AGRICULTURAL FINANCING AND AGRICULTURAL PRODUCTIVITY IN NIGERIA: A CASE OF AGRICULTURAL CREDIT GUARANTEE SCHEME FUNDS (ACGSF)

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Abstract
The agricultural sector is seen to be indispensable in establishing the framework for the Nigeria’s economic growth. Literature affirms finance to it can enhance the productivity which in turn can supply inputs to another sector regarding provision of food for the population while increasing savings, capital and foreign exchange needs of the economy. Thus, this study evaluates the performance of ACGSF in the sector and its effects on productivity.
This study employed both descriptive and econometrics analysis of the time series data sourced from 1981 to 2013. This study concludes that publicly supported agricultural interventions in Nigeria regarding Agricultural Credit Guarantee Scheme Funds were effective at driving productivity in the agricultural sector with 32 percent speed of adjustment. This study recommends that the Federal Government of Nigeria should effectively and efficiently align agricultural spending and policy priorities while strengthening the institutional capacities to ensure the sustainability of successful development initiatives in agricultural credit guarantee scheme funds.

Keywords: Agriculture financing, productivity

JEL: Q14, Q15

Introduction
The Agricultural Credit Guarantee Scheme Fund (ACGSF) is a policy instrument of the Federal Government of Nigeria regarding agricultural credit financing which was established by Decree Number 20 of 1977 and took effect in 1978. This Scheme was reputable for provide guarantee on loans granted by banks to farmers for agricultural production and agro-allied processing. The ACGSF is not the first credit scheme that the Federal Government put in place to encourage agricultural development. According to CBN (1986) other farmer’s credit schemes like Nigerian Agricultural and Co-operative bank (now known as the Nigerian Agricultural Co-operative and Rural Development Bank) established in November 1972, an establishment of rural branches of commercial banks throughout the country following a mandatory Federal directives and creation of the River Basin Authorities in 1979 throughout the Country among others. However, the persistent poor performance of the above institutions and conventional banks regarding provision of adequate finance to agricultural activities in the mid-1970s was a clear evidence that the country was in need of further financial and institutional reforms that would revitalize the agricultural sector by encouraging the flow of institutional credit into it. Also, the risky nature of agricultural production, the necessity of agriculture to Nigeria economy as well as the urgency to provide additional incentives to further enhance the development of agriculture to solve the problem of food insecurity and the increasing demand. Through lending institutions for appropriate risk aversion measures in agricultural lending provided justifications for the establishment of the Nigerian Agricultural Credit Fund (ACGSF) by the Federal Government of Nigeria in 1977 (Mafimisebi, Oguntade & Mafimisebi, 2010).
This scheme was expanded to about ₦35.6 million in 1981, ₦82.1 million in 1991, ₦728.5 million in 2001 and ₦8.68 billion in 2013 (CBN, 2013). The Agricultural sector contribution within this period oscillates between positive and negative growth rate with increasing unemployment rate. In fact, the average share of the total labour force employed was 59.1 percent from 1981 to 1985, 55.6 percent from 1986 to 1990, 57 percent from 1991 to 1995 and fell to 45 percent between 1996 to 2000. Even though ACGSF is the longest standing scheme in the Nigeria agricultural sector, its impact on the sector as well as employment generation is a source for concerned. Thus, how well as this system perform and what is the need for its perpetuation? This study critically examines its performance and its impacts on agricultural productivity.

Literature Review

Theoretical Review

The endogenous growth theory is a new theory which explains the long-run growth rate of an economy by endogenous factors as against exogenous factors of the neoclassical growth theory. This new growth theory does not just criticise the classical theory. Rather, it extends the latter by introducing endogenous technical progress in growth models. This endogenous growth models have been developed by Arrow (1962), Romer (1990) and Lucas (1988), among other economists. Lewis Spellman’s theory with financial intermediation explicitly recognized that not only the owner-operated agriculture but also the urban informal sector, lacking cooperating capital instead of land, was characterized by a system of bargaining rather than cooperative wages. Lewis contribute a major way to transit growth theory, to the notion of development phases and sub-phase, en-route to modern economic growth. The Lewis theory applies to overpopulated developing countries under the certain assumption.

