# Impact of Remittances from Nigerians in diaspora on Exchange rate Stability

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### ABSTRACT

*This Paper delves into examining the impact of remittances flow on exchange rate stability for the period 1990-2018. In an attempt to realize the major objectives of the study various writers' works on relevant topics were exhaustively reviewed. The study utilizes annual time series data for its analysis and data on Exchange rate Remittances inflow as percentage of GDP, FDI and Oil price were collected for the period under review. Autoregressive distributed lag (ARDL) model approach was applied to estimate long run and short run relationship among the aforementioned variables. Both the short run and long run levels result seems to be consistent with each other that remittances is positively and significantly related to exchange rate meaning it leads to depreciation of Naira while FDI and oil prices found to appreciate the value of the Naira. The error correction model of the analysis is correctly sign and significant with 84% speed of adjustment per annum.*

**Keywords: Exchange rate, Remittances FDI, GDP, ARDL**

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# 1.0 Introduction

Exchange rate remains a core macroeconomic variable alongside Gross Domestic Product (GDP), Inflation rate, Interest rate, balance of payment (BOP), Unemployment rate which in aggregation give an outlook/mirror the performance of an economy over a period of time. They reflect the underlying strength, vulnerability and competitiveness with world economies.

There are numerous factors that affect exchange rate stability some are general while others are peculiar to countries with similar economic setting as Nigeria. For instance a change in oil price will have a certain massive effect on the Nigerian Naira (₦) than it might have on United Kingdom's Sterling Pounds (£) given the fact the Nigerian economy substantially depends on crude oil proceedings.

As a general rule whenever the home currency depreciates it will result in cheaper export goods (higher import goods) while when the home currency appreciates it will result in lower import prices (higher export goods) making domestically produced goods unattractive. Given this notion stability of exchange remains a vital macroeconomic objective which all monetary policy authorities seeks to achieve.

Relatively, Remittances are transfers of money sent back to home country by individuals working abroad. Remittances is mainly a household income and is sent back through both formal and informal channels. The remittances inflow is of crucial importance to the recipient countries which are most likely the developing nations.

Remittances have the potency of both direct impacts ie poverty reduction, offset of BOP deficits, reducing of foreign exchange shortages, productive investment and stimulation of aggregate demand and indirect impacts such as easing of capital and risk restraint and generation of multiplier effects of consumption spending.
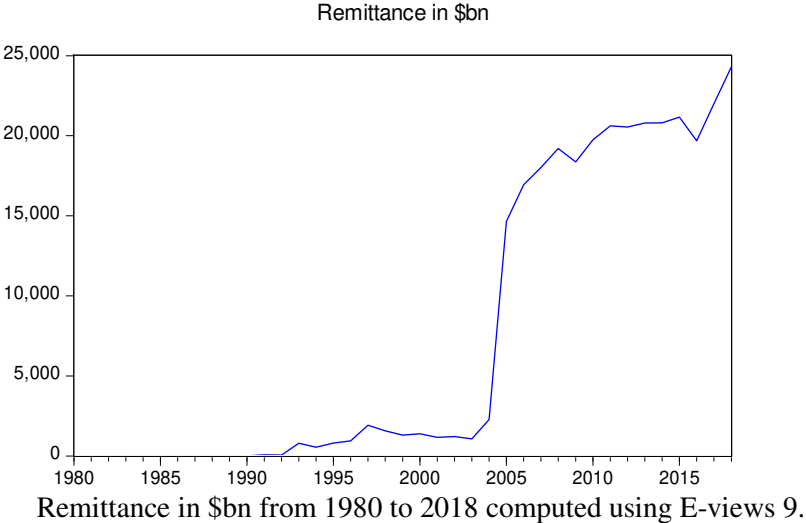
 This is made possible through the perpetual rise in migration from developing nations to developed nations due to harsh economic standard of living, brain drain, natural disasters, political instability, incessant civil unrest/violence, ravaging poverty in countries of origin. Also some are migrating in a continuous scout of greener pastures, establish Professional networkings and high payoffs for their labor services rendered (remunerations).

