REMITTANCES, FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH IN NIGERIA

Abiodun Hafeez Akindipe
Nigerian Institute of Social and Economic Research (NISER)
hafeezakindipe@gmail.com
+234 808 557 6707

ABSTRACT

This study examines the role of financial development in enhancing the impacts of remittances on economic growth in Nigeria using annual time series data from 1981 to 2018. Two models were constructed and each model has three specifications to capture the three measures of financial development. The first model is without interactive terms while the second model include the interactive terms. The key variables are financial development, remittances and growth rate of GDP. Government spending and gross fixed capital formation are the control variables. The three measures of financial development include the ratio of broad money (M2) to GDP; the ratio of private sector credit to GDP; and the ratio of market capitalization to GDP.

ARDL Bound test approach is the estimation technique. The results of the Bound test show that the variables are cointegrated in all specifications. In the model without the interactive term, the impacts of remittances on economic growth depend on the measure of financial development both in the long run and short run. However, when remittances are interacted with financial development, both remittances and all the indicators of financial development have positive and statistically significant effects on economic growth. Furthermore, the coefficients of all the interactive terms are positive and significant. This supports the existence of complementarity between financial development and remittances. Therefore, the government of Nigeria should intensify efforts in creating enabling environment for well-developed financial market.

1.   Introduction

The importance of remittances in stimulating economic growth of the developing countries cannot be overemphasized. Remittances, an unrequited fund transfer by migrants working abroad to developing countries, have increased dramatically in the recent years. It rose from paltry US$3.3 billion in 1975 to US$528 billion in 2018. This formed 84.32 per cent of the global workers' remittances in 2018 (World Bank, 2019). Remittances have become the second largest of the external finance to developing countries after foreign direct investment (FDI), both in absolute terms and as a proportion of GDP. Compared to private capital flows, remittances have the special quality of being stable and increases during the period of economic downturn and natural disaster (Aggarwal et al., 2011).

Nigeria plays key role in African migration. As a demographic giant of Africa, Nigeria is the largest recipient of remittances in sub-Saharan Africa. A sum of US$24.31 billion was recorded as remittance inflows into the country in 2018 (World Bank, 2019). Thus, remittances played very important role in the stability and survival of Nigeria's economy. Remittances do not only provide livelihood to families of the remitters, but also played an important role in the management of current accounts deficit.

For policy purposes, what matters is not the absolute size of remittance flows, but its magnitude as a percentage of recipient countries' GDP. By this measure, remittances have increased in importance in Nigeria. Remittances measured as a percentage of GDP have consistently increased over the years as it rose from 2 per cent in 2000 to 6.12 per cent in 2018 (World Bank, 2019). The main drivers of remittances in Nigeria just as in the other developing countries are migrant stocks and economic conditions in remittance-sending countries. Exchange rates and the cost of sending remittances are also important determinants.

Appreciation of currency in the remittance source country against naira boosts the inflows of remittances in Nigeria (World Bank, 2014).

In terms of the use of remittances in the recipient countries, the conventional wisdom has it that remittances are mostly used for consumption. Therefore, most studies on remittances have focused on households' micro-level variables such as consumption, savings, poverty, inequality, education, infant mortality and entrepreneurship (Kumar, 2013). However, in the recent time, research efforts have been shifted to macroeconomic effects of remittances due to increasing volume and stable nature of remittances to developing countries (Ajilore and Ikhide, 2012). But, the focus of this strand of literature has disproportionately been on the direct effect of remittances on economic growth. Only few studies have considered the channels through which remittances facilitate economic growth.

One of the channels through which remittances stimulates growth is its financial deepening effects. For instance, Chowdhury (2016) argued that the presence of financial development in an economy enhances the impacts of remittances on growth. Although this connection has been adequately studied for other source of external flows, such has FDI, foreign portfolio investment (FPI) and official development assistance (ODA), the existing literature has not examined this relationship for remittances in details.

This study attempts to fill the void, as no study to the best of my knowledge, has examined the role of financial development in enhancing the effects of remittances on economic growth of Nigeria. The rest of the article is organized as follows. The second section reviews the relevant literature. The third section outlines the estimation technique. The fourth section presents the results and analyses and the fifth section concludes the article.

