focus of this study is on exchange rate fluctuation, we include other control variables. In line with the variables under focus, the model for this study can be stated linearly as;

$$\partial HSW = \eta_0 + \eta_1 \partial EXR + \eta_2 \partial EXP + \eta_3 \partial PCI + \eta_4 \partial INT + \eta_5 \partial FDI + \mu_t \quad \dots\dots\dots (3.2)$$

where HSW= Household welfare (proxied by household consumption expenditure per capita), EXR= Exchange rate (Domestic/foreign, i.e Naira/Dollar), EXP= Export, PCI= Per capita income, INT= Interest rate, FDI= Foreign direct investment,  $\partial$  = partial dirative,  $\mu_t$  = Stochastic error term. The data used in this study are annual series from 1970-2014 obtained from Central Bank of Nigeria Statistical Bulletin, Nigeria Bureau of Statistics and World Bank Database (WDI). Data were analyzed with Eviews 8 econometric software package.

The VAR model will be used to find the causality relationship between the dependent variable and the explanatory variables. The model is of the form:

$$\begin{aligned}
 ?HSW_t = & \alpha + \sum_{j=1}^k \beta_j H?CE_{t-j} + \sum_{j=1}^k \delta_j EXR_{t-j} + \sum_{j=1}^k \theta_j INT_{t-j} + \sum_{j=1}^k \varphi_j FDI_{t-j} + \sum_{j=1}^k \vartheta_j PCI_{t-j} \\
 & + \sum_{j=1}^k \varrho_j EXP_{t-j} + \mu_{1t} \text{-----} (3.2a)
 \end{aligned}$$

$$\begin{aligned}
 EXR_t = & \rho + \sum_{j=1}^k \chi_j EXR_{t-j} + \sum_{j=1}^k \gamma_j HSW_{t-j} + \sum_{j=1}^k \eta_j INT_{t-j} + \sum_{j=1}^k \tau_j FDI_{t-j} + \sum_{j=1}^k \varpi_j PCI_{t-j} \\
 & + \sum_{j=1}^k \upsilon_j EXP_{t-j} + \mu_{2t} \text{-----} (3.2b)
 \end{aligned}$$

$$\begin{aligned}
 INT_t = & \sigma + \sum_{j=1}^k \omicron_j INT_{t-j} + \sum_{j=1}^k \pi_j HSW_{t-j} + \sum_{j=1}^k \nu_j EXR_{t-j} + \sum_{j=1}^k \theta_j FDI_{t-j} + \sum_{j=1}^k \psi_j PCI_{t-j} \\
 & + \sum_{j=1}^k \sigma_j EXP_{t-j} + \mu_{3t} \text{-----} (3.2c)
 \end{aligned}$$

$$\begin{aligned}
 FDI_t = & \alpha + \sum_{j=1}^k \beta_j FDI_{t-j} + \sum_{j=1}^k \delta_j HSW_{t-j} + \sum_{j=1}^k \theta_j EXR_{t-j} + \sum_{j=1}^k \omega_j INT_{t-j} + \sum_{j=1}^k \varrho_j PCI_{t-j} \\
 & + \sum_{j=1}^k \chi_j EXP_{t-j} + \mu_{4t} \text{-----} (3.2d)
 \end{aligned}$$

$$\begin{aligned}
 PCI_t = & \theta + \sum_{j=1}^k \omicron_j PCI_{t-j} + \sum_{j=1}^k \pi_j HSW_{t-j} + \sum_{j=1}^k \nu_j EXR_{t-j} + \sum_{j=1}^k \kappa_j INT_{t-j} + \sum_{j=1}^k \beta_j FDI_{t-j} + \sum_{j=1}^k \psi_j GDP_{t-j} \\
 & + \sum_{j=1}^k \delta_j NEX_{t-j} + \mu_{6t} \text{-----} (3.2e)
 \end{aligned}$$

$$\begin{aligned}
 NEX_t = & \theta + \sum_{j=1}^k \pi_j HSW_{t-j} + \sum_{j=1}^k \nu_j EXR_{t-j} + \sum_{j=1}^k \kappa_j INT_{t-j} + \sum_{j=1}^k \beta_j FDI_{t-j} \\
 & + \sum_{j=1}^k \delta_j PCI_{t-j} + \mu_{6t} \text{-----} (3.2f)
 \end{aligned}$$

