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REMITTANCES REVIEW

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Interactive Effects of Remittances and Financial Sector Development on Economic Growth in Nigeria

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Abstract

A well-developed and efficient financial sector together with remittances can serve as a transmission mechanism to ensure well-rounded economic growth because extant literature shows that remittances alone may not be sufficient to promote the desirable level of economic growth. Therefore, this study investigated the interactive effects of remittances and financial sector development on economic growth in Nigeria for the period 1977-2017. The data for this study was obtained from the World Bank's World Development Indicator (WDI) Database. The data were analysed using the Instrumental Variable Generalised Method of Moments (IV-GMM) estimator. The findings of this study showed that remittances alone had a negatively significant effect on economic growth at 1% significance level but when interacted with financial sector development, they enhance economic growth as revealed by the positive coefficient of the interactive term which is also significant at 1% level. The study concluded that Nigeria's economy profits from migrants' remittances in terms of economic growth through the existence of a developed financial sector. This study recommended among other things that the interaction of remittances and financial sector development should be used as an avenue to encourage more savings from remittances by lowering transaction costs and increasing payment of deposits' interest on remitted funds. Besides, bank financial institutions should find a better match for these savings (in terms of investment opportunities) in order to neutralise the negative effects of remittances on economic growth caused by recipients' consumption smoothing drive.

Keywords: Financial Sector Development; Remittances; Complementarity; Nigeria.

JEL Classification: F14, F24

Introduction

The effects of remittances on economic growth, coupled with the role(s) played by intermediaries in the financial sector have continued to gain considerable attention in the development literature (Abida

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& Sghaier, 2014; Bettin & Zazzaro, 2012; Hamma, 2016, and so forth). The fact that remittances are stable, reliable, and least volatile transfers has made it serve as important sources of national income for low-income countries (Ajayi *et al.,* 2009; Sirkeci, Cohen & Ratha, 2012; World Bank, 2006). Debates also continue as to what entails remittances (Cohen & Sirkeci, 2012). From across the globe, migrants' transfers are usually influenced by a host of factors, amongst which include, flexible financial sector infrastructure, low transaction cost of transfers, high international labour mobility, sound economic policies (such as, flexible foreign exchange controls), high level of inequality, trade openness, and forceful return of migrants to their home country (Ajayi *et al.,* 2009; Chami, Fullenkamp, & Jahjah, 2005). Particularly for developing countries like Nigeria, migrants' transfers to their families in the home country are influenced by the intention to improve the welfare of these families especially during periods of bad economic conditions (Ajayi *et al.,* 2009; Sobiech, 2019).

Like financial sector development, migrants' transfers may contribute positively to economic growth when such transfers are channeled to potentially productive uses by the migrants' families, rather than for unproductive consumption purposes which can deter economic growth although it is hard to distinguish between productive and unproductive consumption. According to the World Bank (2018b) update on remittance inflows worldwide, Nigeria is the largest recipient of remittances in sub-Saharan Africa (SSA) officially documented to have received approximately US$22 billion in 2017; and also ranks among the top 7 recipients globally. The figure has increased slightly by 11.68% from about US$19.7 billion received in 2016. Migrants' transfers to developing countries have increased rapidly and ranked above the sum of official development assistance (ODA) received (Levine, Loayza & Beck, 2000; Sirkeci *et al.,* 2012; Sumata, 2008) both in absolute terms and in terms of percentage of gross domestic product (GDP) as well as above foreign direct investment (FDI) inflows (Sobiech, 2019). During the United Nations (UN) Third International Conference on Financing for Development which was held in Addis Ababa from 13-16th July 2015, remittances have been recognised as one of the potential sources of external finance for unlocking the growth potentials of a nation through an established Sustainable Development Goals (SDGs). Also, remittances were largely recognised as a means through which migrants' can support their families in developing countries, and a well-functioning financial sector was considered necessary to amplify these remittances through lower costs and better services availability (United Nations, 2015). The average transaction cost of remitting which was 10 percent in 2010 has further decreased to 7.45 percent

in the last quarter of 2015, however, this rate is still higher than the SDG targeted rate of 3 percent by 2030 (World Bank, 2017).