2.   Literature Review

In the literature, the two major motives for sending money home by emigrants are altruism and self-interest (Lucas and Stark, 1985). However, this can be further broken-down into: altruism, exchange, insurance, investment, inheritance and strategic motive. Lucas and Stark (1985) argued that remitters derive utility from the well-being of the remittance recipients at home. So, the emigrants transfer money without expecting any compensation from the recipients. The remitters send money to mitigate against poverty, low incomes, shocks and draught which may affect the well-being of the family. The exchange motive involves sending money for service rendered such as taking care of the emigrants' children and repayment of debt (Cox, et al., 1998). Moreover, remittances are sent home for investment purposes such as purchase of land, houses or to start a small business in own country. Remitted funds are used for investment where the financial sector cannot meet the credit need of the local investors.

Also, remittances can serve as a form of insurance. The relatives of the remitters' can enter into a contract whereby emigrants' remittances are used to insure against shortfall in their income. This is encouraging since government sponsored social insurance is generally poor or non-existent in most developing countries (Yang and Choi, 2005). In addition, Kifle (2009) argued that emigrants use remittances to strategically protect themselves against wages competition from potential migrants. Therefore, the incentive for recipients of remittances to emigrate is reduced when emigrants send money home.

Having considered the motivation for remittances, the impacts of remittances on economic growth are largely inconclusive in the literature. Just as remittances could have a positive effect on growth, the negative impact cannot be ruled out. Remittances can have negative impacts on economic growth by reducing labour participation. For instance, Chami et al. (2005) posit

that when remittances discourage supply of labour, it has adverse effects on recipient economy. Also, remittances can lead to Dutch disease effect. The inflows of remittances could lead to appreciation of domestic currency which make exports to be expensive and encourage imports. The increase in imports worsens domestic trade balance and indirectly reduces economic growth in the recipient economy (Lartey et al., 2008).

However, remittances can stimulate economic growth through an increase in investment and some other mechanism. Lartey (2013) shows remittances can still promote growth in the recipient country even when the larger portion of the remitted funds go to consumption instead of investment. Remittances enhances growth by smoothing consumption which lead to a stable macroeconomic environment that could foster investment. In addition, Chami et al. (2009) show that remittances can serve as automatic stabilizer. This is because remittances have the tendency to increase during economic downturn, thus cushion the effect of recession in home country.

Though there are extensive studies on the relationship between remittances and economic growth, the studies on the link between remittances and financial development are scanty. There has been an ambiguous relationship between financial development, remittances and economic growth in the literature. While some studies argued that the presence of well-functioning financial market enhances the effects of remittances on economic growth, other studies posit that remittances can serve as a substitute for financial development by loosening liquidity constraints. Therefore, potential entrepreneur could use remittances whenever the financial system does not help start productive activities due to high lending cost (Guiliano and Ruiz-Arranz, 2009).

For instance, Nyamongo et al. (2012) investigated the role of remittances and financial development on economic growth using a panel of 36 countries in Africa between 1980 and 2009. While employing a panel econometrics

framework, they found out that remittances complements financial development. Also, Mundaca (2009) using a dataset of 39 Latin American and Caribbean countries between 1970 and 2002 showed that a complementarity exists between remittances and financial development in enhancing economic growth. Bang et al. (2015) using data from 84 countries for the period 1986-2005 added to the literature on the interactive effects of financial development and remittances on economic growth. Their argument was that financial reform which accelerates financial development increases the flow of remittances via the investment motive and thus leads to economic growth.

On the other hand, Bettin and Zazzaro (2009) examined whether the impacts of remittances and financial development on growth were substitutes or complements using a panel of 66 developing countries for the period of 1970-2005. They found out that the impact of remittances on economic growth was negative in countries where bank efficiency was low. Guiliano and Ruiz-Arranz (2009) investigated the effect of interaction between remittances and financial development on economic growth with macroeconomic data from 1975 to 2002 for 73 developing countries using GMM technique. Having controlled for endogeneity of remittances and financial development, their results showed that remittances removed credit constraints, improved the allocation of capital and promoted growth in less financially developed countries.

Summarily, there have not been unanimous results on the interaction effect of remittances and financial development on economic growth in literature. A wide variety of data have been employed in the analyses of the subject. The dataset ranges from countries which have remittances as very small proportion of their GDP (less than 0.001 per cent) to those with large percentage of the GDP as remittances (more than 10 per cent). Several studies have used very restrictive econometric models to estimate nexus between remittances and economic growth. The development of financial sector accelerated in most

developing countries in early 2000s and it is the sole focus of the study to investigate whether accelerated financial development enhances the impact of remittances on economic growth.