On the global scale World Bank estimated remittances grew by 10%, $689bn in 2018 from $633bn in 2017 with developing countries receiving 77% ($528). In aggregation India, China, Philippines, Mexico and Egypt accounting for an approximate value of 36% total inflows. However the official recorded remittance

are much lower than the actual remittance that takes place through informal channels which aren't yet track or recorded due to under developed collection in most recipient countries.
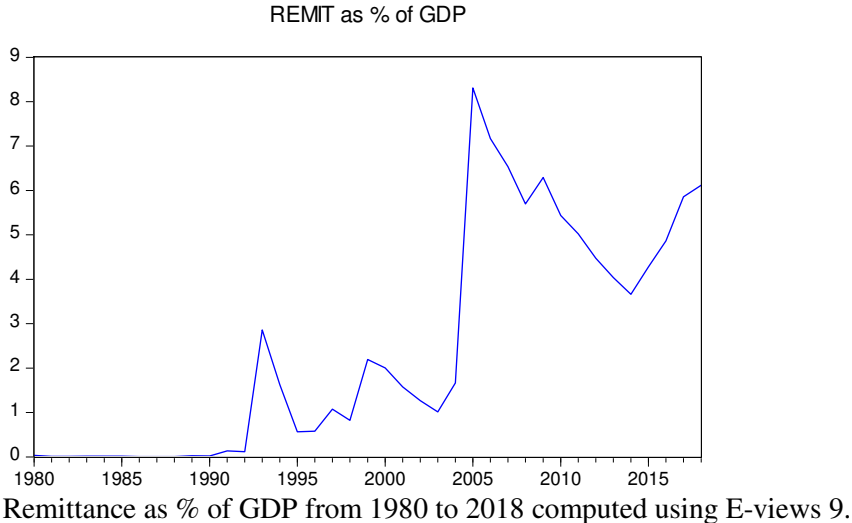
Egypt and Nigeria account for the largest recipients nations in Africa in 2018. Initially in 2017 Nigeria was the highest in Africa continent in terms of remittances receipts but dropped to second place behind Egypt in 2018.

*Figure 1- Nigerian Remittance in $bn*

Remittance in $bn

Remittance in $bn from 1980 to 2018 computed using E-views 9.

Source: World Development Indicators (WDI)

*Figure 2- Nigeria's Remittance Flows as a % of GDP*

REMIT as % of GDP

Remittance as % of GDP from 1980 to 2018 computed using E-views 9.

Source: World Development Indicators (WDI)

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*Figure 3- Comparative analysis between Remittances as % of GDP and FDI as % of GDP*



Computed using E-views 9.

Source: World Development Indicators (WDI)

A report by World Bank, (2013), Nigeria was indicated amongst the top remittances receiving countries four places behind India ($71bn), China ($60bn), Philippines ($26bn) and Mexico ($22bn) respectively

Consequently in the same World Bank (2013) report, Nigeria was indicated as the highest recipient of remittances in Africa which as at 2010 and 2013 stood up to $10bn and $21bn respectively.

According to United Nations, 2017 they are about 1.24 million Nigerians migrants in the diaspora with projection of the figure rising up in 2018 and 2019. In a survey conducted by PricewaterhouseCoopers (PWC, 2019) that half of Nigerian adults have indicated their willingness to leave the country in the next five years.

Furthermore PWC, 2019 estimated that the amount rose to $23.63bn in 2018 and project the remittance inflow is to hit $25.5bn, $29.8bn and $34.8bn in 2019, 2021 and 2023 respectively.

After crude oil proceeds the remittance inflow to Nigeria follows second as the main source of foreign receipts out spacing Foreign Direct investment (FDI), Official Development Assistance (ODA) and portfolio investment flow, World Bank (2019). The 2018 remittance translates to 83% of Federal Government Budget in 2018, 11 times the FDI and 7.4 times larger than the net official development assistance in 2017 of $3.4bn.

The significance of remittance to recipient households cannot be overemphasized. It's crystal clear how the these remittances are utilized to serve/fulfil consumption needs of household, insurance against adverse shocks, improving access to qualitative education and health care services, financing of cash and noncash investments, debt servicing of household debts, access to Information and Communication Technology (ICT) and aiding Financial inclusion. Aggregatively looking at the entire macroeconomic system remittances inflow drive the aggregate demand which in turn stimulate the economy to rising a growth.

