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IMPACT OF REMITTANCES ON FINANCIAL SECTOR DEVELOPMENT IN NIGERIA

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Abstract
This study investigates the impact of remittances on financial sector development in Nigeria using annual data from 1986 to 2020. Autoregressive distributed lag (ARDL) bound testing approach was employed. Evidence from the bounds test results revealed a long run relationship exists between financial sector development, remittances (REMT), GDP growth rate (GDP), real interest rate (RIR), gross fixed capital formation (GCFG) and trade openness (TROP). The empirical findings from the ARDL result shows that, there is positive relationship between financial sector development, RIR, GCFG, and TROP. While negative relationship exists among REMT, GDP and financial sector development. Based on the empirical findings, the study makes the following recommendations; government should employ policies that will encourage judicious utilization of funds received through remittances by channeling the funds into productive investment as it will encourage more inflow of remittances. Also, Nigerian government should make policy measures more stabilized to attract more inflow of remittances.

Key words: Remittances, Financial Sector, ARDL

1.0 Introduction
Migration has been a livelihood strategy among households in most developing countries. The World Bank (WB) reports that about 244 million migrants from developing countries lived and worked outside the country of their birth. Hence, only about 20 per cent of Sub-Saharan Africans (SSA) educated abroad return home and the remaining 80 per cent stayed on in the country of their study as migrants (WB, 2015). Nigeria is one of the top recipients of remittance in Sub-Saharan Africa (WB, 2018). The country was estimated to have received about 21 billion USD remittances in 2012 as compared to 2.3 billion USD in 2004. It is also projected that up to 22 billion USD will flow into Nigeria in 2017 through diaspora remittances. The European Union (2016) stated that more than 10 million Nigerians which

represents more than 5% of the country's population were living abroad of which almost 50% of them were in SSA. The WB (2018) report has shown that remittances by Nigerians in diaspora rose steadily in the last 13 years.

Despite tremendous increase in the inflow of remittance to Nigeria, the financial sector has remained underdeveloped. World Development Indicators (WDI) indicated that; in 2010 broad money supply percentage of GDP stood at 15.66% While in 2015 it falls to 14.21% in 2016 it rises to 15.68% (WDI, 2020). Nigeria's remittances ratio to GDP as of 2017 stands at 5.8%, rising above many other countries. Presently, the inflow of remittances matched against the size of GDP, provides a leveraging factor to the Nigerian economy compared to the likes of China and India (WB, 2018).

Despite the increasing size of remittances in Nigeria, its impact on financial sector development in Nigeria has been receiving less attention. Statistics have indicated that; in 2010 Nigeria received remittances worth 19.7 billion USD, broad money supply as percentage of GDP stood at 15.66%, while in 2015 remittances rose to 21 Billion USD, broad money supply percentage of GDP fall to 14.21%, in 2016 remittances fall to 19.7 billion USD, broad money supply as percentage of GDP increase to 15.68% (World Development Indicators, 2018).

Most of the studies on remittances and financial sector development in Nigeria employed various methods of analysis including Generalized Method of Moment (GMM) and Ordinary Least Square OLS (Oke et al., 2011; Oluwa & Oluwa, 2013; Waheed & Ayodele, 2015). To the best of literature review, studies conducted on the impact of remittances on financial sector development using ARDL approach in Nigeria remain scarce.

Therefore, this study employed ARDL as a method of analysis. In addition, the study introduces important variables which the previous literature on remittances and financial sector development has failed to capture, particularly in Nigeria. Such variables include Real interest rate, gross capital formation, growth rate of gross domestic product and trade openness, which are crucial for financial development (Elsherif, 2015). It is against this background that, this study examines the impact of remittances on financial sector development in Nigeria from 1986 to 2020 period.

2.0 Literature Review

There are several empirical studies on the impact of remittances on financial sector development in various countries across the globe, but little has been done in Nigeria. Furthermore, the studies employed different methods of analysis including OLS,

Cointegration, Vector Error Correction Model (VECM), Pooled OLS, GMM, ARDL (Ambrosius & Cuecuecha, 2016; Chowdhury, 2011; Cooray, 2012; Oluwa & Oluwa, 2013). These studies produced mixed and /or inconclusive results, as argued by Demirgüç-Kunt, Córdova, Pería and Woodruff (2011). For example, Fromentin (2017) investigated the long-run and short-run impact of remittances on financial sector development in developing countries, using panel unbalanced data sets. Autoregressive distributed lag (ARDL) technique was used. The result shows that a positive long-run relationship between remittances and financial development in countries.