In analyzing Granger-Causality relationships, our main focus is to find the lead/lag relationship between variables. The Granger (1969) approach to the question of whether X causes Y is to determine how much of the current Y can be explained by past values of Y, and then to see whether adding lagged values of X can improve the explanation. Y is said to be Granger-

caused by X if X helps in the prediction of Y, or if the coefficients on the lagged Xs are statistically significant. Note that two-way causation is frequently the case: where X Granger-causes Y and Y Granger-causes X).

#### 4. RESULT AND DISCUSSION

The result presentation starts with the presentation of the result of the various pre-estimation tests conducted which include descriptive statistics, stationarity test and cointegration test

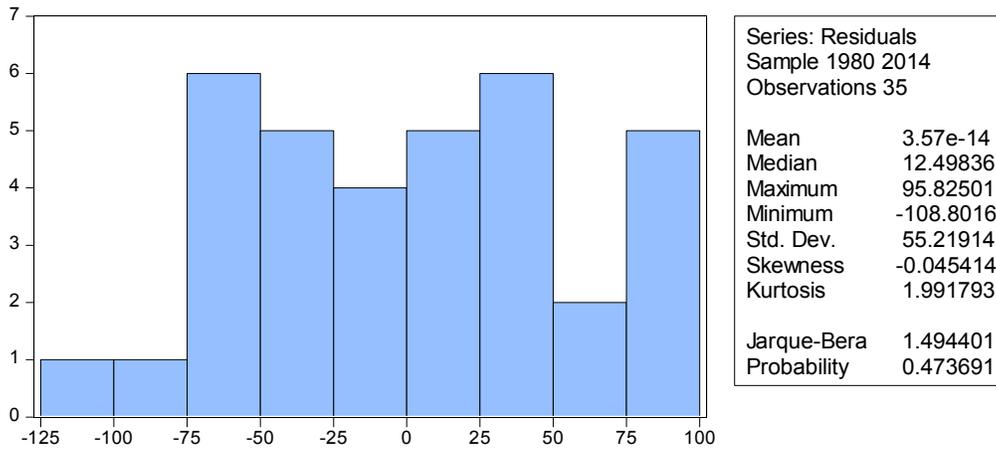
##### 4.1 Descriptive Statistics Result

Table 1: Summary of descriptive statistics

Variable	HSW	EXR	FDI	EXP	PCI	INT
Mean	475.3567	66.30739	2.58E+09	1.41E+12	1476.514	12.3765
Median	480.6758	21.88610	1.35E+09	1.90E+11	1079.000	10.8200
Maximum	700.4036	168.2130	8.84E+09	1.34E+13	3567.000	26.2057
Minimum	294.6151	0.546358	1.89E+08	-1.91E+11	383.0000	4.7048
Std. Dev.	115.7887	64.28009	2.67E+09	2.73E+12	997.4667	5.6451
Skewness	0.184438	0.280175	1.146181	2.832733	0.541040	0.8567
Kurtosis	1.811217	1.288818	2.899965	11.95944	1.832988	2.8786
Jarque-Bera	2.259360	4.728113	7.678020	163.8715	3.693687	4.3028
Probability	0.323137	0.094038	0.021515	0.000000	0.157734	0.1163

From the descriptive statistic in Table 1 above, export has the highest average value while interest rate has the least average value. Since all the variables exhibit positive range of value, it shows that the mean is normally distributed. The median of the variables when arranged in order of magnitude are the values of the household consumption expenditure per capita and per capita income as they take the 3<sup>rd</sup> and 4<sup>th</sup> position. Export has the highest value in the order of magnitude while the data for the interest rate has the lowest value in the order of magnitude. All the variables are positively skewed but export has the longest tail indicating that it has the more large extreme values than others. The kurtosis of all the variables except that of the export are less than 3 indicating that they are all platykurtic, which implies they have negative kurtosis (i.e. their probability distribution have very low peakedness) as further indicated in the normality test presented in Figure I below.