Cooray (2012) notes that rates of economic growth are higher in countries with a well-developed financial sector. However, the level of economic growth is relatively low in many developing countries including Nigeria, whereas access to potential sources of external finance can help to unlock the growth potentials of a nation. Nevertheless, remittances alone may not be strong enough to promote a desirable level of economic growth, hence financial sector development can serve as a transmission channel in enhancing the effects of remittances on economic growth (Jouini, 2015; Zghidi & Abida, 2015). The growth effects of remittances inflows can be multiplied with the help of banking remittance recipients through formal remitting channels (Hinojosa-Ojeda, 2003; World Bank, 2006). The effect can further be enhanced if savings made by these recipients out of their remittances are pooled together by institutions in the financial sector, precisely banks for recycling them as credit to the private sector (Jayaraman, Lau & Ng, 2018). Bank financial institutions play a key function by facilitating credit flow from the savers' side to the users' group in an economy, and in that process, they create a multiplicity of investments, which serve as one of the drivers of economic growth (Kolapo, Oke & Olaniyan, 2018).

Based on the inconsistent results of the previous studies, evidence provided in the literature is ambiguous and still far from being conclusive. The results of these studies have also varied with the time period considered, the data used, the diversity of the country sample/region analysed, the definition of remittances adopted, the model specification, as well as the estimator(s), used. The literature has shown that the complementarity hypothesis has the most supporting empirical evidence, though the degree of the effect differs across countries. From the review of literature, it also appears that there are more cross-country panel studies on the topic. With the exception of some studies in other developing countries which provide mixed and controversial findings (see Chen & Jayaraman, 2016; Jayaraman *et al*., 2016; Sibindi, 2014; Uddin & Sjö, 2013), a country-specific study on the effect of remittances on economic growth using the role of financial sector development as a transmission mechanism is relatively scarce, whereas it is obvious from the review of empirical literature that the role of financial sector development in enhancing remittances to support economic growth in Nigeria was previously unexplored. A country-level study for Nigeria is relevant since the level of financial sector development differs across countries depending on whether the financial system is market-

based or bank-based financial sector like ours with a hypertrophic banking system. Thus, this study provides initial evidence of the complementarity evidence in Nigeria, the largest recipient of remittances in the SSA region.

The questions to address then are: first, what are the effects of remittances inflows on economic growth in Nigeria? Second, what are the interaction effects of remittances and financial sector development on Nigeria's economic growth? Therefore, the aim of this study is to examine the interactive effects of remittances and financial sector development on economic growth in Nigeria and to specifically investigate the effects of remittances on economic growth in Nigeria.

Following this introductory section, section 2 discusses the literature review and hypothesis development. Section 3 illustrates the estimation model and methodology. Section 4 presents the estimation results. Section 5 summarises the empirical findings and concludes based on the results.

Conceptual Review of Remittances Literature

Remittances, also known as international remittances, migrants' transfers or remittances inflows) are the cross-border earnings that migrants send from where they work to their home countries (Nyamongo, Misati, Kipyegon, & Ndirangu, 2012). It can be classified in terms of money or kind. Remittances in kind are related to material goods and items, while remittances in money are units of foreign currencies sent by the migrants' to family members in their home country. These transfers are made either for altruistic or self-interest reasons. Altruistic in the sense that migrants' may remit in order to help reduce the effects of economic hardship in their home countries, and self-interest when such funds are used on behalf of the migrants' for investment purposes, should they intend to return back home in the future. These transfers may pass through official- or unofficial channels. The official channels allow transfers to be remitted through the domestic banking system and/or money-transfer organisations whereas the unofficial channels remit mainly in cash or in-kind through the use of carriers such as family members or friends; money or goods taken by the migrant on his/her seasonal visits to his/her home country and; funds remitted through other unlicensed money transfer operators (*hawala* system). However, transfers through unofficial channels are far more expensive (Jayaraman *et al*., 2018); it is also higher than the former.

Financial sector development

Financial sector development refers to an increase in the ability of the financial sector to perform its intermediary functions efficiently. The financial sector is an important channel through which remittances can promote economic growth (Giuliano & Ruiz-Arranz, 2005; Mundaca, 2009); hence the sector may be treated as an essential determinant as well as a significant contributor to economic growth. The other potential channels through which remittances can influence economic growth are output volatility, investment, total factor productivity (TFP), real exchange rate (Sobiech, 2019), and capital accumulation (Uddin & Sjö, 2013).

Economic growth

Economic growth refers to the rate of growth of real per capita GDP. The level of economic growth in a country can increase as a result of the inflows of international capital, such as remittances through the activities of institutions in the financial sector. Financial intermediaries, especially banks are expected to perform efficiently to ensure that financial resources are available to support the potentially productive sectors of the economy, such as the agricultural, manufacturing, and oil and gas sectors which are regarded as agents of structural change in an economy. The link between financial development and growth largely depends on whether the financial system is bank-based or market-based. A well-developed banking sector can facilitate economic growth through (i) the provision of providing *ex-ante* information about possible investments and allocate capital, (ii) the monitoring of investments and exert corporate governance after providing credit, (iii) the facilitation of trading, risk diversification, and risk management, (iv) the mobilisation and pooling of capital, and (v) the facilitation of the exchange of goods and services (Demirgüç-Kunt & Levine, 2001; Levine, 2005; Pagano, 1993). On the other hand, the proponents of market-based financial systems, among other things, claim that markets permit greater customisation of risk ameliorating instruments through a richer set of risk management tools.