In the same vein, Williams (2016) used 5-year non-overlapping unbalanced panel data from 1970 to 2013 to study the effect of remittances on financial development in SSA, using GMM technique. The empirical evidence showed that remittances are important source of financial development in SSA. Karikari, Mensah and Harvey (2016) used panel data of 50 developing countries in Africa from 1990 to 2011 to explore on whether remittances promote financial development in Africa or not. The study uses fixed effect and random effect estimations techniques as well as VECM. The study concludes that remittances promote financial sector development in the short run and the development of financial sector helps increase the propensity to remit through formal channels.

Kakhkharou (2015) investigated the impact of remittances on financial development in the transitive economies of the former communist bloc. The paper used panel data for 27 countries of the former communist bloc from of 1996- 2012 the study focuses on the link between remittances and broad money supply to the economy, claims on other sectors and the private sector. In addition, the study also investigates the association between remittances and total deposits. The GMM fixed and dynamic effect techniques were utilized as estimation techniques. The findings provided evidence of a robust, significant and positive link between remittances and financial development.

Moreover, Chowdhury (2011) used time series annual data from 1971 to 2008 to explore remittances flow and financial development in Bangladesh. The study employed Johansen co-integration and VECM. The results revealed that; remittances have a positive significant effect on financial development. Also, Demirguc-Kunt, Cordova, Martinez and Woodruff (2011) examined remittances and banking sector breadth and depth in Mexico. The study used survey data for the even numbered years between 1992 and 2008. The study uses linear OLS regression as an estimation technique. The results show that remittances are strongly associated with greater banking sector breadth and depth, increasing the number of branches and account per capita and amount of deposits to GDP. Also, the association between remittances and bank branches, accounts and deposits is significant both

statistically and economically. The coefficient on bank branches per capita is 0.16% in the first specification, indicating that a 1point change is percentage of household receiving remittances is associated with 0.16% increases in the number of bank branches per 100,000 residents. For credit however, the results found a much smaller and statistically insignificant effect.

Similarly, Gupta, Catherine, Pattillo, and Wagh (2009) investigated the effect of remittances on poverty and financial development in Sub-Saharan Africa, using panel data consisting 24 countries from 1980 to 2005. OLS was utilized by the study for estimation. The results from both the random and fixed effects panel regression indicated that remittances are statistically significant as a positive determinant of financial development. Likewise, Aggarwal *et al.* (2006) explored the relationship between workers' remittances and financial development, using panel data for 99 developing countries from 1975 to 2003. By running Fixed Effects (FE) and Random Effects (RE) regressions. The findings revealed remittances have a positive and significant effect on financial development.

In his analysis, Brown, Carmignani and Fayad (2013) examined migrants' remittances and financial development on macro and micro levels a pervasive relationship. At macro level annual data for 138 countries from 1970 to 2005 has been examined, OLS was employed for panel estimation. The result shows that a higher inflow of remittances is not associated with any relevant increase in the indicators of financial development used.

Also, Waheed and Ayodele (2015) used time series annual data from 1977 to 2010 and examine the effects of remittances on financial sector development in Nigeria, employing both OLS and GMM techniques. The results indicated that, remittances positively and significantly influence financial development in Nigeria. Furthermore, Oluwa and Oluwa (2013) examined migrants' remittances and financial sector development in Nigeria, using a time series annual data from 1977 to 2010 In particular, the study examines the association between remittances and the aggregate level of deposits and credit intermediated by the local banking sector. The OLS and GMM have been used by the study as estimation techniques. Two indicators of financial development are employed by the study. The first indicator, FINDEPTH is the ratio of money supply (M2) to GDP. The second indicator is the ratio of credit to private sector to GDP (PRIVY). The results provide evidence of a positive, significant, and robust link between remittances and financial development in Nigeria.

Likewise, Oke et al. (2011) assessed the impact of workers' remittances on financial development in Nigeria, using time series data between 1977 and 2009. They employed

OLS technique to establish the relationship and further used GMM estimation. Two indicators of financial development were employed in this study. The regression result indicated that the coefficient of remittances is both correctly signed and are significant at 5 per cent level. This means that whether they measure financial development as a ratio of money supply to GDP or ratio of credit to private sector to GDP, remittances positively and significantly influence financial development in Nigeria. However, the result of (GMM) estimation indicated insignificant coefficient, the implication is that remittances augment liquid liabilities more than loanable funds in Nigeria, as remittances are likely used for consumption purposes than for productive ventures in Nigeria. Hence, the result generally indicated that remittances positively and significantly influence financial development in Nigeria, with the exception of CPS/GDP measure of financial development in GMM estimation.

