

Funding the Nigerian Agricultural Sector for Improved Performance: The Role of Migrant Workers' Foreign Remittances Inflows

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Abstract

Although there is a plethora of empirical evidence on the impact of foreign remittances inflows on economic growth in Nigeria, there are few studies that investigated the impact of foreign remittances on agricultural sector performance in the country. This study therefore examined the impact of funding on the performance of the agricultural sector in Nigeria with emphasis on the role of foreign remittances inflows. Specifically, the study investigated the impact of foreign remittances inflows, government expenditure on agriculture, bank credit to agriculture, the Agricultural Credit Guarantee Scheme Fund, and exchange rate on agricultural sector output performance in Nigeria. Exchange rate was used as a control variable. The Johansen co-integration test, Error Correction Mechanism (ECM), and Granger causality test were used to estimate the annual time-series data for the period of 1981 to 2021. The findings from the study revealed that foreign remittances inflows, government expenditure on agriculture, and loans guaranteed under the Agricultural Credit Guarantee Scheme Fund (ACGSE) have significant positive impact on agricultural sector performance. On the other hand, bank credits to agriculture and exchange rate have insignificant negative impact on agricultural sector performance. Among other things, it is recommended that recipients of foreign remittances in Nigeria should be encouraged to invest more in the agricultural sector.

Keywords: Funding, Credit, Agriculture sector, foreign remittances, Performance.

Introduction

Before independence, and up to the first post-independence decade, agriculture was the main stay of the Nigerian economy. However, the discovery of crude oil in 1956 and the subsequent oil boom of the 1970s practically snuffed life out of the agricultural sector. The oil boom resulted in a shortage of labour in the sector as members of the rural agrarian workforce migrated to the urban centres in search of white-collar jobs. The attention of the government was also diverted from the agricultural sector since its revenue and expenditure needs were met from the proceeds of crude oil exports (Anyanwu *et al*, 1997, Wilson, 2002). Consequently, the once vibrant agricultural sector was neglected as a result of the oil syndrome. Today, Nigeria is a net importer of food and other raw materials needed in the agro-allied industry. There is also a significant reduction in the capacity of the

agricultural sector to absorb the country's large workforce. This has resulted in massive unemployment in the country (Olukemi, 2018).

Several factors responsible for the poor performance of the agricultural sector have been identified. These include; low income and poverty of the farmers, low rate of capital formation, lack of modern storage facilities, and inadequate credit facilities, among other things. The farmers are generally poor because of low income. Since the farmers are poor, they could not accumulate large enough capital to enable them procure modern farm inputs that would improve their productivity. Also, the farmers lack the required collateral security with which to acquire large enough credit facilities from financial institutions in the country (Lambo, 1989; Wilson, 2002).

From the foregoing, it is clear that poor funding or lack of capital is a serious problem militating against the development of the agricultural sector in Nigeria. It is also true that due to the preponderance of low income among the farmers, it would be difficult to accumulate enough financial resources required to revamp the agricultural sector from revenue generated internally from the sector. It is important to note that the United Nations Food and Agricultural Organization estimated that developing countries need about USD 83 billion annual investment in the agrarian sector to meet their food requirement (Okpe & Ikpesu, 2019). Meanwhile, it has been reported that Nigeria is among the top recipients of migrant workers' remittances in Africa. Official records also indicate that there are about 1.24 million Nigerian migrants in the diaspora (Nevin & Omosomi, 2019). It is therefore logical to say that the gap in the resources needed to improve the performance of the Nigerian agricultural sector can be bridged through the inflow of migrant workers' remittances. The argument is that, if a reasonable portion of the total annual remittances inflows is channelled to the agricultural sector, it will complement other sources of funding to improve the performance of the sector.

The foregoing discussion provides the background against which this study is designed. The study therefore examined the impact of funding on the performance of the Nigerian agricultural sector with emphasis on the role of migrant workers' remittances inflows. Specifically, the study examined the impact of migrant workers' remittances inflows, government expenditure on agriculture, bank credit to agriculture, and the Agricultural Credit Guarantee Scheme Fund on the performance of the agricultural sector in Nigeria. The paper is structured into five sections. Section one focuses on the introduction. Section two is concerned with

literature review. The methodological procedure used in conducting the study is examined in section three. The result of the data analysis and discussion of findings are presented in section four, while conclusions and recommendations are taken care of in section five.