Theoretical review

The complementarity hypothesis and substitutability hypothesis are theories relevant in showing the interactive effects of remittances and financial sector development on economic growth.

Complementarity hypothesis

The complementarity hypothesis was propounded by Mundaca (2009). In its proposition, the hypothesis states how the effects of remittances on economic growth become stronger and positive at a high level of financial development. The hypothesis assumes that

remittances and financial development support (complement) one another in promoting economic growth; and migrants' can send money home cheaply, safely, and faster when there is a high degree of financial sector development. Furthermore, it explains that the effects of remittances on economic growth seem to be more pronounced only in countries where banking systems function well. The hypothesis also assumes that remittances pass through financial intermediaries (banks, precisely) to their beneficiaries in order to increase the well-being of the receivers (in terms of their consumption needs) and economic growth (when the remitted funds are available for potentially productive activities).

Substitutability hypothesis

The substitutability hypothesis was advocated by Giuliano and Ruiz-Arranz (2009). The hypothesis proposes that remittances can be an important source of financing growth-enhancing activities in countries with poorly developed (shallow) financial sectors, particularly when these remittances serve as a substitute where institutions in the financial sector (particularly, banks) have failed in their expected role of providing funds for entrepreneurial and potentially productive activities. The hypothesis assumes that the remitted funds which pass through the financial sector can substitute for the absence of banks' credit, thus the recipients of remittances can make use of such funds for potentially productive activities. It also assumes that the effect of remittances on economic growth is more pronounced in less financially developed countries, where banks are weak in providing adequate funds for potentially productive activities; hence remittances act as substitutes for financial sector development.

Empirical review

Cross-country analysis of remittances, financial sector development, and economic growth

Mundaca (2009) examined the effects of remittances and financial sector development, as well as their interrelationship on economic growth for a panel dataset of 25 countries of Latin America and certain countries in the Caribbean (LAC) over the period 1970-2002. Using the First-Difference Generalised Method of Moments (GMM), the results showed the first evidence of complementarity hypothesis. Nyamongo *et al.* (2012) investigated the role of financial sector development and remittances in supporting economic growth for a panel of 36 countries in Saharan Africa for the period 1980-2009. Utilising both Ordinary Least Squares (OLS) and the Two-Stage Least Squares (TSLS), the results showed that remittances complement

financial development to support the economic growth of the countries. This also supports the complementarity hypothesis.

Bettin and Zazzaro (2012) estimated the effects of remittances on the economic growth, highlighting the role of the financial development measured by standard quality-based indicators of the microeconomic efficiency of banks by considering a panel dataset of 66 developing countries globally for the period 1991-2005. Applying OLS and System-GMM estimators, the overall results showed the existence of complementarity between remittances and bank efficiency in promoting economic growth. Abida and Sghaier (2014) tracked the relationship between remittances, financial development, and economic growth in a panel dataset of four North Africa countries for the period 1980-2011. Employing System-GMM panel data analysis, the results showed that remittances appear to be working as a complement to financial development in promoting economic growth.

Hamma (2016) investigated the effect of remittances on economic growth and considered the role of financial sector development in 12 Middle East and North Africa (MENA) countries over the period 1984-2012. Using the System-GMM estimator, it revealed that a complementary relationship exists between financial development and remittances to ensure economic growth. Chowdhury (2016) explored how remittances can influence economic growth under different levels of financial development in a sample of 33 top remittances-recipient developing countries globally over the period 1979-2011. Applying the two-step System-GMM, the results showed that financial development neither works as a substitute nor a complement, whereas stand-alone remittances but not with the interaction effects of financial development are effective in promoting economic growth.

A pocket of attempts across a sample of countries showed support for the substitutability of remittances and financial development in promoting economic growth, for example, Giuliano and Ruiz-Arranz (2009) studied the relationship between remittances and growth, in particular how local financial sector development influence countries capacity to take advantage of remittances by considering a sample of 73 developing countries globally for the period 1975-2002. Utilising OLS and System-GMM estimators, the results showed that the substitutability hypothesis holds. Ramirez and Sharma (2009) examined the impact of remittances and their interaction with financial development on the economic growth of the 23 selected LAC countries over the period 1990-2005. Using the Fully Modified OLS estimator, the results showed that remittance inflows have a positive

and significant effect on economic growth. Furthermore, the remittances-financial development conditioning term showed that the two variables act as substitutes.