Using the 2009 World Bank's Migration and Remittances Household Survey data for Nigeria, Ajefu and Ogebeb (2019) examined the impact of remittances on financial inclusion, the study employed an instrumental variable estimation technique. The paper indicates that, the receipt of remittances increases the probability of using formal financial services, such as deposit accounts and Internet/ mobile banking. In the same country, Ben and Athanasius (2019) assessed the impact of International remittances and financial deepening on the economic growth from 1985 to 2016. The study found a positive and statistically significant relationship between remittances and financial deepening in Nigeria.

The existing empirical literature, review the impact of remittances on financial sector development in Nigeria and used GMM and OLS as the method of analysis (Oke et al., 2011; Oluwa & Oluwa, 2013; Waheed & Ayodele, 2015). Furthermore, both OLS and GMM have certain limitations when employing them as method of analysis. These methods cannot accommodate variables that are a combination of I (0) and I (1). Also, the techniques are very weak when the sample size is small. There exist a vital justification for using ARDL which is more robust estimation technique in the sense that it can accommodate the variable with different order of integration, I(0) and (I), it can also be used when the sample size is small, as in our case, (32 annual observation). In addition, some important variables were captured in this study such as real interest rate, trade openness, gross capital formation which are important determinants of financial sector development but were neglected by the previous studies.

3.0 Methodology

This study adopts portfolio theory approach coined by Markowitz (1952). In this theory, remittances are viewed as a strategy by an emigrant worker to diversify his or her savings.

Accordingly, the decision to remit is based on the risk return differential of assets in both the host and recipient country. Since the desire to remit is purely motivated by investment opportunities we assumed that the theory has the following function in equation (3.1):

$PINV = F(REMT)$…….…. 3.1

Where PINV means private investment and REMT is remittances. Equation 3.1 was transformed into equation (3.2) as;

$PINV_t = \beta_1 + \beta_2 REMT_t$…….3.2

For this study, we follow the work of Olufemi (2011) who used Broad Money Supply (BMS) as a proxy for financial sector development. The equation (3.2) was modified to include other variables of interest. For instance, scholars have argued that remittances have an impact on broad money supply as percentage of GDP (Karikari et al., 2016; Waheed & Ayodele, 2015). In addition, BMS was used in many empirical studies as a measure of financial sector development. Hence, private investment was substituted with broad money supply as a percentage of GDP (BMS), thus the equation is specified as follows:

$BMS_t = \beta_1 + \beta_2 REMT_t + \mu_t$ …….3.3

Also, growth rate of gross domestic product (GDP) is very significant in determining broad money supply. Williams (2016) argued that deposit interest rate has a lasting impact on financial sector development. Furthermore, Real exchange rate also is an important determinant of financial sector development (Takyi & Obeng, 2013). Also, gross capital formation and trade openness are important variables in determining financial sector as shown in equation (3.4).

$BMS_t = F(REMT_t, GDP_t RIR_t GCFG_t, TROP_t)$…….…. 3.4

Where BMS is the broad money supply as percentage of GDP, REMT is personal remittances received, GDP is growth rate of gross domestic product per capita, RIR is the real interest rate, GCFG is the growth rate of gross capital formation and TROP is the trade openness.

The general model is specified as follows:

$$BM_GDP_t = \beta_1 + \beta_2 lnREMT_t + \beta_3 GDPPG_t + \beta_4 RIR + \beta_5 GCFG_t + \beta_6 TROP_t + \mu_t \ldots\ldots\ldots\

Zakari, 2020). The ARDL approach involves the estimation of a restricted error correction (EC) version of the ARDL model.

The ARDL model is therefore specified as:

$$\Delta(BMS)_t = a_0 + a_1(BMS)_{t-1} + a_2\ln(\mathrm{REMT})_{t-1} + a_3(\mathrm{GDP})_{t-1} + a_4(\mathrm{RIR})_{t-1} + a_5(\mathrm{GCFG})_{t-1} + a_6(\mathrm{TROP})_{t-1} + \sum_{i=1}^{h}\beta_1\,\Delta(BMS)_{t-i} + \sum_{i=0}^{o}\beta_2\,\Delta\ln(REMT)_{t-i} + \sum_{i=0}^{j}\beta_3\,\Delta(GDP)_{t-i} + \sum_{i=1}^{q}\beta_4\,\Delta(\mathrm{RIR})_{t-1} + \sum_{i=0}^{k}\beta_5\,\Delta(GCFG)_{t-i} + \sum_{i=0}^{l}\beta_6\,\Delta(\mathrm{TROP})_{t-1} + \mu_t \ldots\ldots\ldots\ldots 3.6$$

The meaning of variables remains constant, $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5\ and\ \beta_6$ are short run parameters estimated, Δ denotes differencing, ln means logarithm and h, o, j, b, q, k, l are the optimal lag length.