Empirical Review

Finance can be accessible to the farmer who has necessary cultivable land for mechanization of the process, as it is increasingly becoming clearer that the smallholder farmer may not have sufficient land to maximize the use of credit when made available. Several studies have revealed that government is almost the sole provider of financial and other capital resources to aid agriculture in Nigeria. Nwosu (2004) asserted that the Federal Government has embarked on several attempts to increase her spending on the sector through budgetary allocation and the provision of cheap and easily accessible credit facilities. Also, the author found that over the years, the government fiscal spending has being an important determinant of productivity in agricultural sector in Nigeria. However, Odi (2013) investigate the role of agricultural credits as a factor of production to enhance economic growth in Nigeria using Nigeria Agricultural Cooperative and Rural Development Bank. The Author found that agricultural financing exhibit significant impact on economic growth but the level of loan repayment rate over the years has negative impact on economic growth. Also, Oyinbo, Zakari and Rekwot (2013) critically investigated the link between budgetary allocations to agriculture and economic growth in Nigeria. They found that the relationship between agricultural fiscal allocation and the Nigeria economy which was positive but not significant in the long-run. They asserted that the insignificant nature of this, could be due to the low allocations to the sector over the years. Nasiru (2012) examine the relationship between government spending and economic growth in Nigeria. They found that government capital expenditure induces economic growth but there is no observable causal relationship between recurrent expenditures and economic growth in Nigeria. Iganiga and Iganiga and Unemhilin (2011) concluded that there is inverse relationship between credit financing and agricultural outputs. This association from total credit to agriculture and population growth rate confirmed that it is not enough to give out credit facilities without proper monitoring.

Oboh and Ekpebu (2011) used ordinary least square to investigate the determinants of formal agricultural allocation to the farm sector in Nigeria. Their study reveals that need to critically assess factors affecting the rate of credit allocation beneficiaries of government institutions like Nigerian Agricultural Cooperative and Rural Development Bank (NACRDB).

Eze et al. (2010) assessed the agricultural finance policies of Nigeria and its effect on rural development. The study found out that the government has made several and committed efforts at making efficient agricultural policies, programmes and institutions but it has failed to back the up with adequate budgetary allocation and financing due to systemic corruption in their execution. Also, Enoma (2010) assessed the impact of agricultural credit on the growth of GDP in Nigeria. The study found out that agricultural credits are effective tool for counter-cyclical agricultural productivity, non-oil export and GDP stabilization in the
economy although the value of domestic productivity decline by the end of the period indicating that such policies fail with time.

Methodology
This study employed secondary time series data covering 1981 to 2013 sourced from the Statistical Bulletin of Central Bank of Nigeria (2013) for real agricultural productivity, agricultural credits guarantee scheme funds and budgetary allocation to agricultural sector while employment in the sector was sourced from various publications of Nation Bureau of Statistics (NBS). This study employed both descriptive and econometric analysis to assess the effect of structured finance on agricultural productivity in Nigeria.

Model Specification
This study employs Lewis Spellman’s theory with financial intermediation on the typical Cobb-Douglas model which relates productivity to factor inputs capital and labour. Cobb-Douglas Model is expressed in equation (i).

\[ Q = f(L^\alpha, K^\beta) \]  

(i)

The capital inputs in the sector were decomposed into budgetary allocations by the Federal government to Agricultural sector and Agricultural Credits Guarantee Scheme Funds while employment rate in agricultural sector was used to proxy labour component.

The model was re-written as follows:

\[ \text{AGDP} = f(\text{BAGDP}^{\beta_1}, \text{ACGSF}^{\beta_2}, \text{EMP}^{\beta_3}) \]  

(ii)

Where AGDP stands for Agricultural productivity, BAGDP stands for Budgetary allocations by the Federal government to Agricultural sector; ACGSF stands for Agricultural Credits Guarantee Scheme Funds and EMP stands for employment rate in the agricultural sector.

Applying Log to equation (ii), it becomes;

\[ \ln\text{AGDP}_t = \beta_0 + \beta_1 \ln\text{BAGDP}_t + \beta_2 \ln\text{ACGSF}_t + \beta_3 \ln\text{EMP}_t + \mu_t \]  

(iii)

A Priori Expectation

\[ \beta_0 \) represent the intercept.

\[ \beta_1, \beta_2 > 0 \) the slopes of this model is expected to be positive, since both parameters estimate the elasticity of investment injections on the productivity level.

\[ \beta_3 > 0 \) the slopes of this model is expected to be positive since usage of labour input is expected to enhance productivity in the agricultural sector.