Jayaraman *et al.* (2018) assessed the role of financial sector development in the relationship between remittances and economic growth for a panel dataset of five Pacific Island countries over the period 1997-2014. Through the results of Dynamic Ordinary Least Square (DOLS), the study showed that remittances and financial sector development are substitutes for economic growth. Sobiech (2019) examined the role of financial sector development for the relationship between remittance and growth in 61 emerging and developing countries over the period 1970-2010. Using Dynamic Panel Data with Fixed Effects (QML-FE) and System-GMM estimators, the overall results showed that there is a substitution between remittances and financial development as factors enhancing the economic growth for the countries.

Country-level analysis of remittances, financial sector development, and economic growth

Sibindi (2014) evaluated the effects of remittances and financial development on economic growth in Lesotho for the period 1975-2010. Through the Johansen cointegration procedure and Granger causality based on the Vector Error Correction Model (VECM), the results showed that remittances complement rather than substitute financial development in bringing about economic growth to Lesotho. Therefore, the study lent credence to the complementarity hypothesis. Jayaraman, Choong, and Kumar (2016) studied the role of remittances in India's economic growth over the period 1970-2009. Applying the Autoregressive Distributed Lag (ARDL) bounds testing approach to cointegration. The results showed that remittances and the interaction between remittances and financial sector development have a positive and significant effect on economic growth. The results of the study validated the complementarity hypothesis in the context of India.

A few country-specific studies have documented evidence of substitutability between remittances and financial sector development. For instance, Jayaraman, Choong, and Kumar (2010) examined the role of financial sector development for the relationship between remittances and economic growth in Tonga for the period 1981-2007. Through the ARDL bounds testing approach to cointegration and Granger causality test, the results showed evidence to support the substitutability hypothesis. Uddin and Sjö (2013) investigated the relationship between remittances, financial sector development and economic growth in Bangladesh for the

time period 1976-2011 by applying the Johansen's Vector Autoregression (VAR) method. It showed that the inflow of remittances can substitute for financial sector development in the long-run, whereas remittances act as a shock absorber to income changes in the short-run. Chen and Jayaraman (2016) examined the role of financial sector development in the remittances-growth nexus in Fiji for the period 1980-2012. Utilising the Engle-Granger cointegration procedure and two major Instrumental Variables (IV) estimators: the Two-Stage Least Squares (2SLS) and Two-Stage GMM, it was found that remittances and financial sector development are substitutes in Fiji's developing economy which have a shallow financial system.

Hypothesis 1. Remittances inflow and the interaction of remittances and financial sector development do not have a positive significant effect on economic growth in Nigeria.

Methodology

This study collects time-series annual data for the 1977-2017 period. First, the selection of the time period for this study is based on the availability of reliable data; there are no official data on remittances inflows to Nigeria before the year 1977. Second, the start period captures the year when remittance inflows as a percentage of GDP were low for Nigeria compared to the entire SSA region, and vice versa for the end period. The data for this study were collected from the World Bank's World Development Indicators (WDI) Database. The *ex-post facto* research design was used for this study since the data are collected from a secondary source.

Model specification

This study adapts the growth equation of Sobiech (2019). The modification to the model lies in the choice of control variables which vary slightly, this is to ensure that a specific growth-determining macroeconomic factor, such as inflation level which is relatively high in Nigeria is captured. The inclusion of a one-period lagged dependent variable as a regressor makes the model specified in Eq. (3) to be dynamic, hence it allows for the possibility of partial adjustment of economic growth to its long-run equilibrium as suggested by Baltagi, Demetriades, and Law (2009).

The estimation model of Sobiech (2019) is stated in Eq. (1) as:

$$y_{it} = \alpha + \gamma y_{it-1} + \delta_1 \mathrm{Re}m_{it} + \delta_2 FinDev_{it} + \delta_3 \mathrm{Re}m_{it} FinDev_{it} + \beta X_{it} + \mu_i + \eta_t + \varepsilon_{it} \quad (1)$$

The functional model for this study is specified in Eq. (2) as:

$$GDPg = f(\mathrm{REM}, \mathrm{FSD}, \mathrm{REM}^{*}\mathrm{FSD}) \quad (2)$$

The dynamic model to be estimated for this study is as follows:

$$GDPg_t = \alpha_1 + \beta_1 GDPg_{t-1} + \beta_2 REM_t + \beta_3 FSD_t + \beta_4 (REM_t * FSD_t) + \beta_5 X_t + \varepsilon_t \quad (2)$$

where GDPg denotes the contemporaneous real GDP capita growth, $GDPg_{t-1}$ refers to the one-period lagged value of real GDP per capita growth, REM represents remittances, FSD refers to financial sector development, REM*FSD is the product of remittances and financial sector development (which is an interaction term), X refers to the vector of control variables, a is the intercept, while β_1 - β_5 are the parameters to be estimated, ε_t is the error term and the subscripts *t* indicate time period.