2.0 Literature Review

Nigeria's Agricultural Sector

The agricultural sector in Nigeria is divided into four subsectors or components. These are crop production, livestock, fishery and forestry. In Nigeria, the agrarian sector is made up of mixed system of traditional (informal) and modern (formal) farming activities. The National Bureau of Statistics (NBS) estimates show that, on the average, the traditional agricultural system accounted for 90 per cent of the total agricultural output, while the modern farming sector accounts for the balance of 10 per cent. Traditional farming is characterized by production for subsistence, extensive use of land and the practice of shifting cultivation, and a land tenure system based on ownership and access through the family system (CBN, 2010).

Overall, agriculture has remained an important sector in the economy, employing a good percentage of the labour force and contributing significantly to the country's GDP. Specifically, the share of agriculture to total GDP averaged 38.1 per cent, 39.3 per cent and 24.8 per cent for the periods 1981-1989, 1990-1999 and 2000-2010 respectively. The share of agriculture to GDP dropped to 23.9 per cent for the 2011-2019. Analysis of the structure of the agricultural sector by economic activities in 2018 showed that crop production remained the predominant sub-sector (90.0 per cent), followed by livestock (6.3 per cent), fishery (3.3 per cent) and forestry (1.3 per cent). "In 2020, crop production output was ₦16544.52 billion constituting about 90.17 per cent of the total agricultural output. The livestock sub-sector contributed ₦1233.11 billion (6.72 per cent) to the total agricultural output. Fishery was ₦380.03 billion representing 2.07 per cent of total agricultural output while forestry was ₦190.51 billion (1.04%). By 2021, crop production stood at ₦16920.52 billion (90.3 per cent); livestock was ₦1240.22 billion (6.62 per cent); fishery contributes ₦384.45 billion (2.05 per cent) while forestry was ₦193.22 billion (1.0 per cent) (CBN, 2021)

Theoretical Literature Review

1. Theories of Remittances

Theories of remittances are theories that seek to explain the motivating factors that make migrants to send money and other resources to their households in their home

countries. These theories include pure altruism, pure self-interest, implicit family-loan agreement, and the intention-to-return theories.

Proponents of pure altruism hypothesis suggest that individual family members are obligated to help each other and that explains migrants' decisions to remit. The theory suggest that a migrant will willingly sacrifice his or her own welfare or interest to take care of the wellbeing of family members due to the love and concern for them (Osili, 2007). The pure self-interest theory, which is also called the tempered altruism or enlightened self-interest theory, was suggested by Lucas and Stark (1985). The theory states that the decision to remit results from the mutually beneficial informal contractual agreement between the migrant and his or her household. According to Lucas and Stark (1985), remittances are claims on implicit co-insurance contracts and because such informal contracts are mutually beneficial, they are self-enforcing and ensure that there is no delinquency. The implicit family-loan agreement theory suggested by Poirine (1997) states that migrants' remittances are the results of family – loan agreements that are entered into by migrants during their youth. Poirine (1997) posits that migrant remittances result from the existence of internal familial markets which finance the investments in human capital of young family members. Therefore, the repayments of such loan contracts appear as remittances when they are made by family members who reside in different countries (Rapoport & Docquire, 2005). The intention-to –return theory is based on empirical studies conducted in Kenya and Botswana by Hoddinott (1994), and Lucas and Stark (1985) respectively. Intention-to-return is often cited as a motive for remitting funds and other resources by migrants to their country of origin. It is ascribed to the motivation on the part of the migrant to return home and inherit what he has invested (remitted) over the years (Collier *et al*, 2011).

2. Theories of Agricultural Development

Several theoretical models have been developed to explain societal and environmental forces that lead to agricultural improvement. These models include the conservation, urban-industrial impact, diffusion, and high pay-off input models. However, due to the limitations associated with the conservation, urban-industrial impact and diffusion models, the high pay-off input model is rated the highest among them. In addition, the high pay-off input model encompasses the central themes of the other three models and was formulated to take care of the inefficacy of policy actions based on the other models. In fact, the high pay-off input model is highly ranked due to the desirable impact resulting from its application in

Mexico, the Philippines, and other countries in Asia, Africa and Latin America (Moseman, 1970; Udemezue & Osegbue, 2018).