To take into cognizance the role of remittances of Nigerians in diaspora the federal government signed the Nigerian in diaspora bill into law in July, 2017. Subsequently Nigerians in Diaspora Commission (NIDCOM) which was setup to engage and utilize the human, capital and material resources of the diaspora community. Given all the aforementioned evident fact and figures this research paper intends to establish a link between remittance inflow and exchange rate stability. Over the years it has been admitted that remittances inflows are the second major source of foreign receipts after crude oil which translating to spurring the supply of more foreign currencies in the forex market. From a broader perspective the supply of foreign exchange is derived from receipts of oil export, Non-oil exports, transfer/flow of financial assets to Nigeria's capital market, expenditure of foreign tourist in Nigeria, unilateral transfers from Nigerians in diaspora, flow of financial aid to Nigeria, while the demand side for forex comprises of payment for imports, financial commitment to international organization, debt service of external loan, granting of financial assistance to foreign countries. They pool of funds remitted back to Nigerian economy categorically comes from athletes and professionals working in both international agencies and national establishments abroad.

As a general mechanism whenever the supply of foreign currency exceeds the demands the foreign currency it will leads to appreciation of local currency (₦) and vice versa. In other words whenever the demand of local currency exceeds the demand for foreign currency and vice versa.

International remittances serves as an auxiliary/shock absorber against the fluctuations or sudden depreciation of local currency. They serve as an economic support for dependents of migrant workers in their home countries.

## 2.0 Literature Review

### 2.1 Conceptual Framework

The currencies of most countries are fully convertible to another, some at a fixed ratio and others at a ratio subject to daily fluctuations. This ratio is the number of units of one currency that are exchangeable for unit of another is termed as change rate. Exchange rate implies the price of one currency in terms of another. It is the ratio between a unit of one currency and the amount of another currency for which that can be exchanged at a particular time.

Different definitions have been attributed to Remittances inflows by different scholars. For instance, (D. Kihangire and M. Katarikawe , 2008)remittance is defined as money sent home by migrants working abroad to their home countries. Similarly, remittance has been defined has a portion of migrant workers earnings sent to their countries of origin and this could be in cash or gifts (Odozi .J.C, Awoyemi TT and Omonona BT ). Also, (International Monetary Fund, 1999)maintains that remittance is limited to money sent by migrant workers who have been staying in a foreign country for more than a year to his/her household in his/her country of origin and this does not include migrants that are self-employed. Furthermore International Organization for Migration (2006) largely defines remittances as the monetary flows connected to migration, that is, cash transfers by migrants or immigrants living abroad to a relation in home countries. (D.Solari, 2019) further categories remittances into Monetary remittance and social remittance and she emphasized on the direct link between migration and remittance based on her findings she conclude that Ukraine emigrants main motives for emigration are either poverty aversions or European aspirations.

According to the International Monetary Fund (IMF) remittance are recorded in three different sections of the BOP such as

- Compensation of employee are the gross earnings of workers residing abroad for less than 12 months and are recorded in the current account subcategory "income" item code 2310.
- Workers remittances are the value of monetary transfers sent home from workers residing abroad for more than one year recorded in the current account subcategory "current transfers" item code 2391.
- Migrant transfer represent the net wealth of migrants who move from one country of employment to another recorded in the capital account subcategory capital transfers item code 2431.

Although the IMF standard is clear and precise but most countries face complications in implementation and compliance. Countries like Bulgaria and Czech Republic, summed up all remittances under compensation of employees even for migrants who are abroad for more than a year and pull all remittances and merged them together with other private transfers respectively.

## 2.2 Theoretical Framework

As (Stark, 1991) points out no general theory of remittances exist however level of remittances depends on the migrant's ability (income-savings) and his motivation to remit savings generated from earnings to home country. Also on the desire/willingness of migrants to remit money depends on the intended duration of migration either temporary on permanent basis as well as the family situation.

In the literature there are number of hypothesis formulated as determinants of money remittances such as Pure Altruism, Pure Self Interest, Implicit family agreement (Co-insurance and loan), and Portfolio management decisions.

i.   <u>Pure Altruism</u>

This principle emphasized on how a migrant gives weight to concerned relatives welfare at home country. The migrant derives satisfaction from the welfare/wellbeing of his/her family. Moreover the model assumes number of hypothesis that; Firstly amount of remittances should increase with migrant's income, secondly the amount of remittances should decrease overtime as the attachment of the family weakens.

ii.   <u>Pure Self Interest</u>

This is another motive of remitting money back home which emphasized the rationality/self-interest of the migrant. It also predict three hypothesis that firstly a migrant remits money to his/her parent driven his aspirations to inherit from their stock of wealth, secondly the ownership of assets in the home country might motivate migrant to family members to look after those assets and thirdly the intention to return home might promote remittances for procurement of assets (financial & public) and undertake investment in real estate in a bid to enhance prestige, dignity, self-esteem and political affluence  in the local community.

iii.   <u>Implicit Co-insurance and loan agreement</u>

This model is based on implicit family decision making which involves an informal mutual agreement. The main aim for principle is risk diversification and investment in the education of young family members.