3. Method and Data

3.1 Model Specification

The method employed in this study is a simple construction of Solow growth model. Similar to the work of Kumar (2013) and Rao (2010), the conventional Cobb-Douglas production function with augmented capital and labour will be adopted. The output per worker equation y_t is specified as:

$$y_t = A_t k_t^\beta, \ \beta \in (0,1) \tag{1}$$

Where A_t measures the level of technology, k_t is the stock of capital per worker and β measures the share of capital in output. The evolution of technology in the Solow model is given as:

$$A_t = A_0 e^{gT} \tag{2}$$

Where A_0 is the initial stock of knowledge, g is the growth rate of technology and T is time. For the purpose of this study, technology is expressed as a function of remittances and financial development. This is specified below:

$$A_t = f(REM_t, FINDEV_t, T) \tag{3}$$

Where REM is personal remittances, $FINDEV$ is the measure of financial development and T is the time trend.

In order to capture the effect of REM and FINDEV on total factor productivity (TFP), REM and FINDEV will be incorporated into the production function as shift variables (Kumar, 2013). Subsequently,

$$A_t = A_0 e^{gT} REM_t^{\alpha} FINDEV_t^{\gamma} \qquad\qquad 4$$

And

$$y_t = (A_0 e^{gT} REM_t^{\alpha} FINDEV_t^{\gamma}) k_t^{\beta} \qquad\qquad 5$$

In order to derive a standard growth accounting equation, natural logarithms and time derivatives of equation (11) is taken. This yields a dynamic production function:

$$\Delta \ln y_t^* = g + \alpha \Delta \ln REM_t + \gamma \Delta \ln FINDEV_t + \beta \Delta \ln k_t$$

$$6$$

Where $\Delta \ln$ is the partial differential of natural logs of respective variables and the intercept term g, is the TFP is compactly defined. After taking into account the economic environment, the general formulation of the dynamic production function can be specified as follows:

$$\Delta \ln y_t = \beta_0 + \beta_1 \Delta \ln REM_t + \beta_2 \Delta \ln FINDEV_t + \beta_3 \Delta \ln k_t + \beta_4 \Delta \ln GEXP + \beta_5 \Delta \ln REM_t * FINDEV_t + \varepsilon_t \quad 7$$

Where $REM * FINDEV$ is the interaction between remittances and financial development and $GEXP$ is the government expenditure. Following the standard economic theory, the a priori expectation can be specified as:

$\beta_1 > 0$, $\beta_2 > 0$, $\beta_3 > 0$, $\beta_4 > 0$ and $\beta_5 > 0$

3.2   Data Description

Data on remittances, economic growth, financial development and control variables used are described in this section. Personal remittances as described in the World Development Indicator (WDI) are used. This remittances data (REM) are expressed as the ratio of GDP. Financial development (FINDEV) is proxied by three indicators. Two indicators are used to measure the bank aspect while one indicator is for the market aspect of financial development. The ratio of broad money (M2) to GDP (DEPTH) and the ratio of private sector credit to GDP (CPS)

are the two measures of the bank aspect. Private sector credit is used because liquid liabilities may not accurately measure the effectiveness of financial sector in ameliorating informational asymmetries and easing transactions costs. However, private sector credit improves on broad money by isolating credit issued to the private sector, as opposed to credit issued to governments, government agencies, and public enterprises. Furthermore, it excludes credits issued by the central bank (Levine, 2000).

In order to capture the market aspect of financial development, the ratio of market capitalization to GDP (CAP) is used as the third measure of financial development. Market capitalization is seen as the most important measures for assessing the size of capital market as it underlines the role of financial market in supporting non-financial companies which is the true engine of growth of an economy (Levine and Zervos, 1998). Economic growth (y) is the dependent variable and it is measured by the growth rate of GDP. The two control variables are the capital stock (k) and government spending (GEXP). The ratio of gross fixed capital formation to GDP is used as a proxy for investment and government spending is measured by the ratio of government consumption expenditure to GDP. The analysis is based on time series annual data from 1981 to 2018. All the data are sourced from either World Bank database (WDI) or Central Bank of Nigeria Statistical Bulletin.