The high pay-off input model developed by Schultz in 1964 is based on a view point developed during the 1960s (Ruttan, 1977). The viewpoint is that farmers in traditional agrarian societies are rational and have the ability to allocate resources efficiently. The farmers, according to this view point, remained poor due to the fact that in most developing countries, there were not enough technical and economic opportunities available for them to explore. Schultz (1964) therefore believe that if high pay-off inputs are made available to the farmers in less developed countries, their primitive agrarian sectors will be transformed into a viable source of economic growth (Moseman, 1970). This study is therefore based on the high pay-off input model of agricultural development.

Empirical Literature Review

Alleluyanatha and Treasure (2021) examined the impact of remittances on crop productivity and household welfare in south-eastern Nigeria using 714 households selected from Anambra and Imo states. The findings showed that there is no significant difference between remittances receiving and non-remittances receiving households. The study also established that remittances have effects on crop productivity. Etim *et. al* (2020) analysed the impact of remittances on a sample of 120 small holder farmers from six Agricultural Development Project (ADP) zones in Akwa-Ibom state. The result showed that education, experience, farm size and labour have significant positive impact on output of remittance-receiving households. Edeh *et al* (2020) studied the impact of government spending on agriculture on output performance of the sector in Nigeria. The outcome of the study showed that government capital expenditure on agriculture has significant effect on agricultural output while government recurrent expenditure has insignificant negative impact on agricultural output. Korgbeelo (2019) analysed the impact of public sector spending on agricultural sector performance in Nigeria. The findings showed that government capital and recurrent expenditure have insignificant impact on agricultural sector performance.

Ajibade *et. al* (2018) examined the sources and uses of remittances by farming households in Kwara state, Nigeria. The result showed that age of household head, marital status, gender, number of remitters, etc. are the significant determinants of remittances utilization. Ogburu *et. al* (2018) examined the impact of government spending on agriculture on unemployment in Nigeria. The study showed that

government spending on agriculture has no significant impact on unemployment. Adejumo and Ikhida (2017) investigated the impact of remittances inflows on sectoral performance of the Nigerian economy. The findings showed that remittances have significant positive impact on tradable agricultural, manufacturing and merchandise sector exports. Okoh *et. al* (2017) examined the impact of migrants' remittances inflows on human capital development and agricultural productivity in Nigeria. The finding showed that remittances have no significant impact on human capital development, while it has significant positive impact on agricultural productivity.

Akpan *et. al* (2017) examined the impact of remittances inflows on indicators of agricultural productivity in Nigeria. The study established that remittances have no significant impact on agricultural GDP/total GDP, agricultural productivity index, and crop production index. Zira and Ezie (2017) investigated the impact of government spending on agricultural production in Nigeria. The findings indicated that government capital expenditure has insignificant positive impact on agricultural production, while government recurrent expenditure has significant positive impact on agricultural production. Nnaji and Nweze (2016) investigated the types, sources and uses of remittances by rural households for agricultural purposes in Enugu state, Nigeria. The study established that 64.4% and 53.3% of the households channelled remittances to crop production and livestock production respectively. Obi and Obayori (2016) in their study established that both capital and recurrent expenditure on agriculture have insignificant positive impact on agricultural production. Okoh (2016) established positive impact of government agricultural expenditure on agricultural productivity in Nigeria.

From the empirical literature reviewed, it is observed that recent studies on the impact of remittance on agricultural sector performance in Nigeria are mostly location – specific. That is, they are case studies of one state or the other. Hence, empirical studies that utilized national data to examine the impact of remittances inflows on the output performance of the agricultural sector in Nigeria are scanty.

3.0 Methodology

The study made use of annual time series data for the period 1981 to 2021. The data were obtained from the Central Bank of Nigeria annual statistical bulletin for 2021, the Central Bank of Nigeria annual reports and statements of account (various years) and the World Bank Development Indicators (various years).