Under the implicit Co-insurance model, the migrant is first considered as an insuree and the family at home funds and finance the initial migration project which is relatively costlier and burdensome for it to be secured alone by the migrant alone, for that reason his family act as his/her support system. In the second phase of the migration project the migrant in turn act as an insurer to the family after securing employment abroad, high earnings and remit money to support his family consumption demands and undertake investments in the home country.

iv.    Portfolio Management Decision

This principle is distinctive from all the hypothesis aforementioned which mainly focused on the individual (microeconomic elements) rather than macroeconomic variables. This model takes into cognizance of the macroeconomic factors both in the host and home country that affects remittances. Migrant's savings on earnings might be remitted to given the considerations of interest rate, exchange rate, inflation rate and relative rate of returns on different financial and real assets.

 In view of these governments of remittance receiving nations used to implement incentives scheme ie premium of exchange rates, foreign exchange deposit with higher returns in order to attract remittances from their members in diaspora.

## 2.3 Empirical Literature
On the stock of literature on Nigeria, studies pertaining remittances and exchange rate are quietly very few. Most studies focused on its impact on GDP growth and development, the likes of (Adeagbo and A.O. Ayandibu, 2014), ( A. Badejo and O. Oshota , 2015) (Akonji and Wakili, 2013)and (2013) (Akinpelu ,Ogunbi,Oladejo and Omojola , 2013).

However from the very few studies between exchange rate and remittances at various scholars used different techniques to come up with their findings.

(Aderemi, 2019) In his study between exchange rate volatility and foreign capital inflows remittances inclusive in Nigeria using VAR found that FDI and exchange rate significantly related while remittance and exchange rate insignificantly positively related.

Also (Augustine Osigwe and Chekwube Madichie, 2015)examined the cointegration and granger causality between M2 (Money supply), remittance and exchange rate. The result obtained indicated the presence of cointegration, neutrality between M2 and remittance and unidirectional relationship between exchange and remittance.

Similarly in a panel study by (Adnan Khurshid et'al) of 58 countries from low, lower middle and middle-income groups using System Generalized Method of Moment (SGMM) for the period (1988-2014) found that remittance appreciate exchange rate and adversely affect competitiveness of lower- middle and middle-income countries.

Moreover (A.C, Osigwe & K.O, Obi, 2016) conducted a research to model impact of remittances on real exchange in Nigeria founds that remittance, openness, nominal exchange rate, terms of trade, RGDP growth positively impacted on RER While on the contrary government expenditure negatively affect RER.

## 3.0 METHODOLOGY

The type of data used in this analysis is annual time series data for Nigeria from the period of 1990-2018. Variables employed in the analysis are exchange rate (endogenous variable) while remittances, FDI rate, and oil price index are expressed as explanatory terms. Collected data were subjected to unit root test to ascertain their time series properties to avoid spurious result.

This study employs ARDL which is presumed to be more robust and dynamically stable as it accommodate variables of different order of integration. Also the ARDL doesn't necessarily require conducting Unit root test because the model accommodate both I (0) and I (1) series however to avoid model crash due to presence of I(2) stochastic trend it's advisable to undertake the Unit root test.

### 3.1.1 Data sources

With regard to this the study the data on all the four variables were sourced from different sources i.e. Data on exchange rate was sourced from CBN Statistical bulletin (2018), while data on both Remittances and FDI were all sourced from WDI (2018) and lastly data on Oil price year on year is obtained from Organization of Petroleum Exporting Countries (OPEC) statistical bulletin (2018).