The control variables included in this study which measures the interactive effects of remittances and financial sector development on economic growth as suggested by prior empirical studies reviewed are investment ratio, human capital formation, population growth, and inflation. Also, the variables in the model for this study except inflation, economic growth (measured as real GDP per capita growth) and lagged real GDP per capita growth are log-transformed; inflation and real GDP per capita growth contains some negative observations, hence the coefficients of all variables but inflation and lagged real GDP per capita growth are divided by 100 for interpretation purpose.

Table 1. Variables description and their measurements.

Variables	Description	Measurements and/or sources
Economic Growth	One period lagged of real GDP per capita was included as a regressor in the model of this study in order to control for economic convergence, which is also known as the catch-up effect. This is the idea that the per capita incomes of poorer economies tend to grow at faster rates than the richer economies.	This is the dependent variable and it is measured as the annual percentage growth rate of real GDP per capita (in Constant 2010 US dollars). Real GDP per capita growth rate was obtained from the World Bank (2018a).
Remittances	Remittances are the sum of the receipts of three aggregates: Workers' remittances, compensation of employees, and migrants' transfers (Sobiech, 2019; World Bank, 2016).	This independent variable is the main variable of interest in this study and it is measured as a percentage of GDP.
Financial Sector Development	This study is motivated to use the quantity-based proxy (an indicator of financial institution depth) to measure financial sector development because the financial system in Nigeria is predominantly bank-based; the financial markets are not well-developed as the money market. Moreso, the banking sector provides a plausible source of finance for unlisted companies than in financial markets. For this reason, this bank-based financial proxy is more appropriate for this study. It is often argued to be a more superior and appropriate measure of financial sector development (Ang & McKibbin, 2007; Calderón & Liu, 2003; Jayaraman *et al*., 2016); this proxy is the preferred measure of financial sector development used by Beck, Levine, and Loayza (2000) and Kumar, Stauvermann, and Prasad (2017). It can also be directly linked to private investment and economic growth (Mundaca, 2009).	It is measured as banks' credit to the private sector as a percentage of GDP.
Interaction Term	This variable serves as a pointer to the effect of remittances on economic growth using the financial sector development as a transmission mechanism or	NA

	otherwise. A positive and significant interaction term will indicate that remittances and financial sector development are complementary and that the growth effects of remittances are enhanced if the financial sector is highly developed. On the other hand, a negative and significant interaction term will suggest that remittances and financial sector development can be used as substitutes to promote economic growth; whereas a non-significant interaction term would be that the two are independent of each other in promoting economic growth.	
Investment Ratio	It represents investments in physical capital. Greater investment shares have been shown to be positively related to economic growth (Mankiw, Romer & Weil, 1992). Therefore, a positive coefficient is expected.	It is measured as the ratio of gross fixed capital formation to GDP.
Human Capital Formation	It represents the investment in human capital. Greater school enrollment ratios lead to greater human capital formation, which should be positively related to economic growth (Gemmel, 1996). Thus, a positive coefficient is expected.	It is measured as the primary school gross enrollment rates.
Population Growth	Greater population growth often leads to lower GDP per capita growth (Solow, 1956). For this reason, a negative coefficient is expected. It can also act as a driving force for migration and increase the number of remittances sent back home.	It is measured as population growth expressed as an annual percentage.
Inflation	Nigeria is a high-inflation country, and a high level of inflation can distort the decisions of economic agents', such that it discourages financial intermediation and encourages savings in the real assets which affects economic growth. Therefore, a negative coefficient is expected.	It is measured as the annual percentage growth rate of the GDP implicit deflator.