The dependent variable for this study is agricultural sector output performance. It is the annual total contribution of the agricultural sector to Nigeria's real GDP. It is measured in billions of naira. The explanatory variables include the foreign remittances, Government expenditure on agriculture, Bank credit to agriculture and Agricultural Credit Guarantee Scheme Fund, while exchange rate is used as a control variable

Theoretical Model

The model used for this study is specified based on the high pay-off inputs model of agricultural development and the analytical models of Akpan *et. al.* (2014) which are expressed as follows:

$$AGP=F (REM/GDP) \text{ ----- } 3.1$$

$$API=F (REM/GDP) \text{ ----- } 3.2$$

$$CRP= F (REM/GDP) \text{ ----- } 3.3$$

Where, AGP= Agricultural GDP as a ratio of total GDP

API= Agricultural Productivity Index

CRP= Crop Productivity Index

REM/GDP- Remittance as a ratio of GDP

F= Functionality Notation.

The adopted model was slightly adjusted to allow for the inclusion of the variables of the present study. Therefore, the functional form of the model is expressed as follow:

$$AGOUT=F (REMT, GEXA, BCA, ACGSF, EXR) \text{ ----- } 3.4$$

Where, AGOUT= Agricultural Sector Output

REMT= Foreign Remittances Inflows

GEXA= Total Government Expenditure on Agriculture

BCA= Bank Credit to the Agricultural Sector

ACGSF = Total Value of loans guaranteed under the Agricultural Credit Guarantee Scheme Fund.

EXR = Exchange Rate

F = Functionality Notation

AGOUT is the dependent variable, while REMT, GEXA, BCA, ACGSF and EXR are the explanatory variables. EXR was introduced as a control variable.

The ordinary least squares (OLS) multiple regression equation based on the functional model above is expressed as follows:

$$AGOUT = \beta_0 + \beta_1 REMT + \beta_2 GEXA + \beta_3 BCA + \beta_4 ACGSF + \beta_5 EXR + U \dots 3.5$$

Where, β_0 is the regression constant, β_1 to β_5 are the coefficients or parameter estimates of the explanatory variables, while U is the random variable. All other variables are as earlier defined.

The model can be expressed in Logarithmic form as follows:

$$LAGOUT = \beta_0 + \beta_1 LREMT + \beta_2 LGEXA + \beta_3 LBCA + \beta_4 LACGSF + \beta_5 LEXR + U \dots 3.6$$

Where, L is the natural logarithm of the variables. All other variables are as earlier defined.

Apriori Theoretical Expectations

Based on economic theory, we expect the following signs of the parameter estimates.

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

The implication of the above signs of the parameter estimates is that an increase in remittances inflows, government expenditure on agriculture, bank credit to agriculture and loans guaranteed under the Agricultural Credit Guarantee Scheme Fund will lead to improved agricultural sector performance. On the other hand, an increase in the Naira-Dollar exchange rate will bring about a reduction in the performance of the agricultural sector.

Techniques of Data Estimation

The classical least squares regression technique is based on the implicit assumption that the underlying time-series data are stationary. However, in real life, many macroeconomic time-series are non-stationary (Gujarati & Porter, 2009).

Therefore, due to the problem of non-stationarity associated with time-series data, the analytical procedure was started with stationarity test. To conduct the stationarity test, the Augmented Dickey-Fuller (ADF) unit root test was used. The ADF unit root test is estimated in its general form by the following regressions.

$$\Delta Y_t = a_0 + a_1 Y_{t-1} + \sum_{i=1}^n a_i \Delta Y_i + \epsilon_t \dots\dots\dots 3.7$$

$$\Delta Y_t = a_0 + a_1 Y_{t-1} + \sum_{i=1}^n a_i \Delta Y_i + \delta_t + \epsilon_t \dots\dots\dots 3.8$$

Where Y_t is a time-series, t is a linear time trend, Δ is the first difference operator, a_0 is a constant, n is the optimum number of lags in the dependent variable, and ϵ_t is the random error term.

The ADF test relies on rejecting the null hypothesis of unit root (i.e. series is non-stationary) in favour of the alternative hypothesis of no unit root (i.e. series is stationary).