3.3   ARDL Bound Testing Approach

Following Kumar (2013), this study employs Autoregressive Distributed Lag (ARDL) Bound testing approach proposed by Pesaran et al. (2001). This approach has some statistical advantage over other cointegration techniques. While other cointegration techniques require all variables to be I(1), ARDL bound testing procedure is applicable whether all the variables are I(0) or I(1) or frictionally cointegrated. It also provides consistent and efficient results in both small and large samples. The different order of integration and small number of

observations make the bound testing technique a preferred approach for this study. For comparison purpose, ARDL models are specified for the impacts of remittances on economic growth without the interactive term and with interactive term. The ARDL equation for the impacts of remittances without the interactive term is specified as:

$$\Delta \ln y_t = \beta_0 + \sum_{i=1}^{n} \beta_{1i} \Delta \ln y_{t-1} + \sum_{i=0}^{n} \beta_{2i} \Delta \ln REM_{t-1} + \sum_{i=0}^{n} \beta_{3i} \Delta \ln k_{t-1} + \sum_{i=0}^{n} \beta_{4i} \Delta \ln FINDEV_{t-1} +$$

$$\sum_{i=0}^{n} \beta_{5i} \Delta \ln GEXP_{t-1} + \beta_{6i} \ln y_{t-1} + \beta_{7i} \ln REM_{t-1} + \beta_{8i} \ln k_{t-1} + \beta_{9i} \ln GEXP_{t-1} + \beta_{10i} \ln FINDEV_{t-1} + \varepsilon_{1t}$$

8

Following this ARDL model, another set of ARDL equations where the role of remittances through the financial development is examined. The hypothesis of whether financial development enhances the impacts of remittances on economic growth or not is tested. This is captured through the interactive term. A negative coefficient of interactive term would indicate that remittances are more effective when financial development is less developed. However, a positive coefficient of the interaction would show that growth effect of remittances is enhanced when the financial development is well developed. In order words, this supports the complementarity of remittances and financial development. The ARDL model for the interaction of remittances and financial development is specified as:

$$\Delta \ln y_t = \beta_0 + \sum_{i=1}^{n} \beta_{1i} \Delta \ln y_{t-1} + \sum_{i=0}^{n} \beta_{2i} \Delta \ln REM_{t-1} + \sum_{i=0}^{n} \beta_{3i} \Delta \ln FINDEV_{t-1} + \sum_{i=0}^{n} \beta_{4i} \Delta \ln k_{t-1} + \sum_{i=0}^{n} \beta_{5i} \Delta \ln GEXP_{t-1} +$$

$$\sum_{i=0}^{n} \beta_{6i} \Delta \ln FINDEV * REM_{t-1} + \beta_{7i} \ln y_{t-1} + \beta_{8i} \ln REM_{t-1} + \beta_{9i} \ln FINDEV_{t-1} + \beta_{10i} \ln k_{t-1} + \beta_{11i} \ln GEXP_{t-1} + \beta_{12i} FINDEV * REM_t + \varepsilon_{1t}$$

9

Where Δ is the difference operator. In order to implement the ARDL bound test approach, the familiar Wald coefficient test or F-statistic should be used to test the joint significant of the coefficient of the lagged variables for the purpose of examining the existence of long-run relationship among the variables. The null hypotheses of no long-run relationship among the variables in equation 8 is (H_0:

$\beta_6 = \beta_7 = \beta_8 = \beta_9 = \beta_{10} = 0$) and that of equation 9 is ($H_0: \beta_7 = \beta_8 = \beta_9 = \beta_{10} = \beta_{11} = \beta_{12} = 0$). These null hypotheses are tested against the alternative hypotheses of (H_1: $\beta_6 \neq \beta_7 \neq \beta_8 \neq \beta_9 \neq \beta_{10} \neq 0$) for equation 8 and ($H_1$: $\beta_7 \neq \beta_8 \neq \beta_9 \neq \beta_{10} \neq \beta_{11} \neq \beta_{12} \neq 0$) for equation 9 following Peseran et al. (2001). The decision to accept or reject is based on the following conditions: if F-value > upper bound, H_0 is rejected and the variables are cointegrated; if F-value < lower bound, then H_0 is not rejected and the variables are not cointegrated; however, the test is inconclusive when F-value ≥ lower bound ≤ upper bound. The error correction model for the estimation of the short-run relationship for both equations are specified as:

$$\Delta \ln y_t = \beta_0 + \sum_{i=1}^{n}\beta_{1i}\Delta \ln y_{t-1} + \sum_{i=0}^{n}\beta_{2i}\Delta \ln REM_{t-1} + \sum_{i=0}^{n}\beta_{3i}\Delta \ln k_{t-1} + \sum_{i=0}^{n}\beta_{4i}\Delta \ln GEXP_{t-1} + \sum_{i=0}^{n}\beta_{5i}\Delta \ln FINDEV_{t-1} + \beta_{i6}ECM_{t-1} + \varepsilon_{1t} \quad 10$$