Results and Discussion of findings

Descriptive Analysis

Figure 1 revealed that the real agricultural productivity rose steadily during the period while both budgetary allocation and agricultural credits guarantee scheme funds (ACGSF) oscillate between upwards and downwards movement. The ACGSF rose sharply in 2005 from about ₦2 billion to ₦9 billion and was at its peak in 2011 with about ₦10 billion. Budgetary allocation to the sector was crawling from 1981 to 2000 which later rose to its highest in 2009 (₦148 billion) but only above 10 percent of total government expenditure in 1983 (see Figure 2). Also, the finance to the agricultural sector through ACGSF increase the sector’s productivity but at less proportionate to the rise in finance. These could be due to long delay in disbursement of loan to the farmers in the rural areas. Since most of the banks were located in the cities, in some cases where loans are approved, it arrives too late for it to fulfill the purpose for which it was intended and sometimes diverted for personal needs of the farmers.

The breakdown of the agricultural credit guarantee scheme funds (ACGSF) according to crop, fishing and livestock farming from 1981 to 2013 revealed that funds towards crop farming were high in 1980’s but steadily decline throughout the decade. Crop farmers’ received most funds from the scheme than fishing and livestock farmers (See figure 3). However, as the funds to livestock farming decline its productivity fell while when the funds were rising and falling, the productivity of the farmers still continue to deteriorate at decreasing rate (See figure 4). Also, there is volatility in the funds received by the crop farmers from the scheme from 1981 to 2013 with sharp oscillation, but its effects on their productivity were minimal. Thus, it is suggestive that the consistent increase and decrease of funds to crop farming in the country exact negligible effect on the productivity of crop farmers even though they receive most funds from the scheme during the period reviewed (See figure 5). However, the trend analysis reveals high
volatility between fish farming and ACGSF finance to fish farmers (See figure 6) which suggests that fishing farming in Nigeria could be greatly influenced through the scheme.

Figure 1: Trends of ACGSF, BAGRIC and AGDP

Figure 2: Trends of ACGSF and BAGRIC/TOTEXP

Figure 3: ACGSF to Crop, fishing and livestock

Figure 4: ACGSF supported Livestock farming and livestock

Figure 5: ACGSF supported Crop farming and Fishing production.

Figure 6: ACGSF supported Fishing farming and Crop production.
Econometric Analysis

Stationarity Test

The results of the Philips-Perron (PP) unit root test statistics shows that all the variables are stationary at first difference. The decision rule for the PP Unit root test states that the PP Test statistic value must be greater than the critical value at 5% absolute term for it to be stationary at level and if otherwise, differencing occurs using the same decision rule. This suggests that the variables are I(1) series. Table 1 presents the results of the stationarity test in summary and the order of integration.

Table 1: PP Unit Root Test and Order of Integration

<table>
<thead>
<tr>
<th>Variables</th>
<th>PP Test Value</th>
<th>Statistic 5% Critical Value</th>
<th>Remark</th>
<th>Order of Integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>D(Lagdp)</td>
<td>-5.8986</td>
<td>-2.9604</td>
<td>Stationary</td>
<td>I(1)</td>
</tr>
<tr>
<td>Lagdp</td>
<td>0.8003</td>
<td>-2.9571</td>
<td>Non-Stationary</td>
<td>I(0)</td>
</tr>
<tr>
<td>D(Lagcsf)</td>
<td>-5.6607</td>
<td>-2.9604</td>
<td>Stationary</td>
<td>I(1)</td>
</tr>
<tr>
<td>Lagcsf</td>
<td>-0.0470</td>
<td>-2.971</td>
<td>Non-Stationary</td>
<td>I(0)</td>
</tr>
<tr>
<td>D(Lbagric)</td>
<td>-7.3506</td>
<td>-2.9604</td>
<td>Stationary</td>
<td>I(1)</td>
</tr>
<tr>
<td>Lbagric</td>
<td>0.6784</td>
<td>-2.9571</td>
<td>Non-Stationary</td>
<td>I(0)</td>
</tr>
<tr>
<td>D(employ)</td>
<td>-6.7435</td>
<td>-2.9604</td>
<td>Stationary</td>
<td>I(1)</td>
</tr>
<tr>
<td>Employ</td>
<td>-0.3900</td>
<td>-2.9571</td>
<td>Non-Stationary</td>
<td>I(0)</td>
</tr>
</tbody>
</table>

Source: Author’s Computation from Eviews 9.0

Summary of Co-integration results

Both the trace statistics and the Max-Eigen Statistics indicated the present of one co-integrating equations at 5 percent level of significance. Thus, the result confirms the present of co-integration between agricultural productivity (lagdp), Agricultural Credit Guarantee Scheme Fund (lagcsf), budgetary allocation to agricultural sector (lbagric) and employment rate in agricultural sector (see table 2). Hence, these variable exhibits long-run association.