Source: Author's compilation

Estimation technique

This study estimates the model in Eq. (3) using the Instrumental Variable Generalised Method of Moments (IV-GMM) robust estimator. The IV-GMM estimator is appropriate considering the concern pertaining to this study's research question, and to growth regressions in total. The concern is closely related to the hypothesised endogeneity between financial sector development and remittance measures (and other potential determinants of economic growth), as it is unclear whether the existence of better financial intermediation actually increased the volume of remittances or it only ensured that greater share from the inaccurate estimates of the informal channels are diverted to the formal and more quantifiable channels. Also, remittances could affect the growth of a country and therefore impact on the magnitude of future remittances received (Nyamongo *et al*., 2012). Therefore, the IV-GMM estimator is naturally capable of assuaging the anxiety over endogeneity problems (resulting from reverse causality), simultaneity bias, measurement error, omitted variable bias, and heteroscedasticity in the regression model through the use of Instrumental Variables (IVs). This study utilises the two-period lagged values of the dependent variable and of the regressors which are assumed to be weakly exogenous as "GMM style" instruments; since many of the external instruments such as country's legal systems,

distance from the country of origin, and creditor rights which may fully reflect the flows of remittances do not vary over time (Nyamongo *et al*., 2012). The IV-GMM estimator produces consistent and information efficient regression estimates. The estimator is also consistent with the assumption of a dynamic specification of the dependent variable.

To ensure that the GMM estimator is identified, the study has the same number of instrumental variables as the parameters to be estimated. The results from this study are validated through certain post-estimation tests which are carried out, such as the tests of endogeneity, weak instruments test, and the tests for overidentifying restrictions.

A *priori* expectation

Table 2 presents the list of variables, their proxies, expected relationship, and the sources as:

Table 2. Predicted signs for the variables under consideration.

Variable (Proxies)	Predicted Sign with the Dependent Variable	Source
Remittances (REM)	Positive (+)	World Bank (2018b)
Financial development (FSD)	Positive (+)	World Bank (2018c)
Interaction term (REM*FSD)	Indeterminate (+/-)	Author's Computation*
Investment ratio (GFCF)	Indeterminate (+/-)	World Bank (2018d)
Human capital formation (HCF)	Positive (+)	World Bank (2018e)
Population growth (POPG)	Negative (-)	World Bank (2018f)
Inflation (INFR)	Negative (-)	World Bank (2018g)

Note: * implies that the interactive term was computed from REM and FSD data. Source: Author's computation

Findings

Table 3 reports the results from the summary statistics, showing that the mean values for the variables (real GDP growth rate, remittances, financial sector development, gross fixed capital formation, human capital formation, population growth, and inflation) are 0.716092, 2.983939, 14.53334, 15.80376, 92.83878, 2.619064, and 20.8486 percents respectively. The mean inflation over the period investigated is 20.8%; this is a pointer to the price stability struggles of Nigeria. Following a similar order for reporting the mean values, the minimum values are -15.45478, 0.008619, 8.692986, 5.458996, 60.09945, 2.488183, and -5.665685 percents respectively, while their maximum values are 30.35658, 13.04258, 38.34855, 48.29301, 113.0455, 3.044342, and 113.0754 percents respectively. The standard deviation for these variables is 7.132203, 3.61977, 5.839882, 10.99169, 9.947228, 0.135890, and 25.86327 percents respectively. These results show that Nigeria has suffered from the volatility of output growth with a standard deviation which is largely greater than the average economic growth over the period investigated.

Table 3. Results of summary statistics

Statistic	GDPG (%)	REM (%)	FSD (%)	GFCF (%)	HCF (%)	POPG (%)	INFR (%)
Mean	0.716092	2.983939	14.53334	15.80376	92.83878	2.619064	20.8486
Minimum	-15.45478	0.008619	8.692986	5.458996	60.09945	2.488183	-5.665685
Maximum	30.35658	13.04258	38.34855	48.29301	113.0455	3.044342	113.0754
Std. Dev.	7.132203	3.61977	5.839882	10.99169	9.947228	0.135890	25.86327
Observations	41	41	41	41	41	41	41

Source: Author's computation

Estimation results

This study estimated the model specified to investigate the interactive effects of remittances and financial sector development on economic growth using the IV-GMM robust estimator. Table 4 reports the results of the regression estimation as follows:

Table 4. Remittances-financial sector development estimation results.

Explanatory Variables	**Coefficient**	**Robust Standard Error**	**Z- statistics**	***p >/z/***
Lag1gdpg	-0.1901	0.07225	-2.63	0.008***
Rem	-11.2219	2.17051	-5.17	0.000***
Fsd	-6.4565	2.42841	-2.66	0.008***
Remfsd	4.3990	0.82015	5.33	0.000***
Gfcf	-6.1973	2.43325	-2.55	0.011**
Hcf	13.7626	6.14320	1.93	0.054*
Popg	36.5961	18.2957	1.95	0.052*
Infr	-0.0848	0.03409	-2.79	0.005***
Intercept	-63.4794	31.0757	-1.99	0.047**
Observations	39			
Model Fit and Diagnostics				
Model Fit:				
R-squared	0.35			
Wald χ^2	119.01 (0.000)***			
Model Diagnostics:				
Number of Instruments	15			
Hansen's J test	7.23547 (0.4048)			
Endogeneity test χ^2	1.60977 (0.0245)**			