$$\Delta \ln y_t = \beta_0 + \sum_{i=1}^{n}\beta_{1i}\Delta \ln y_{t-1} + \sum_{i=0}^{n}\beta_{2i}\Delta \ln REM_{t-1} + \sum_{i=0}^{n}\beta_{3i}\Delta \ln FINDEV_{t-1} + \sum_{i=0}^{n}\beta_{4i}\Delta \ln k_{t-1} + \sum_{i=0}^{n}\beta_{5i}\Delta \ln GEXP_{t-1} + \sum_{i=0}^{n}\beta_{6i}\Delta FINDEV*REM_{t-1} + \beta_{7i}ECM_{t-1} + \varepsilon_{1t} \quad 12$$

A negative and significant ECM measures the speed of adjustment of any disequilibrium between the dependent and explanatory variables in the short run to long-run equilibrium.

4. Empirical Results

4.1 Unit Root Test

In order to determine the order of integration, unit root test was conducted on the series. Three test of unit root and stationarity tests are employed. Augmented Dickey-Fuller (ADF) (1981) and Phillips Perron (PP) (1988) tests are used for the test of unit root. The two tests are complemented with the test of stationarity using Kwiatkowski-Phillips-Schmidt-Shin (KPSS) (1992). While the results of both ADF and PP shows that the series were of different orders of integration, KPPS confirmed all the series were integration of order one I(1) (table 1). The contradictory results between the three unit roots for GDPC could be due to the

lower power of ADF and PP tests when the root is very close to the unity circle (i.e. estimated coefficient is close to one) and decreases when deterministic factors are added (Choong and Lim, 2009). It should be noted that while the rejection of null hypothesis of both the ADF and PP means there is no unit root, KPPS is a stationarity test. Therefore, the rejection of null hypothesis under KPSS means the series are not stationary.

Table 1:   Test of Unit Root Using ADF, PP and KPSS

	ADF			PP			KPSS		
Variable	Level Constant with Trend	First Constant with Trend	I(q)	Level Constant with Trend	First Constant with Trend	I(q)	Level Constant with Trend	First Constant with Trend	I(q)
DEPTH	-2.5365	-5.8021***	I(1)	-2.5365	-5.8021***	I(1)	0.6748***	0.0401	I(1)
CAP	-2.4116	-5.8369***	I(1)	-2.5137	-6.0084***	I(1)	0.5264***	0.0718	I(1)
CPS	-2.0845	-5.4471***	I(1)	-2.0767	-6.3734***	I(1)	0.1671**	0.0589	I(1)
GDPC	-3.3859*	-10.225***	I(0)	-3.8716**	-10.225***	I(0)	0.6772***	0.0377	I(1)
K	-3.0827	-6.1494***	I(1)	-3.0827	-6.1494***	I(1)	0.2827***	0.0488	I(1)
REM	-1.8354	-6.7700***	I(1)	-1.8354	-6.7700***	I(1)	1.3509***	0.0491	I(1)

GEXP	-2.0235	-5.9123***	I(1)	-2.0568	-5.9227***	I(1)	1.2694***	0.0779	I(1)

Source: Author's computation. Note: *** , ** and * indicate 1per cent, 5 per cent and 10 Per cent significant levels respectively

4.2 Descriptive Statistics

Table 2 presents the summary statistics of the variables used in the study. The results of the descriptive statistics show that the mean is very close to the median. The highest median and mean values in absolute term are recorded by the remittances. It is also shown in the table that remittances have the highest variation around the mean as their standard deviation of 2.57 is the highest. This shows that remittances are relatively volatile.