Table 2: Co-integration Results

<table>
<thead>
<tr>
<th>Max Rank</th>
<th>Eigenvalue</th>
<th>Trace Statistics</th>
<th>5% Critical values</th>
<th>Critical Max-Eigen Statistic</th>
<th>5% Critical values</th>
</tr>
</thead>
<tbody>
<tr>
<td>*None</td>
<td>0.8762</td>
<td>103.8848</td>
<td>47.85613</td>
<td>60.59402</td>
<td>27.58434</td>
</tr>
</tbody>
</table>
The error correction parameter estimate is both significant and acceptable at 5 percent because its value is negative and lies between 0 and 1. As well as its p-value (0.0000) is less than 0.05, and the error correction model variable is statistically significant and indicates that the model has 32 percent speed of adjustment. The probability value of F statistics (0.00000) is less than 0.05, therefore the overall dynamic model is statistically significant at 5 percent level, and there exist the linear relationship between the independent variables and the dependent variable.

The adjusted $R^2$ of 0.889 indicates that the independent variables in the dynamic model jointly explain 88.9 percent variations in the dependent variable (real agricultural gross domestic product) whereas other variables not captured in this model explained 10.1 percent deviations in the dependent variable.

Using the test for significance of variables from the dynamic systemic model in Table 3, the parameter estimates of agricultural gross domestic product in period 1 and 2, agricultural credit guarantee scheme period 1 and 2, budgetary allocation to agriculture period 2 and employment in the sector period 2 were statistically significant at 5 percent.

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**Table 3: Error Correction Model Result**

Dependent Variable: D(LAGDP)
Method: Least Squares
Sample (adjusted): 1985 2013
Included observations: 29 after adjustments

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECM(-1)</td>
<td>-0.318893</td>
<td>0.032399</td>
<td>-9.842697</td>
</tr>
<tr>
<td>D(LAGDP(-1))</td>
<td>0.351702</td>
<td>0.071528</td>
<td>-4.916957</td>
</tr>
<tr>
<td>D(LAGDP(-2))</td>
<td>0.394585</td>
<td>0.060047</td>
<td>-6.571281</td>
</tr>
<tr>
<td>D(LAGDP(-3))</td>
<td>-0.013685</td>
<td>0.065317</td>
<td>0.209514</td>
</tr>
<tr>
<td>D(LACGSF(-1))</td>
<td>0.025318</td>
<td>0.007215</td>
<td>-3.509197</td>
</tr>
<tr>
<td>D(LACGSF(-2))</td>
<td>0.017424</td>
<td>0.006956</td>
<td>-2.504816</td>
</tr>
<tr>
<td>D(LACGSF(-3))</td>
<td>0.000296</td>
<td>0.006475</td>
<td>0.045703</td>
</tr>
<tr>
<td>D(LBAGRIC(-1))</td>
<td>-0.016314</td>
<td>0.004888</td>
<td>-3.337510</td>
</tr>
<tr>
<td>D(LBAGRIC(-2))</td>
<td>0.016797</td>
<td>0.004722</td>
<td>-3.556846</td>
</tr>
<tr>
<td>D(LBAGRIC(-3))</td>
<td>-0.002525</td>
<td>0.004328</td>
<td>-0.583300</td>
</tr>
<tr>
<td>D(LEMP(-1))</td>
<td>0.028313</td>
<td>0.061419</td>
<td>0.460977</td>
</tr>
<tr>
<td>D(LEMP(-2))</td>
<td>0.218202</td>
<td>0.088202</td>
<td>2.473878</td>
</tr>
<tr>
<td>D(LEMP(-3))</td>
<td>0.136474</td>
<td>0.086681</td>
<td>1.574431</td>
</tr>
<tr>
<td>C</td>
<td>0.091604</td>
<td>0.007701</td>
<td>11.89475</td>
</tr>
</tbody>
</table>

R-squared               0.940927  Mean dependent var 0.051947
Adjusted R-squared      0.889730  S.D. dependent var 0.035259
S.E. of regression      0.011709  Akaiake info criterion -5.750728
Sum squared resid       0.002056  Schwarz criterion -5.090654
Log likelihhood         97.38555  Hannan-Quinn criter. -5.544001
F-statistic             18.37870  Durbin-Watson stat 2.498767
Prob(F-statistic)       0.000001