Figure I: Normality Test



4.1.2 Stationarity Test (Unit Root Test)

To test the stationarity of the variables, Augmented Dickey-Fuller test was used and the results presented in Table 2 below.

Table 2: Unit Root Result

Variable	ADF Test Statistic	Mackinnon Critical Value At 5%	Order of Integration
HSW	-4.0095	-3.5577	I(1)
EXR	-3.7053	-3.5577	I(1)
FDI	-4.0314	-3.5577	I(1)
INT	-6.7015	-3.5628	I(2)
PCI	-4.6259	-3.5577	I(1)
EXPT	-3.6721	-3.5577	I(1)

In Table 2 above, except for interest which is integrated at order I(2), household consumption expenditure per capita, foreign direct investment and exchange rate are integrated at order I(1). Their absolute values are greater than the ADF critical values at 5% level of significance. We therefore conclude that all the variables are stationary.

The impact of exchange rate, export, per capita income, interest rate and foreign direct investment on household welfare was determined with ordinary least squares (OLS) and the result presented below.

Table 3: OLS result

Variable	Coefficient	Standard Error	t-value	Probability
Constant	29.8432	14.5852	4.8335	0.0000
EXR	1.4858	0.3439	4.3194	0.0002**
FDI	1.72E-08	9.64E-09	1.7813	0.0853*
INT	-2.5810	2.0202	-1.2775	0.2115*
PCI	0.1150	0.0168	6.8304	0.0000**
EXP	-0.0273	0.0073	-3.7043	0.0009*
R2 = 0.77 DW = 1.46				

Source: Authors' calculation. Note: \*\*indicate significance at 10%, \*indicate significance at 5%

The coefficient of exchange rate of 1.4858 is an indication that a positive relationship exist between household welfare and exchange rate. The positive relationship is also significant. Thus holding other variables constant, a unit increase in the exchange rate will on the average increase the level of household welfare by about 1.49 percent. From the result, a positive relationship also exist between household welfare and foreign direct investment (FDI), it is not statistically significant. Holding other variables constant, a unit increase in foreign direct investment would on the average increase household welfare by 0.002 percentage point. The coefficient for per capita income is 0.1150 and significant which implies a positive relationship between per capita income and household welfare. Specifically, holding other variables constant, a unit increase in per capita income will on the average increase household consumption per capita by 0.12 percent. This result conforms to a prior expectation going by the Keynesian law of consumption which postulates that on the average disposable increase consumption as income increases but not in the rate as the increase in income. Interest rate has negative relationship with household welfare. Holding other variables constant, a unit increase in interest rate will on the average decrease the level of household consumption per capita by 2.58 percent. Interest rate reduces the purchasing power of the consumer because it affects savings and consumption pattern. However, being statistically insignificant, it could be inferred that interest rate has not been actually

inhibiting household welfare in Nigeria. Although, the coefficient of export is also found to be significant, the result reveals a negative relationship between export and household welfare. A unit increase in export would reduce household welfare 0.03 percent. This outcome is in tandem with theory as more export will decrease the amount of goods available for domestic consumption and hence decrease the level of consumption expenditure.

Table 4: Pair-wise Granger causality test result between Household consumption per capita and Exchange rate

Null hypothesis	f-statistic	Prob.
EXR does not Granger Cause HSW	10.6719	0.0004
HSW does not Granger Cause EXR	0.5571	0.5791

Source: Authors' calculation

From Table 4 above, judging by the p-value, it could be deduced that exchange rate Granger causes household welfare while household welfare does not Granger cause exchange rate at 5% level of significance. In resume, the direction of causality flows from exchange rate to household welfare without a feedback.

### 5. CONCLUSION

From the study, it has been shown that the impact of the exchange rate increases on the household welfare is positive but at the expense of depletion of household savings. Thus, we conclude that though the impact of exchange rate fluctuation is positive, it depletes household welfare since fewer goods can be bought with more units of naira. Thus, the overall impact of exchange rate fluctuations on the household welfare in Nigeria is negative. Given the positive impact of the exchange rate on household consumption expenditure and its attendant consequence of depleting savings in order to smooth consumption, the government therefore should evolve exchange rate management approach that will strengthen the naira against the dollar.

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