Table 2:   Summary Statistics

	CAP	CPS	DEPTH	GDPC	GEXP	GFCGDP	REM
Mean	-2.56003	-2.318866	-1.996880	0.005776	-3.610367	-1.140592	-5.260704
Median	-2.681297	-2.500109	-2.067493	0.016346	-3.874189	-1.005623	-4.150369
Maximum	-0.917539	-1.571502	-1.546122	0.124575	-2.359331	-0.112205	-2.487482
Minimum	-3.488894	-2.827295	-2.391233	-0.154504	-4.698125	-1.954133	-9.927086
Std. Dev.	0.780149	0.434240	0.263092	0.054647	0.776632	0.539154	2.572516
Observations	37	37	37	37	37	37	37

Source: Author's computation

4.3 Cointegration Analysis

Table 3 and table 4 present the results of the cointegration test based on ARDL-bound testing method. Three alternative specifications were employed for each equation using one measure of financial development at a time. The results

indicate that the F-statistic is greater than the upper critical bound at different significance levels. For equation 8, the F-statistic is greater than the upper bound at 10 per cent significant level when the ratio of broad money to GDP and private credit are used as measures of financial development. However, the F-statistic is greater than the upper bound at 5 per cent when the ratio of market capitalization to GDP is the measure of financial development. For equation 9, when financial development is measured by the ratio of broad money to GDP, the F-statistic is greater that the upper bound at 5 per cent significance level. For the private sector credit, the F-statistic is greater than the upper bound at 10 per cent significance level and for market capitalization, the F-statistic is greater than the upper bound at 1 per cent significance level. Therefore, the null hypothesis of no cointegration is rejected for all the specifications. It can be concluded from the study that there is a long-run relationship among the variables in all the models.

Table 3:   Results of the Cointegration Test with No Interactive Terms

Model		F-Statistic	Result
1	F_{GDPC}(GDPC | REM,DEPTH,k,GEXP)	ARDL(1,1,0,1,0) 3.86*	Cointergrated
2	F_{GDPC}(GDPC | REM, CPS, k, GEXP)	ARDL(1,1,0,1,0) 3.57*	Cointergrated
3	F_{GDPC}(GDPC | REM, CAP, k, GEXP)	ARDL(2,0,0,1,0) 4.54**	Cointergrated
	Critical value bounds	1 per cent	5 per cent 10 per cent
	I0 Bound	3.74	2.86 2.45

I1 Bound	5.06	4.01	3.52	

Source: Author's computation. Note: the critical values are sourced from Peseran et al. (2001). *** , ** and * indicate 1per cent, 5 per cent and 10 Per cent significant levels respectively

Table 4: **Results of the Cointegration Test with Interactive Terms**

Model				F-Statistic	Result
1	F_{GDPC}(GDPC|REM,DEPTH,k,GEXP)	ARDL(1, 3, 3, 1,3)	4.7105**		Cointergrated
2	F_{GDPC}(GDPC|REM, CPS, k, GEXP)	ARDL(1, 0, 2, 0,0)	3.6510*		Cointergrated
3	F_{GDPC}(GDPC|REM, CAP, k, GEXP)	ARDL(2, 2, 2, 2,2)	5.1721***		Cointergrated
	Critical value bounds	1 per cent	5 per cent	10 per cent	
	I0 Bound	3.74	2.86	2.45	
	I1 Bound	5.06	4.01	3.52	

Source: Author's computation. Note: the critical values are sourced from Peseran et al. (2001). *** , ** and * indicate 1per cent, 5 per cent and 10 Per cent significant levels respectively

4.4 Long-run and Short-run Estimate

This section presents the long-run and short-run estimates of the parameters in the equation (8) and (9). Starting with equation (8) where the growth effects of remittances without the interaction are examined, table 5 and table 6 present the long-run and short-run estimates for equation (8) respectively. Remittances have positive but insignificant effects on growth when broad money and private

sector credit are used as measures of financial development. However, a negative insignificant effect of remittances on growth is reported when market capitalization is the proxy for financial development. The coefficients of all the measures of financial development apart from market capitalization are negative. This implies that financial development when measured by broad money and private sector credit do not stimulate growth. On the other hand, market capitalization as a measure of financial development has positive effect on economic growth. The results suggest that the growth effects of financial development depend on the measure of financial development.

Table 5:   Long-run Coefficients with No Interactive Terms

Variable	1	2	3
Constant	3.9109(1.4368)**	3.8177(1.3738)	5.3933(1.7992)***
REM	0.0065(0.0052)	0.0060(0.0049)	-0.0051(0.0072)
DEPTH	-0.0590(0.0750)		
CPS		-0.0320(0.0392)	
CAP			0.0697(0.0299)**
K	-0.1569(0.0573)**	-0.1516(0.0547)***	-0.2143(0.0719)**
GEXP	0.0271(0.0229)	0.0265(0.0215)	-0.0184(0.0205)

Source: Author's computation. Note: ***, ** and * indicate 1per cent, 5 per cent and 10 Per cent significant levels respectively