The explained variable is real GDP per capita growth. *Note:* The variables in bold are the most relevant to this study. Also, *, ** and *** implies significance at 10%, 5%, and 1% respectively. *p*-values are reported in brackets ( ). Source: Author's computation

Discussion

In the results of the IV-GMM regression, as shown in Table 4, the coefficient of the lagged value of real GDP per capita growth is negatively signed and significant at 1 percent level. This is consistent with the conditional convergence hypothesis of the neoclassical theorists which argues that poor countries with a low initial GDP grow relatively fast, permitting them to catch up with the richer countries.

This result is consistent with the studies of Abida and Sghaier (2014), Chowdhury (2016), and Nyamongo *et al.* (2012) but differs from the positively signed coefficients reported by Fayissa and Nsiah (2010).

Starting from the key variables, the estimated coefficient of remittances is found to be negative in contrast to expectation, however, it is highly significant. On the coefficient's magnitude, a 1 percent change in remittances will cause a negative change in real GDP per capita growth by 0.112 unit. This implies that besides investment, households have the moral hazard problems of receiving remittances largely for consumption smoothening purposes, the remitted funds may have been considered as a substitute for labour income and an opportunity to increase their leisure activities; this negatively affects labour productivity and economic growth in the long-run. This finding conforms to the evidence from the studies of Chami *et al.* (2005) and Hamma (2016) but deviates from the positive findings of Chowdhury (2016), Kumar *et al*. (2017), and Nyamongo *et al.* (2012). This study rejects the hypothesis that remittances do not significantly affect economic growth since its accompanying *p*-value is less than 0.01 percent.

The estimated coefficient of financial sector development is negative and significant. This means that a 1 percent change in financial sector development is associated with a negative change in real GDP per capita growth by 0.065 unit. The negative effect of financial sector development on growth may not be the consequential effect of an undeveloped system, but evidence of resources misallocation by the sector. For this reason, one would expect that the development of the financial sector should be accompanied by the development of the productive sectors of the economy but where they grow disproportionately, economic growth will be affected. This finding is contrary to expectation and the positive evidence from the studies of Chen and Jayaraman (2016), Giuliano and Ruiz-Arranz (2009), and Sobiech (2019) but in line with the findings of Kumar *et al.* (2017).

The estimated coefficient of the interaction term of remittances and financial sector development is positively signed and highly significant. The coefficient's magnitude indicates that a 1 percent change in the interaction term will bring about a positive change in real GDP per capita growth by 0.044 unit. Therefore, remittances and financial sector development are complements for the growth-enhancing process in Nigeria. Moreso, the presence of financial sector development helps to mitigate the negative effect of stand-alone remittances on economic growth through the channeling of a less-significant remitted funds of the households which are saved with banks to productive and growth motivated investments. This finding is

consistent with those shown by Abida and Sghaier (2014), Bettin and Zazzaro (2012), Nyamongo *et al.* (2012), whereas the studies by Chen and Jayaraman (2016), Giuliano and Ruiz-Arranz (2009), and Sobiech (2019) showed a negative interaction term which implies that the substitutability hypothesis holds. This study rejects the hypothesis that the interaction of the two variables does not significantly affect economic growth since its accompanying *p*-value is also less than 0.01 percent.

With regards to the control variables, the estimated coefficient of investment ratio is negative and significant. Going by coefficient's magnitude, a 1 percent change in investment ratio is associated with a negative change in real GDP per capita growth by 0.062 unit. This result implies that the level of private investment will retard economic growth when remittance recipients' undertake risky investments as they try to smooth their investments thereby causing output volatility, especially where policy and institutional frameworks are weak. This finding is consistent with the report of Abida and Sghaier (2014) but differs from the positive evidence found by Giuliano and Ruiz-Arranz (2009), and Hamma (2016). The estimated coefficient of human capital proxied by gross primary school enrolment rate is positive and significant. The coefficient's magnitude shows that a 1 percent change in human capital will cause a positive change in real GDP per capita growth by 0.138 unit. This implies that increasing human capital formation by investing remittance inflows on children's education will produce more creative and innovative ideas which have a growth-enhancing effect. This finding confirms the position of Nyamongo *et al.* (2012), Giuliano and Ruiz-Arranz (2009), and Sobiech (2019) on the relationship between the two variables.