Based on the result of the ADF unit root test, the Johansen cointegration test was used to test whether there exist long-run equilibrium relationships or not among the variables in the model. The essence of the cointegration test is to avoid the problem of spurious regression results. Johansen (1988) and Johansen and Juselius (1990) suggested the test which is based on the Vector Autoregressive (VAR) model. The test starts with a p -lag VAR model specified as follows:

$$Y_t = A_1 Y_{t-1} + A_2 Y_{t-2} + \dots + A_p Y_{t-p} + \beta X_t + \epsilon_t \dots\dots\dots 3.9$$

Where Y_t is a K -Vector of non-stationary endogenous variables that are commonly integrated of order one ($I(1)$); X_t is a d -vector of exogenous deterministic variables; A_1, A_2, A_p and β are matrices of coefficients to be estimated and ϵ_t is a vector of innovation that may be contemporaneously correlated with their own lagged and all the variables on the right hand side. Due to the fact that many macroeconomic time-series are not stationary, the VAR model is generally estimated in its first difference form. Hence, the VAR model can be rewritten as follows:

$$\Delta Y_t = \pi Y_{t-1} + \sum_{i=1}^{p-1} r_i \Delta Y_{t-i} + \beta X_t + \epsilon_t \dots\dots\dots 3.10$$

Where $\pi = \sum_{i=1}^p A_i$ and $r = -\sum_{j=i+1}^p A_j$

To determine the number of cointegrating vectors, Johansen (1988) and Johansen and Juselius (1990) proposed two statistical tests. These are the trace test and the maximum Eigen test. They are computed as follows:

$$\lambda_{\text{trace}}(r) = -T \sum_{i=r+1}^A \lambda_i / n (1 - \lambda_i) \dots\dots\dots 3.11$$

$$\lambda_{\text{max}}(r/r+1) = -T/n(1 - \lambda_r + 1) \dots\dots\dots 3.12$$

Where T is the number of usable observations or sample size and λ 's are the estimated Eigen values from the matrix. The trace test tests the null hypothesis of r cointegrating vectors against the alternative hypothesis of n cointegrating vectors, while the max Eigen test tests the null hypothesis of r cointegrating vectors against the alternative hypothesis of r+1 cointegrating vectors.

The Error Correction Model (ECM) was used to estimate the short-run behaviour of the variables of the study. Specifically, the ECM was used to measure the speed with which any disequilibrium in the short-run is adjusted to long-run equilibrium trend. Equation 3.6 is therefore expressed in ECM form as follows:

$$\Delta \log AGOUT_t = \beta_0 + \sum_{i=1}^p \beta_{1i} \Delta \log AGOUT_{t-1} + \sum_{i=0}^p \beta_{2i} \Delta \log REMT_{t-1} + \sum_{i=0}^p \beta_{3i} \Delta \log GEXA_{t-1} + \sum_{i=0}^p \beta_{4i} \Delta \log BCA_{t-1} + \sum_{i=0}^p \beta_{5i} \Delta \log ACGSF_{t-1} + \sum_{i=0}^p \beta_{6i} \Delta \log EXR_{t-1} + \lambda ECT_{t-1} + \epsilon_t \dots\dots\dots 3.13$$

Where β_0 is the constant term or drift parameter, Δ is the first difference operator, the terms with the summation sign (\sum) (i.e. $\beta_{1i} - \beta_{6i}$) are the short-run coefficients, p is the ECM lag length, log is the natural logarithm, λ is the error correction term coefficient, ECT is the error correction term, and ϵ_t is the white noise error term. All other variables are as earlier defined.

The Granger causality test was used to determine the nature and direction of causality between the variables.

4. Result and Discussion of Findings

Descriptive Statistics

The results of the descriptive statistics are presented in table 1

Table 1: Descriptive Statistic Results

Variables	AGOUT	REMT	GEXA	BCA	ACGSF	EXR
Mean	409.3510	0.467000	6.475750	36.43075	0.143775	10.04825
Median	372.5700	0.125000	0.240000	3.820000	0.016500	1.320000
Maximum	2792.540	12.10000	63.82000	410.1400	7.283000	70.80000
Minimum	105.5700	8.100000	63.02000	129.1700	5.171000	7.260000
Std. Dev.	464.6784	3.267666	29.60874	90.14435	1.791479	19.33820
Skewness	3.411037	0.887497	0.037184	2.278637	0.986948	1.901512
Kurtosis	18.40241	7.286374	3.073148	9.609664	9.380696	5.310032
Jarque-Bera	472.9583	35.87268	0.018136	107.4273	74.34925	32.99874
Probability	0.000000	0.000000	0.990973	0.000000	0.000000	0.000000
Sum	16374.04	18.68000	259.0300	1457.230	5.751000	401.9300
Sum sq. Dev.	8421114	416.4280	34190.42	316914.1	125.1664	14584.67
Observations	41	41	41	41	41	41