### 3.1.2 Measurement of the variables:

*Table 1: Definition of Variables and Data Source*

| Variables | Measurements | Data source |
|-----------|--------------|-------------|
|           |              |             |

| Exchange Rate | Pre-Determined by CBN on a ₦/$ basis | CBN Statistical Bulletin (2018) |
|---|---|---|
| Remittances | Total sum of Remittances as % of annual GDP | WDI(2018) |
| FDI | Total value of FDI as % of annual GDP | WDI(2018) |
| Oil Price | Forces of demand and supply. $/barrel via ORB | OPEC Statistical Bulletin (2018) |

## 3.1 Method of Data Analysis

The method of analysis/estimation that will be used in this paper is the Autoregressive Distributed Lagged Model (ARDL) due it's to flexibility, dynamism and improvement upon the Ordinary Least Squares (OLS).

## 3.2. Model Specification

$$Y_t = \beta_0 + \beta_1 Y_{t-1} + \beta_2 X_t + \beta_3 X_{t-1} + \beta_4 Z_t + \beta_5 Z_{t-1} + \beta_6 O_t + \beta_7 O_{t-1} + \mu_t \text{ ----------- (1)}$$

Where;

$Y_t$= Exchange rate     $Y_{t-1}$= lagged of Exchange rate

$X_t$ =Remittances     $X_{t-1}$= lagged of Remittances

$Z_t$ =FDI     $Z_{t-1}$ = lagged of FDI

$O_t$= Oil price     $O_{t-1}$= lagged of Oil price

Taking the natural of eq (1) gives rise to the ARDL as

$$\ln\Delta EXR_t = \alpha_0 + \partial_1\ln EXR_{t-1} + \partial_2\ln REM_{t-1} + \partial_3\ln FDI_{t-1} + \partial_4\ln OP_{t-1} + \sum^n_{i=0}$$
$$\beta_1\Delta\ln EXR_{t-i} + +\sum^n_{i=0}\beta_2\Delta\ln REM_{t-i} + +\sum^n_{i=0}\beta_3\Delta\ln FDI_{t-i} + +\sum^n_{i=0}\beta_4\Delta\ln OP_{t-1} + \varepsilon_t-$$
------------------------------------ (2)

Where: The optimal lag length n determined using Akaike Information

Criteria (AIC), $\Delta$ denotes the first difference operator. The Expressions with

the summation sign ($\partial 1$-$\partial 4$) represent the long-run relationship. The

remaining expressions ($\beta 1$-$\beta 4$) correspond to the short-run dynamics of the

model.

After formulating ARDL model which describe the relationship between the

variables, then the long-run relationship model for exchange rate and its

determinants can be estimated as in equation (4):

$$\Delta EXR_t = \alpha_0 + \partial_1 EXR_{t-1} + \partial_2 REM_{t-1} + \partial_3 FDI_{t-1} + \partial_4 OP_{t-1} \text{----------------- (\textbf{3})}$$

In order to estimate the short-run dynamics, the error correction model

(ECM) was expressed in equation (4)

$$\Delta\ln EXR_t = \alpha_0 + \sum^n_{i=0}\beta_1\Delta\ln EXR_{t-i} + \sum^n_{i=0}\beta_2\Delta\ln REM_{t-i} + \sum^n_{i=0}\beta_3\Delta\ln$$

$$FDI_{t-i} + \sum^n_{i=0}\beta_4\Delta\ln OP_{t-i} + \lambda ECM_{t-1} \text{------------------------(\textbf{4})}$$

Where: $ECM_{t-1}$: The lagged error-correction term, $\lambda$: Parameter indicating

the speed of adjustment back to long run equilibrium after short run shock, $\lambda$

was expected to have negative sign and significant for the long run

equilibrium. The larger the error correction coefficient indicates faster

adjustment back to long run equilibrium after short run shock.

*Table 2-   UNIT ROOT TEST*

| VARIABLES | ADF | PP | KPSS | Order of Integration |
|---|---|---|---|---|
| EXCHANGE RATE | 16.70*** | 13.64 *** | 0.5000*** | I (1) |
| REMITTANCES | 6.30 *** | 8.51 *** | 0.2083  ** | I (1) |
| FDI | 8.59  *** | 12.0  *** | 0.5000*** | I(1) |
| OIL PRICE | 4.89 *** | 4.86  *** | 0.0880*** | I(1) |

Source: Author calculation using e-views 9.0

** * ** *indicate rejection of null hypothesis at 1% , 5%, 10% level of significance respectively.

*Table 3 ARDL Bounds test (co-integration test)*

| Critical values | I(0) Bound | I(1) Bound | F Statistic |
|---|---|---|---|
| 1% | 5.17 | 4.45 | |
| 5% | 4.01 | 5.07 | 62.89 |
| 10% | 3.47 | 6.36 | |