Upon specifying long run relationship among the variables, now a long-run model is specified as given by Equation (3.7)

$$(BMS)_t = \sum_{i=1}^{h}\beta_1\,(BMS)_{t-i} + \sum_{i=0}^{o}\beta_2\ln(REMT)_{t-i} + \sum_{i=0}^{j}\beta_3\,(GDP)_{t-i} + \sum_{i=0}^{q}\beta_4\,(RIR)_{t-i} + \sum_{i=0}^{k}\beta_5\,(GCFG)_{t-i} + \sum_{i=0}^{l}\beta_6\,(TROP)_{t-i} + \mu_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 3.7$$

In order to get the short-run coefficients, an error correction model (ECM) is estimated. The ARDL specification of the ECM is represented in Equation (3.8) below.

$$\Delta(BMS)_t = \sum_{i=1}^{h}\beta_1\,\Delta(BMS)_{t-i} + \sum_{i=0}^{o}\beta_2\,\Delta\ln(REMT)_{t-i} + \sum_{i=0}^{j}\beta_3\,\Delta(GDP)_{t-i} + \sum_{i=0}^{q}\beta_4\,\Delta(RIR)_{t-i} + \sum_{i=0}^{k}\beta_5\,\Delta\ln(GCFG)_{t-i} + \sum_{i=0}^{l}\beta_6\,\Delta\ln(TROP)_{t-i} + \mu_t \ldots\ldots 3.8$$

.

The analysis began with the unit root test to determine the time series properties of the data. Furthermore, considering the work of Umar, Zakari and Abulkarim, 2022 and Zakari and Umar, 2020, the Augmented Dickey Fuller (ADF) test and Phillips-Perron test was employed.

4.1 Unit Root Test Results for ADF and PP

The results of the unit root are presented in Table 1. It shows that BMS, GDP and RIR are found stationary at level. The table also portrays that LREMT, GCFG and TROP were found stationary at first difference. Therefore, the variables are found to have be mixed order of integration i.e. I(0) and I(1), hence there is justification for using ARDL bounds test cointegration approach

Table 1: Results of the Unit Root

	Level		First Difference		
Variables	ADF	PP	ADF	PP	Status
BMS	-2.651*	-2.679*	-------	------	I(0)
LREMT	-1.756	-2.262	-6.464***	-3.662***	I(1)
GDP	-4.302***	-4.444***	--------	---------	I(0)
RIR	-4.660***	-4.668***	--------	----------	I(0)
GCFG	-2.523	-4.949***	-11.808***	……	I(0)
TROP	-2.158	-2.216	-6.777***	-6.794***	I(1)

Source: Author's computation (2021)

Note: *** and ** indicated statistically significant at 1%, and 5% respectively.

The mixed order of integration among these variables provide a vital justification for the adoption of the Autoregressive distributed lag ARDL approach for this study.

4.2 Results of cointegration (ARDL)

Since the stationarity status has been established, ARDL bound test for cointegration was employed to check for the presence of long run relationship among the variables.

Table 2: Results of Bounds Test Cointegration

F- Statistics	K	Significance	Lower(bound)	Upper(bound)
		10%	2.508	2.508
10.096***	5	5%	3.037	3.037
		1%	4.257	6.040

Source: Author's computation (2021). *** denotes statistically significance at 1% level

The results presented in Table 2 shows that the computed F statistics (10.096) is greater than the upper bound critical value (6.04) I(1) at 1% level. This finding suggests the presence of the long run relationship between BMS, LREMT, GDP, RIR, GCFG and TROP. Having established the long run relationship between the variables, the next step is to estimate the long run as well as short run/ECM coefficient of the optimum model.