Table 6: Short-run Error Correction Estimates with No Interactive Terms

Variable	1	2	3
ECM(-1)	-0.6638(0.1756)***	-0.6978(0.1684)***	-0.7265(0.1980)***
D(REM)	-0.0160(0.0086)*	-0.0153(0.0085)*	-0.0037(0.0048)
D(DEPTH)	-0.0391(0.0457)		
D(CPS)		-0.0223(0.0264)	
D(CAP)			0.0507(0.0203)**
D(GEXP)	0.0179(0.0143)	0.0185(0.0148)	-0.0133(0.0141)
D(K)	-0.0172(0.0576)	-0.0091(0.0589)	-0.0498(0.0602)
	Diagnostic Test		
LM	[0.0112]	[0.1150]	[0.4554]
JB	[2.224]	[2.0705]	[2.7925]
RESET	[0.1798]	[0.0684]	[0.0817}
ARCH	[0.2485]	[0.3692]	[0.0204]

Source: Author's computation. Notes: Diagnostic tests results are based on F-statistic. Figures in parenthesis represent the standard error. JB means Jarque–Bera normality test. LM means Breusch–Godfrey serial correlation LM test. ARCH means ARCH test. RESET means Ramsey RESET test. *** , ** and * indicate 1per cent, 5 per cent and 10 Per cent significant levels respectively.

Surprisingly, the coefficients of investment have negative effects on economic growth in all the three specifications. The possible explanation for this could be that public investment dominates and crowds out private investment in Nigeria. Moreover, apart from when market capitalization is used as a measure of financial development, government expenditure has a positive effect on growth. The coefficient of the error correction model for all the three

specifications are given in Table 6. They are all negative and statistically significant 1 per cent. This suggests that short-run equilibrium is corrected in the long-run equilibrium. Short-run coefficients of remittances are all negative for the three specifications. The only measure of financial development that stimulates growth is market capitalization. Other measures of financial development have negative effects on economic growth in Nigeria.

The effect of remittances on economic growth through financial development is presented in table 7 and table 8. Starting with the key variables, it is observed that remittances have positive effect on economic growth in all the three specifications when interactive terms are included in the model. Also, all the measures of financial development have significant positive effects on growth. The interactions between remittances and financial development are positive and significant in all the specifications. This supports the existence of complementarity between financial development and remittances in Nigeria. Hence a well-developed financial system enhances the impacts of remittances on economic growth.

Table 7: Long-run Coefficients with Interactive Terms

Variable	1	2	3
Constant	-0.797458(0.9590)	-0.8084 (0.3048)**	0.2122(0.9984)
REM	0.1996(0.0918)**	0.0511(0.0195)**	0.2546(0.4253)
DEPTH	0.0895(0.0280)***		
CPS		0.1348(0.0601)**	
CAP			0.4067(0.2179)*
DEPTH*REM	0.1039(0.0452)**		
CPS*REM		0.0287(0.0145)*	

CAP*REM			0.0806(0.0301)
K	0.3251 (0.1699)*	0.3035(0.0830)***	0.0913(0.0376)**
GEXP	-0.0413(0.0633)	-0.0134(0.0222)	-0.2318(0.2309)

Source: Author's computation. Note: ***, ** and * indicate 1 per cent, 5 per cent and 10 Per cent significant levels respectively

Table 8: **Short-run Error Correction Estimates with Interactive Terms**

Variable	1	2	3
ECM(-1)	-0.3793(0.1294)***	-0.6646(0.1414)***	-0.2322(0.0915)**
D(REM)	0.0756(0.0531)	0.0340(0.0530)	0.0468(0.0792)
D(REM(-1))	0.0171(0.0090)*		-0.0017(0.0147)
D(REM(-2))	-0.0172(0.0063)**		
D(DEPTH)	-0.0282(0.1390)		
D(DEPTH(-1))	0.0387(0.0672)		
D(DEPTH(-2))	0.1066(0.0695)		
D(CPS)		-0.0313(0.0887)	
D(CPS(-1))		0.1219(0.0452)**	
D(CAP)			0.0379(0.0663)
D(CAP(-1))			-0.0087(0.0446)
D(REM*DEPTH)	0.0394(0.0250)		
D(REM*CPS)		0.0190(0.0210)	
D(REM*CAP)			0.0187(0.0239)