Source: Computed from E-view

From the descriptive statistics results in table 1, the mean values of the variables are 409.3510, 0.467000, 6.475750, 36.43075, 0.143775, 0.143775, and 10.04825 for AGOUT, REMT, GEXA, BCA, ACGSF, and EXR respectively. The standard deviation shows that AGOUT (464.6785) is the most unstable variable, while ACGSF (1.791479) is the least unstable variable. The skewness shows that all the variables are positively skewed. The kurtosis statistic shows that all the variables are leptokurtic (i.e., their values are greater than 3). This means that they have heavier or flatter tails relative to normal distribution. It also suggests that the variables are non-stationary. Hence, there is the need for stationarity test.

Unit Root Test Result

The result of the Augmented Dickey-Fuller (ADF) unit root test is presented in table 2

Table 2: ADF Unit Root Test Result

Variable	ADF Test Statistic (At Levels)	Critical Values		ADF. Test Statistic (At 1 st Diff.)	Critical Values		Order of integration
		1%	5%		1%	5%	
LAGOUT	-1.981404	-3.605593	-2.936942	-4.964172*	-3.610453	-2.938987	I(1)
LREMT	-1.161289	-3.605593	-2.936942	-9.162778*	-3.610453	-2.938987	I(1)
LGEXA	-0.007872	-3.605593	-2.936942	-7.619924*	-3.610453	-2.938987	I(1)
LBCA	-1.778417	-3.605593	-2.936942	-10.52936*	-3.610453	-2.938987	I(1)
LACGSF	-1.491367	-3.605593	-2.936942	-7.159252*	-3.610453	-2.938987	I(1)
LEXR	-2.293455	-3.605593	-2.936942	-5.161396*	-3.610453	-2.938987	I(1)

Source: Computed from E-view

Note: *denotes rejection of the null hypothesis of unit root at the 1 per cent level of significance.

From the ADF unit root test result in table 2, none of the variables are stationary at levels. However, they all become stationary at first difference (i.e, I(1)) at the 1 per cent level of significance.

Cointegration Test Result

The result of the Johansen cointegration test is presented in table 3. The trace test and max-Eigen statistic are the standard test statistic used in evaluating the Johansen cointegration test result.

Table 3 Johansen Cointegration Test Result

Hypothesized No. of CE(s)	Eigenvalue	Trace statistic	0.05 Critical value	Prob.**
None*	0.661642	115.8726	95.75366	0.0010
At most 1*	0.562314	74.69380	69.81889	0.0194
At most 2	0.410771	43.29618	47.85613	0.1255
At most 3	0.289341	23.19643	29.79707	0.2366
At most 4	0.225282	10.21704	15.49471	0.2644
At most 5	0.013521	0.517288	3.841466	0.4720
Hypothesized No. of CE(s)	Eigen Value	Max-Eigen statistic	0.05 Critical value	Prob.**
None *	0.661642	41.17878	40.07757	0.0374
At most 1	0.562314	31.39762	33.87687	0.0961
At most 2	0.410771	20.09975	27.58434	0.3343
At most 3	0.289341	12.97939	21.13162	0.4541
At most 4	0.225282	9.699753	14.26460	0.2324
At most 5	0.013521	0.517288	3.841466	0.4720

Source: Computed from E-views

Trace test indicates 2 cointegrating equations at the 0.05 significance level

Max-eigenvalue test indicates 1 cointegrating equation at the 0.05 significance level

* Denotes rejection of the hypothesis at 0.05 significance level

** Mackinnon-Haug-Michelis (1999) p-values

From the Johansen cointegration test result in table 3, the trace test indicated 2 cointegrating equations, while the Max-Eigen test indicated 1 cointegration equation. The result therefore shows the presence of long-run equilibrium relationships between the explanatory variables and dependent variable

Long Run Regression result

The long-run coefficients obtained from the normalized cointegrating coefficients are presented in table 4.