4.3 Results of Selected Long Run and Short Run Model

Having confirmed the long run relationship between the variables, the ARDL model was estimated. The long run and short run coefficients for the estimated optimum model (1, 2, 2, 2, 1, 0) as chosen by Akaike information criteria are presented in table 3, which is divided into panels A and B. Panel A contains the long run coefficients whereas the panel B contains the short run/ECM coefficients. From the results in panel A, the coefficient of remittances is a negative and statistically significant at 1 percent significance level in the long run. But has a positive and significance in the short run after it was lag by one year. A 1% increase in remittances leads to an increase in financial sector development by 2.8% in the short run. The finding is in conformity with (Waheed & Ayodele, 2015). However, the long run results indicate a negative and significance relationship between remittances and financial sector development. An improvement in remittances inflow reduces financial sector development by 1.33%. The outcomes is consistence with that of (Olabisi & Ogbeide, 2020). Real interest rate is found significant at 5% in the long run. A 1% increase in RIR improve financial sector by 0.35%. in addition, the growth rate of GDP is negative and significant at 5% level. While growth rate of gross capital formation is not significant at all levels, lastly, trade openness was found significant at 1% level of significance.

Panel B: Long-run Coefficients - Dependent variable is BMS				
Regressor	Coefficient	Standard Error	T-Ratio	Prob.
LREMT	-1.330***	0.246	-5.412	0.000
RIR	0.352**	0.135	2.601	0.020
GDP	-0.553**	0.238	-2.321	0.035
GCFG	0.008	0.037	0.208	0.838
TROP	0.264***	0.061	4.311	0.000
C	19.869***	2.293	8.666	0.000
Panel B: Long-run Coefficients - Dependent variable is BMS				
Regressor	Coefficient	Standard Error	T-Ratio	Prob.
D(LREMT)	-0.193	0.431	-0.448	0.661
D(LREMT(-1)	2.768***	0.477	5.806	0.000
D(RIR)	0.056**	0.021	2.664	0.018
D(RIR(-1)	-0.032	0.021	-1.542	0.144
D(GDP)	0.057	0.053	1.067	0.303
D(GDP(-1)	0.158***	0.042	3.765	0.002
D(GCFG)	0.032***	0.009	3.487	0.003
ECT-1	-0.603***	0.067	-8.987	0.000

*, ** & *** Denotes 10%, 5% and 1% level of significance respectively.
Source: Author's computation (2021). Δ is the first difference operator.

Moreover, the result indicates that real interest rate has positive and significant effect on BMS at 5% level in the short run. 1% increase in RIR interest rate leads to a 0.5% increase in BMS in the short run. Furthermore, GDPPG which is the growth rate of gross domestic products has a positive and significant impact on BMS at 1% level in the short run.

The results also indicated that, Trade openness has a positive relationship with BMS at 1% both in the long run. The coefficient of one period lag error correction term is negative (as expected), less than 1 and statistically significant at 1%. thus, the finding implies the speed of adjustment towards equilibrium due to short run disturbances is 60%. This indicated that about 60% of disequilibrium will be corrected per annum. In other words, it will take 1.5 years for the system to regain equilibrium in the long run. This also confirms the existence of long run relationship or cointegration as found in the cointegration test.

4.4 Results of Diagnostic Tests

Table 4: Results of Diagnostic Tests

Test	Test Statistic
Heteroscedasticity: CHSQ(14)	8.579 [0.804]
Serial correlation CHSQ(2)	2.758 [0.254]
Normality: Jarque-berra	0.965[0.611]
Functional form Ramsey Reset F statistic	1.443[0.250]

Source: Author's computation (2021)

The table 4 shows that Bureuch-Godfrey serial correlation LM test indicates that the residuals are not serially correlated because the value of the Chi-square for the observed R^2 (2.758) and its associated p-value (0.254) are statistically insignificant, this shows that the residuals or the error terms are not serially auto correlated. Moreover, the observed R-square (8.579) and its p-value (0.804) of Bureuch-Pagan-Godfrey test for heteroscedasticity turned out to be statistically insignificant which suggest the acceptance of the null hypothesis of homoscedasticity in the residuals, in other words the residuals are homoscedastic.

In addition, the F- statistic (0.965) and its p-value (0.611) for the Jarque-Berra test for normality were found to be statistically insignificant, hence the acceptance of the null hypothesis of normality in the residuals

To ascertain if the parameter of the estimated models is stable in the long run, the study employed the cumulative sum (CUSUM) and cumulative sum square (CUSUMSQ) tests. If the plots of CUSUM and CUMSUM SQ (figures 1 and 2) do not exceed the critical bounds at 5% level of significance it shows that the parameters of the estimated model are stable during the period under review.