Source: Author’s Computation from Eviews 9.0

The error correction parameter estimate is both significant and acceptable at 5 percent because its value is negative and lies between 0 and 1. As well as its p-value (0.0000) is less than 0.05, and the error correction model variable is statistically significant and indicates that the model has 32 percent speed of adjustment. The probability value of F statistics (0.00000) is less than 0.05, therefore the overall dynamic model is statistically significant at 5 percent level, and there exist the linear relationship between the independent variables and the dependent variable.

The adjusted $R^2$ of 0.889 indicates that the independent variables in the dynamic model jointly explain 88.9 percent variations in the dependent variable (real agricultural gross domestic product) whereas other variables not captured in this model explained 10.1 percent deviations in the dependent variable.

Using the test for significance of variables from the dynamic systemic model in Table 3, the parameter estimates of agricultural gross domestic product in period 1 and 2, agricultural credit guarantee scheme period 1 and 2, budgetary allocation to agriculture period 2 and employment in the sector period 2 were statistically significant at 5 percent.
All the significant independent variables were rightly signed as expected. Specifically, 1 percent rise in ACGSF in period 1 and 2 will induce 0.25 and 0.17 percent respectively increase in agricultural productivity in the current period (and vice versa) while 1 percent growth in budgetary allocation to the sector in the previous 2 periods will induce 0.02 percent upswing in the sectors productivity in the current period. Also, 1 percent rise in the employment rate of the sector will raise productivity by 0.22 percent.

Diagnostic Tests
The serial correlation was tested using the Breusch-Godfrey serial correlation LM test which suggests that there is no serial correlation problem (See Table 4). Breusch-Pagan-Godfrey method of heteroscedasticity indicates the absence of heteroscedasticity. Therefore, the errors are homoscedastic (See table 5). Also, the reported probability of Jarque-Bera statistics for the variables exceeds (in absolute terms) 0.05 under the null hypothesis. Then accept the null hypothesis of a normal distribution. Hence, the time series data of all the variables are properly distributed (figure 7). Furthermore, the CUSUM stability test indicates that the ECM model is stable both in the short and long run while the CUSUM recursive coefficients of the variable confirmed that the ECM stability condition (Figure 8 & 9).

Table 4: Breusch-Godfrey Serial Correlation LM Test:

<table>
<thead>
<tr>
<th>F-statistic</th>
<th>1.060233</th>
<th>Prob. F(2,13)</th>
<th>0.3745</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obs*R-squared</td>
<td>4.066906</td>
<td>Prob. Chi-Square(2)</td>
<td>0.1309</td>
</tr>
</tbody>
</table>

Table 5: Heteroskedasticity Test: Breusch-Pagan-Godfrey

<table>
<thead>
<tr>
<th>F-statistic</th>
<th>3.320521</th>
<th>Prob. F(16,12)</th>
<th>0.0205</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obs*R-squared</td>
<td>23.65670</td>
<td>Prob. Chi-Square(16)</td>
<td>0.0973</td>
</tr>
<tr>
<td>Scaled explained SS</td>
<td>10.04349</td>
<td>Prob. Chi-Square(16)</td>
<td>0.8643</td>
</tr>
</tbody>
</table>

Figure 7: Normality Test
Conclusion and Recommendations

This study concludes that publicly supported agricultural interventions in Nigeria regarding Agricultural Credit Guarantee Scheme Funds were efficient at improving productivity in the agricultural sector though at minimal rate. But budgetary allocations to the sector were ineffective at improving productivity in Nigeria until after 24 months.

The institutional capacities in the agricultural sector in Nigeria should be strengthening to ensure the sustainability of successful development initiatives in agricultural credit guarantee scheme. Also, the federal government of Nigeria should broadly align agricultural spending and policy priorities in order to stimulate qualitative growth in the sector by giving financial support to actual farmers. However, such support must be monitored and periodically reviewed to access its effectiveness and prevent misallocation of funds while increasing budget performance.

Furthermore, they should invest in activities that will promote agricultural gains that will lead to pro-poor growth. Such investments should include basic and applied agricultural research, agricultural extension and capacity building, irrigation development and agribusiness development. All these dimensions of intervention will quicken and enhance the quality of agricultural yields.

References


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