Table 4: Long-Run Coefficients

LAGOUT	LREMT	LGEXA	LBCA	LACGSF	LEXR
1.000000	210 .1711 (78 .0519) (2.692709)	11 .55876 (5.70744) (2.025209)	4.477052 (2 .52502) (1.773075)	481.2418 (103 .244) (4 .661208)	- 12.23476 (9.13295) (-1 .339629)

Source: Computed from E-views

Note: The figures in the first and second parentheses are the standard errors and t values respectively.

Error Correction Model (ECM) result

The result of the parsimonious error correction model (short run) regression result is presented in table 5.

Table 5: Parsimonious Error Correction Model Result

Dependent Variable: LAGOUT

Variable	Coefficient	Std. Error	t-statistic	Prob.
C	234 .7863	79 .27333	2.961731	0.0084
D(LREMT)	-18 .06688	23.02112	- 0 .784796	0.4428
D(LREMT (-1))	-34 .32193	32.89723	-1.043308	0.3106
D(LREMT(-2))	39.88795	27 .17085	1.468042	0.1594
D(LGEXA)	-0.578042	2.742276	-0.210789	0.8354
D(LGEXA(-1))	2.692966	2.581469	1.043191	0.3107
D(LGEXA(-2))	6.270257	3.046848	2.057949	0.0544
D(LACGSF)	91.35281	39.31409	2.323666	0.0321
D(LEXR)	0.257917	3.579775	0.072048	0.9434
D(LEXR(-2))	14.80565	4.396857	3.367326	0.0034
D(LBCA)	0.908559	1.397033	0.650349	0.5237
D(LBCA(-1))	0.0121271	1.249738	0.097037	0.9238
D(LBCA (-2))	2.230966	1 .397427	1.596482	0.1728
ECM (-1)	-0 .177055	0.051392	-3 .445186	0.0026
R-squared	0.769992	Mean dependent var		447.2877
Adjusted-resquared	0.565540	S.D. dependent var		479.0380
S.E. of regression	315.7513	Akaike info Criterion		14.65424
Sum squared resid	1794580	Schwarz Criterion		15.40969
Log likelihood	-239.4492	Hannan-Quinn Criter.		14.91502
F-Statistics	3.766124	Durbin-Watson stat		2.865175
Prob (F-statistic)	0.004127			

Source: Computed from E view

From the error correction model result in table 5, the coefficient of the error correction term (i.e. ECM (-1)) has a correct negative sign. It is also statistically significant at the 0.05 level of significance. The coefficient of the error correction term is -0.177055. This means that any disequilibrium in the short run is reconciled to long run stable equilibrium trend with a speed of adjustment of about 17% within a year.

Granger Causality Test Result

The result of the Pair-wise Granger causality test is presented in table 6

Table 6: Granger Causality Test Result

Lags: 2

Null Hypothesis:					Obs	F-statistic	Prob
LREMT	does	not	Granger	cause	38	0.32346	0.7259
LAGOUT						5.9208	0.0063
LAGOUT	does	not	Granger	cause			
LREMT							
LGEXA	does	not	Granger	cause	38	1.80543	0.1803
LAGOUT						1.71671	0.1953
LAGOUT	does	not	Granger	cause			
LGEXA							
LBCA does not Granger cause LAGOUT					38	0.34226	0.7127
LAGOUT does not Granger cause LBCA						0.74032	0.4847
LACGSF	does	not	Granger	cause	38	0.30990	0.7356
LAGOUT						0.30302	0.7406
LAGOUT	does	not	Granger	cause			
LACGSF							
LEXR does not Granger cause LAGOUT					38	0.01738	0.9828
LAGOUT does not Granger cause LEXR						0.03398	0.9666

Source: Computed from review

The Granger causality test in table 6 indicated only one unidirectional causality running from agricultural output to foreign remittances inflows. “

Post Estimation Tests

Some of the assumptions on which the classical linear regression model (CLRM) is based are tested in this section. The results and decisions of the tests of these assumptions are presented in table 7.