D(K)	-0.2800(0.0646)***	-0.2017(0.0475)***	-0.2015(0.0866)
D(K(-1))			-0.0742(0.0943)
D(GEXP)	-0.0006(0.0155)	-0.0089(0.0148)	-0.0367(0.0312)
D(GEXP(-1))	-0.0387(0.0216)*		-0.0061(0.0283)
D(GEXP(-2))	0.0431(0.0197)**		
	Diagnostic Test		
LM	[0.6546]	[0.8921]	[1.4704]
JB	[0.8515]	[0.5937]	[1.5373]
RESET	[2.0063]	[0.0046	[0.6369]
ARCH	[0.4194]	[0.2668]	[0.6694]

Source: Author's computation. Notes: Diagnostic tests results are based on F-statistic. Figures in parenthesis represent the standard error. JB means Jarque–Bera normality test. LM means Breusch–Godfrey serial correlation LM test. ARCH means ARCH test. RESET means Ramsey RESET test. *** , ** and * indicate 1per cent, 5 per cent and 10 Per cent significant levels respectively.

Interestingly, the signs of coefficients of investment as measured by gross fixed capital formation change from negative to positive in all the three specifications. This shows that the model performs better with interaction. However, government expenditure has negative but insignificant effects on economic growth in the three specifications. Possible explanation for this could be that larger share of government expenditure in Nigeria goes to recurrent expenditure. Only small portions are spent on capital expenditure which is growth enhancing.

The short-run growth effects of remittances on economic growth when interactive terms are included in the model are presented in table 8. The signs of

the error correction models are negative and significant at the conventional levels. This measures the speed of adjustment of the short-run disequilibrium to long-run equilibrium. For example, the coefficient of the ECM is 0.38 when broad money is used as the measure of financial development. This implies that about 38 per cent of the disequilibrium in the previous year shock adjust back to long-run equilibrium in the current year. The coefficients of the interactive term are positive even though not significant. This shows that financial development enhances the impacts of remittances on economic in the short run.

Overall, the results of this study show that the growth effect of remittances depends on the measures of financial development when there are no interactive terms in the model. However, with interactive terms, remittances have significant positive effects on economic growth in Nigeria irrespective of the measures of financial development. This is in line with the studies by Kumar (2013), Latey (2013) and Mim and Ali (2012) that found positive and significant effects of remittances on economic growth.

It was also found out that financial development irrespective of the indicators has positive and significant effect on economic growth in Nigeria when remittances are interacted with financial development. Based on the estimated results, the study is in support of the complementarity of remittances and financial development in Nigeria. Thus, the presence of well-developed financial system enhances the impacts of remittances on economic growth in Nigeria. Though this deviates from study by Bettin and Zazzaro (2009), it is in alliance with the works of Mundaca (2009) and Nyamongo et al. (2012) which found existence of complementarity between financial development and remittances in stimulating economic growth.

4.5   Diagnostic Test

From the diagnostic results from table 6 and table 8, there are no evidences of serial correlation as measured by Breusch-Godfrey LM test. The normality

behaviour of the estimated residuals was tested through the Jacque Berra normality test. It was confirmed that the residuals in all the six specifications are normally distributed as the null hypothesis cannot be rejected. Heteroscedasticity of the models is examined through the ARCH test. Results of the ARCH test also confirm that there is no problem of heteroscedasticity in the models. Lastly, the correct functional forms of the models are confirmed by the RESET test.

5.   Concluding Remark

Using the ARDL Bound test approach with annual time series data between 1981 and 2018, the study has examined the role of financial development in enhancing the impacts remittances on Nigeria's economic growth. This study is motivated by the realization that remittances have become the second largest source of external finance after FDI in Nigeria. Most studies on remittances in Nigeria have focused on their impacts on economic growth. There are scanty country specific studies that considered the role financial development can play in enhancing the impacts of remittances on economic growth. Therefore, it is the focus of the study to add to the body of literature on remittances and growth.

Based on the results of the Bound test, it was found that the variables are cointegrated in all the specifications. In the model without the interactive term, the impacts of remittances on economic growth depend on the measure of financial development both in the long run and short run. However, when remittances are interacted with financial development, both remittances and all the indicators of financial development have positive and statistically significant effects on economic growth in Nigeria. Furthermore, the coefficients of all the interactive terms are positive and significant. This supports the existence of complementarity between financial development and remittances. Thus, it can be concluded that in Nigeria, financial development

enhances the roles of remittances in stimulating economic growth. Therefore, the government of Nigeria should intensify efforts in creating enabling environment for well-developed financial market.

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