Source: Author calculation using e-views 9.0

*Table 4 - Estimated long run coefficients ARDL*

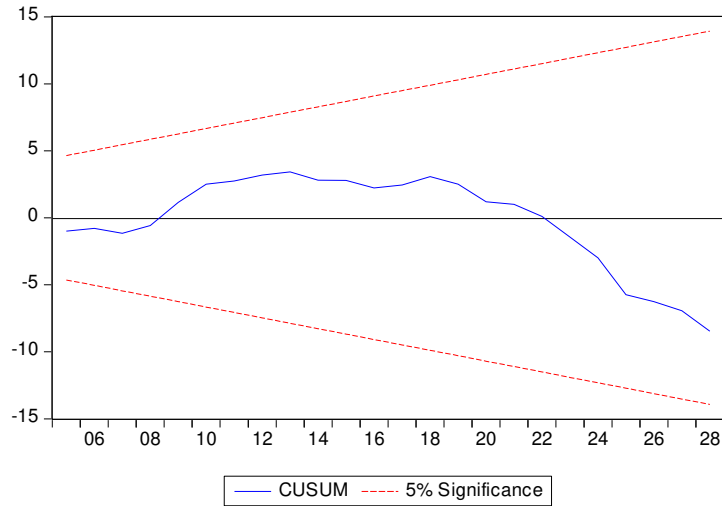| Variable | Coefficient | Standard error | t-statistic | P-value |
|---|---|---|---|---|
| LOG(FDI__) | -0.548459 | 0.350063 | -1.566744 | 0.1303 |
| LOG(OIL_PRICE) | -0.373347 | 0.227881 | -1.638338 | 0.1144 |
| LOG(REMIT__) | 0.506099 | 0.166403 | 3.041409 | 0.0056 |

Source: Author calculation using e-views 9

*Table 5- Estimated error correction representation*

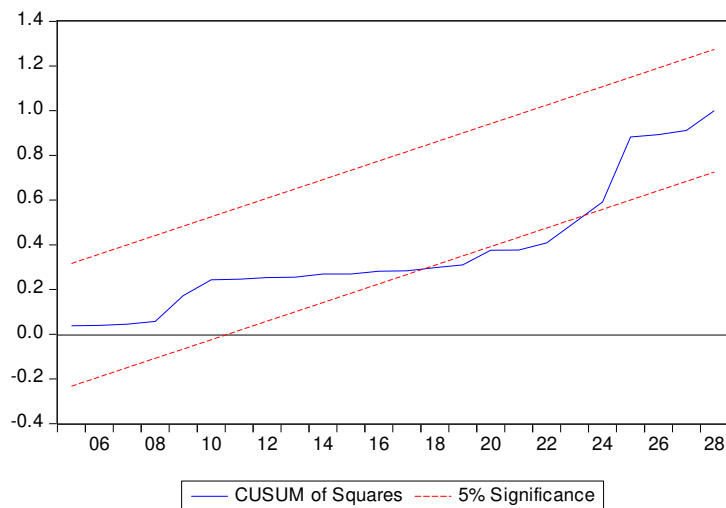| Variable | Coefficient | Standard error | t-statistic | P-value |
|---|---|---|---|---|
| DLOG(EXR_RATE(1) | -0.109791 | 0.058277 | -1.883957 | 0.0717 |
| DLOG(FDI__) | -0.462009 | 0.277089 | -1.667370 | 0.1084 |
| DLOG(OIL_PRICE) | -0.314499 | 0.190258 | -1.653014 | 0.1114 |
| DLOG(REMIT__) | 0.426326 | 0.115262 | 3.698747 | 0.0011 |
| ECM(-1) | -0.842376 | 0.083920 | -10.037834 | 0.0000 |

Source: Author calculation using e-views 9

*Figure 4- CUSUM TEST*



Source: Author calculation using e-views 9

Figure 5- (CUSUMSQ)



Source: Author calculation using e-views 9

## 4.0 .EMPIRICAL RESULTS AND DISCUSSION

This section will be devoted to interprete and discuss the results of empirical analysis which investigate the effect of growth rate of remittances, FDI and oil Price on exchange rate in Nigeria. The analysis proceeds via testing the properties of time series using unit roots test and co-integration tests. First, the integration of all variables will be identified, using ADF, PP and KPSS tests. Even though, ARDL approach does not need a unit root test, but in the case of variables that integrated of order two $I(2)$ the computed F-statistics provided by Pesaran et al.