Table 7: Post Estimation Tests Results

Test	Value	Prob.	Decision
Linearity (Ramsey-Reset) test t-statistic F-statistic	5.475886 29.95886	0.7381 0.7381	Accept (model correctly specified)
Breusch-Godfrey serial Correlation LM Test F-statistic	2.232133	0.1396	Accept (No autocorrelation)
Heteroscedasticity (Breusch- Pagan – Godfrey) Test F- statistic	6.011683	0.8936	Accept (residuals have constant variance)
Normality (Jargue- Bera) Test F- statistic	0.271445	0.873085	Accept (Data normally distributed)

Source: Computed from E-view

Discussion of Findings

Long-run Regression Result

The estimated long-run result showed that foreign remittances inflows, government expenditure on agriculture and loans guaranteed under the Agricultural Credit Guarantee Scheme Fund (ACGSF) have significant positive impact on agricultural output. Bank credit to agriculture has insignificant positive impact on agricultural output, while exchange rate has insignificant negative impact on agricultural sector output in Nigeria. The economic implication of this result is that an increase in foreign remittances inflows, an increase in government expenditure on agriculture, an increase in loans guaranteed under the ACGSF will contribute to improvement in agricultural output performance in Nigeria. On the hand, an increase in exchange rate has adverse effects on agricultural sector output performance.

Short-Run Regression Result

The parsimonious error correction model result indicated that foreign remittances inflows in the current period and its lagged value in period one have insignificant negative impacts on agricultural output. However, the lagged value of foreign remittances inflows in period 2 has insignificant positive impact on agricultural output. Government expenditure on agriculture in the current period has insignificant negative impact on agricultural output. However, the lagged values of

government expenditure in periods one and 2 have insignificant positive and significant positive impact respectively on agricultural output. The Agricultural Credit Guarantee Scheme Fund in the current period has significant positive impact on agricultural output. Bank credit to agriculture in the current period and its lagged value in periods 1 and 2 have insignificant positive impact on agricultural output. Exchange rate in the current period and its value lagged by 2 periods have insignificant positive impact on agricultural output.

The coefficient of determination (R-squared) is 0.769992. This means that the explanatory variables jointly account for about 76 per cent of the total variations in agricultural output. The Adjusted R-squared measures the change in the R-squared resulting from the loss of degree of freedom when additional explanatory variables are included in the model. It therefore measures the penalty for including irrelevant explanatory variables in the model. The adjusted R-squared is 0.565540. The F-statistic is 3.766124 with a probability value of 0.00417. This shows that the overall estimated regression model is statistically significant at the 0.05 level of significance. The Durbin-Watson statistic is 2.865175 which imply that the estimated model is not affected by the problem of autocorrelation.

The Granger causality test result indicated only one unidirectional causality running from agricultural output to foreign remittances inflows.

The findings from this study on the impact of foreign remittances on agricultural sector performance inflows support the findings of Adejumo and Ikhida (2017) and Akpan *et. al* (2017). Similarly, the findings on the impact of government expenditure on agriculture support the findings of Okoh (2015).

5. Conclusion and Recommendations

The study finding indicates that foreign remittances inflows make strong contribution to output performance of the agricultural sector in Nigeria. Also government expenditure on agriculture significantly stimulates the growth of agricultural output in Nigeria. In addition credit allocated by the deposit money banks to the agricultural sector makes insignificant contribution to the output performance of the sector in Nigeria. Further, the amount of loans guaranteed under the Agricultural Credit Guarantee Scheme Fund of the Central Bank of Nigeria makes significant positive contribution to agricultural sector performance in Nigeria. Lastly, exchange rate reduces the output performance of the agricultural sector in Nigeria in an insignificant manner. Based on the conclusions drawn from the study, the following policy measures are recommended

- i. There is the need to encourage the recipients of foreign remittances to invest in the agricultural sector. To achieve this, the government should establish an institutional platform through which recipients of foreign remittances will be trained and enlightened on the investment opportunities in the agricultural sector where they can invest what they receive. In addition, migrants should be also be encouraged to invest directly in the country's agricultural sector.
- ii. The deposit money banks should be persuaded to allocate more credit facilities to productive ventures in the agricultural sector.
- iii. The Central Bank of Nigeria should increase the amount of loans guaranteed under its Agricultural Credit Guarantee Scheme Found. The CBN should also monitor beneficiaries of its ACGSF to ensure that such loans are actually invested in productive enterprises in the agricultural sector.
- iv. The CBN should also adopt a managed floating exchange rate regime so as to reduce the negative effects of high exchange rates on the performance of the agricultural sector.

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