Population growth has an estimated coefficient which is positive and significant as expected. This result shows that a 1 percent change in population growth will lead to positive change in real GDP per capita growth by 0.366 units. This evidence varies from the negative finding of Bettin and Zazzaro (2012) and Sobiech (2019) but consistent with the findings of Giuliano and Ruiz-Arranz (2009). The estimated coefficient of inflation is found to be negative and significant as expected. Regarding the coefficient's magnitude, a 1 percent change in inflation is associated with a negative change in real GDP per capita growth by 0.085 units. This implies that higher economic growth is most likely achievable in an environment where inflation is low and stable, such that investors can easily predict into the future and worry less about uncertainties. Abida and Sghaier (2014), Bettin and Zazzaro (2012), and Giuliano and Ruiz-Arranz (2009) provide evidence related to the finding of this study.

To validate the findings, this study reports the model fitness and performs post-estimation tests for the model. The R-squared of 0.35 implies that the explanatory variables account for 35 percent variations in the explained variable. The Wald $\chi 2$ shows that the model is statistically significant at 1 percent level. The Hansen's J test from the IV-GMM estimator shows that null hypothesis that the overidentifying restrictions are valid cannot be rejected, the failure to reject the null hypothesis implies that the instruments satisfy the orthogonality condition (they are uncorrelated with the error term). The test yields a *p*-value as high as above 0.40, this suggests that the model is correctly specified. The number of instruments is 15. The endogeneity of remittances and financial sector development is affirmed by the endogeneity test which yields a *p*-value as low as 0.0245. Therefore, the null hypothesis that both variables are exogenous is rejected.

Summarily, the findings in this study showed that the measures of stand-alone remittances and financial sector development have significant but negative effects on economic growth in Nigeria. Therefore, the negative effect of remittance inflows into Nigeria on economic growth could mean that more of the remittances are used to finance consumption needs rather than growth-enhancing investment projects. Surprisingly, the findings also point out that remittances will positively affect economic growth in Nigeria not by themselves but with the presence of financial sector development. This study also supports the conditional convergence hypothesis for Nigeria.

Conclusion

This study investigated the interactive effects of remittances and financial sector development on economic growth in Nigeria over the period 1977-2017 using the IV-GMM estimator. It showed that remittances do not by themselves have a direct significant effect on economic growth, but their effects depend on how well the financial sector has been developed, hence it concludes that a country like Nigeria profits from migrants' remittances in terms of economic growth only by ensuring the development of her financial sector, considering the key role which the sector plays in removing liquidity constraints and facilitating access to credit for financially constrained recipients in order to fund growth-enhancing projects. Further to this, remittances can trigger entrepreneurial efforts and economic growth in Nigeria only if financial institutions (especially banks) can efficiently channel a significant percent of the remittance inflows than the unlicensed money transfer operators (*hawala* system). This study unearths the first evidence of the complementarity of remittances

and financial sector development in promoting economic growth which has been previously unexplored in Nigeria.

Based on the core findings of this study, the following recommendations are put forward: First, the financial sector should use the interaction of remittances and financial sector development as an avenue to encourage more savings from remittances by lowering transaction costs and increasing payment of deposits' interest on remitted funds. Besides, bank financial institutions should channel same savings into productive investments in a sound and efficient way; they should find a better match for these savings (in terms of investment opportunities) in order to neutralise the negative effects of remittances on economic growth caused by recipients' consumption smoothing drive. Second, the policymakers and government should set policies that broaden the roles of banks inside the remitting process in order to increase their efficiency in terms of credit allocation to support the productive activities of the real sector, thus eliminating the negative effect of financial sector development on economic growth caused by disproportionate instead of a balanced growth of the real and financial sectors. Third, as a way to further understate the negative effect of remittances on economic growth with the presence of a well-developed financial sector, the Nigerian government together with the regulatory authorities for the financial sector should gear up efforts to increase the depth of the sector in terms of its size and to further deploy and sustain the level of their remitting activities beyond those of the unlicensed money transfer (*hawala)* operators, as a means to further the course of Nigeria's growth-enhancing moves.

This study contributed to the remittance literature in the Nigerian context since existing studies have focused on the effect of remittances on economic growth without accounting for the role of financial sector development nor the interaction effects of remittances and financial sector development as important precursors for magnifying Nigeria's economic growth. The study will guide policymakers in designing appropriate policies aimed at better directing external capital, such as remittances, towards preferred sectors which have the highest effects on the economic growth in Nigeria; the largest recipient of migrants' transfers in SSA. However, the study did not capture the impact of the informal financial sector in assessing the number of formal remittances as well as the determinants of remittances to the informal sector and its incidence on the real economy in Nigeria.

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