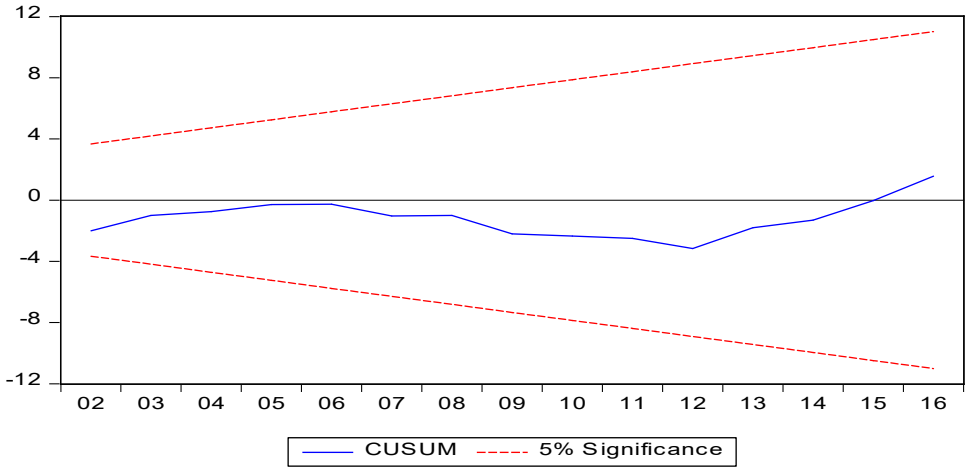

Figure 1: plot of CUSUM
Source: Researcher's calculation (2021**).**

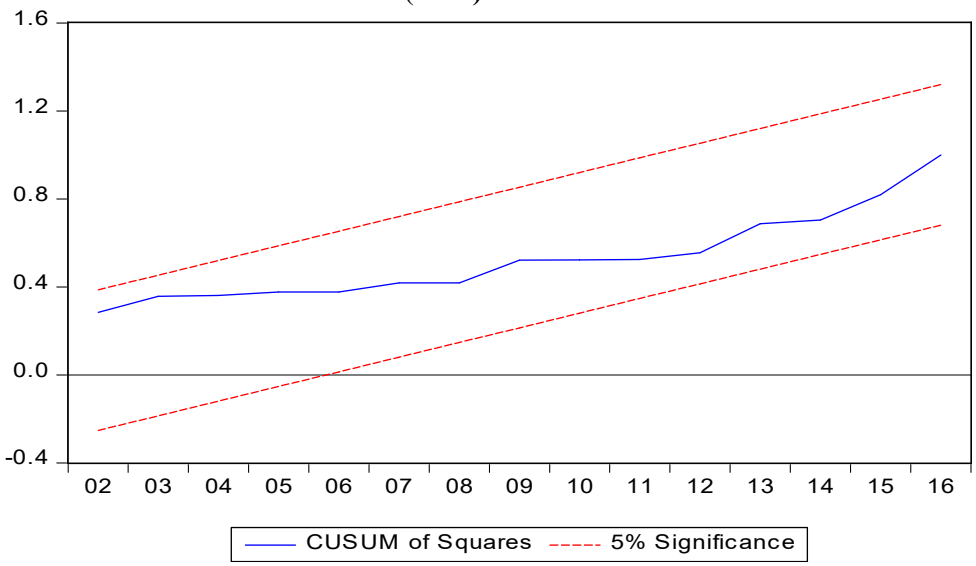

Figure 2: Plot of CUSUMSQ
Source: Researcher's calculation (2021**).**

5.0 Conclusions and Recommendations

The study examines the impact of remittances on financial sector development in Nigeria from 1986 to 2020, using ARDL bound testing approach. The bounds test result revealed

a long run relationship between remittances and financial sector development. This implies that any change in the inflow of remittances may contribute a change in financial sector development in Nigeria. The coefficient of remittances significantly impacted financial sector development. This implies that, in Nigeria remittances importantly impacted financial sector development. Moreover, Growth rate of gross domestic product per capita (GDPPG) has a negative effect on financial sector development in Nigeria. Real interest rate (RIR) is also found to have a positive and significant impact on financial sector development in Nigeria. The growth rate of gross capital formation (GCFG) has a positive but insignificant significant effect on financial sector development in Nigeria. Lastly, trade openness (TROP) is found to have a positive statistically significant impact on financial sector development in Nigeria.

Based on the empirical findings, the study makes the following recommendations; government should employ policies that will encourage judicious utilization of funds received through remittances by channelling the funds into productive investment as it will encourage more inflow of remittances. Also, Nigerian government should make policy measures more stabilized in order to attract more inflow of remittances.

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