(2001) will be not valid, because the bounds test is designed on the assumption that the variables are I(0) or I(1). Therefore, we implemented the unit root test in the ARDL context to ensure that none of the variables are integrated of order more than I (1). The results of unit root test constant are reported in Table 2.

The result in table 2 indicated that all variables are non-stationary at level but rather at first difference using ADF, PP, KPSS test. Across all test statistics all variables are found at 1% critical values except Remittances using KPSS that was found stationary at 5% critical value.

For testing the existence of long run relationship between the dependent and explanatory variables in equation (2), The null hypothesis defined as H0: $\partial 1 = \partial 2 = \partial 3 = \partial 4 = 0$ meaning that there is no co-integration (no existence of long-run relationship) among the variables under consideration whereas the alternative hypothesis is defined as H1: $\partial 1 \neq \partial 2 \neq \partial 3 \neq \partial 4 \neq \partial 5 \neq 0$ which signify the existence of co-integration presence or evidence of long-run relationship (Pesaran et al., 2001). The bounds test (F-statistic) was computed to differentiate the long-run relationship between the concerned variables. The computed F-statistic value was evaluated with the critical values tabulated in of Pesaran et al. (2001). The null hypothesis of no co-integration against alternative hypothesis of co-integration was tested and results represented Table 3-ARDL Bounds Test. Since the computed F-statistic (62.89) greater than upper bound test value at 1% (4.45) therefore, the null hypothesis of no long-run relationship between EXR and independent variables (REM, FDI, and OP) was rejected. The results indicated that there are evidence of co-integrating (the existence of a long- run relationship) between the EXR and the other explanatory variables.

In Table 4, the long-run ARDL model is estimated. The appropriate number of lags for each variable in the model is detected automatically by the program procedure using the Akaike information criterion (AIC). The result in table 4 indicated that only remittances was found to be positive and significantly related to exchange rate while FDI and Oil prices were found to be negative and statistically insignificantly related to exchange rate. Elaborately a 1% change in volume and value of remittances inflow to Nigeria will leads to depreciation of Naira by almost 51% while a unit change in FDI will leads to a rise in value (appreciation) of Naira by 54% and a percentage change in global Oil prices will lead to appreciation of Naira by 37%.

Regarding the short run analysis of the exchange rate determinants, Table 5 shows the results of error correction model using ARDL framework. The appropriate number of lags Selected based on Akaike information criterion. Similarly to the long run model, the short run model also indicated both FDI and Oil prices were

found to be negative and statistically insignificantly related to exchange rate while remittances inflows remains positive and significantly related to exchange rate.

ECM result reveals that exchange rate (EXR) relatively strong adjustment to equilibrium with a speed of adjustment of 84.2% whenever there is a shock in long run equilibrium. The error correction term is correctly signed (negative) and statistically significant at 1%, this implies that, if there is any shock to the economy, the speed of exchange rate adjustment is very fast converge back to the equilibrium. With all these, the findings of the ECM model reveal that a robust and reliable result for the investigation so far.

Finally from fig 4 &5 above, the stability of ARDL long run model parameters were examined using the cumulative sum of the recursive residuals (CUSUM) and the cumulative sum of the squares of recursive residuals (CUSUMSQ) tests proposed by Brown et al. (1975), the graphical results presented in Figures 4 and 5 respectively illustrate that, residuals were within the critical bounds at 5% level of significance in respect to the CUSUM test while demonstrated unstable in the CUSUMQ test. This signifies that the ARDL estimates are partially dynamically and structurally stable, consistent and reliable.

The policy implication of the empirical finding portends that remittances inflow are not sufficiently directed towards productive channels which might have stimulated aggregate demand and ultimately appreciate the value of Naira in conformity with the FDI and Crude oil prices. Accordingly this study recommends the government to strengthen and encourage talent-borne Nigerians with higher prospect overseas to secure working and resident permits in a bid to maximally harness their potentials.  Also it's noteworthy for the government to look into respective international transfer charges and effortlessly cut them down in a bid to capture more remittance inflow that alternatively flows through informal sources.

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