

AGRICULTURE AND DIVERSIFICATION IN NIGERIA: THE ROLE OF FINANCE

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Abstract

The study “agriculture and diversification in Nigeria: the role of finance” shows by a way of robust statistical analysis, the influence of finance in increasing agricultural output in Nigeria. Using data from 1981 to 2015, cointegrating regression (fully modified OLS) was applied to the time series data. The unit root test show that annual rainfall data is stationary at level (I(0)) while data for agricultural credit guaranteed scheme fund, commercial banks’ loan to agricultural sector and agricultural output are I(1)). We found that commercial banks loan to agricultural sector and annual rainfall are positively and significantly related to agricultural productivity in Nigeria for the period concerned in this study. Agricultural Scheme Fund is negative but significant in its relation with agricultural output. This might not be unconnected with political ills that impede policy measures in implementing funds allocated for use of the sector which might drive away real targets of such funds. The study therefore recommends that political ills that negatively affect policies should be done away with for policies to have it desired effect.

Introduction

Government policies in Nigeria since independence have been directed towards accelerating economic development with the ultimate aim of transforming the economy into an industrialized one as well as increasing the standard of living of the populace and also rescuing the nation from its over dependence on oil. Agriculture has been identified as one of the sectors expected to act as catalyst for the realization of the government goal of diversification, industrialization and raising the standard of living of the people. The traditional role of agriculture in economic development provides the premise for this position. The role includes; product, market, factor, and foreign exchange contributions (Johnson and Mellor, 1961).

Despite the enviable position of the oil sector in the Nigerian economy over the past three decades according to Obiechina, 2007, the agricultural sector has remained the largest and arguably the most important sector of the economy. The contribution of agriculture to the Gross Domestic Product (GDP) has remained stable at between 30 and 42 percent, and employs 65 percent of the labour in Nigeria (Aigbokhan, 2001). It is estimated to be the largest contributor to non-oil foreign exchange earnings in Nigeria. It remains the most readily available and viable option for the diversification of the Nigeria economy.

As Anyanwu, et.al(1997) posited, more than 80 percent of the rural population of Nigeria is engaged in one type of agricultural activity or the other, it therefore translate to the fact that, most of the employment generated by the agricultural activities are in the rural areas. Apart from those engaged in subsistence farming, the bulk of the agricultural export crop producers are small holder farmers. This goes a long way to confirm the result of past studies which show that large percentage of the rural farmers is among the poor (FOS, 1999). The level of poverty in the rural areas is high and has continued to be determined, largely by the fortunes of agriculture. The poverty situation has affected the standard of living of the rural dwellers, who are mostly farmers and hence their saving habit. Without savings, there cannot be investment in improved method of farming.

Government has embarked on various policies and programmes aimed at strengthening the sector in order to continue performing its roles. One of such polices is government intervention in agricultural financing by establishing financial institutions like the Nigerian Agricultural and Co-operative bank (NACB) which became the Nigerian Agricultural Co-operative and Rural Development Bank (NACRDB) and later Bank of Agriculture (BOA).This have generated different scholarly reactions as to the efficacy of government policies and programme in improving the agricultural sector. While Olaitan (2006) maintained that agricultural output, especially, the food crop

production has responded positively to the policy reforms, others like Obiechina, (2007) suggested that there has been a general failure of the sector to respond appropriately to the policies like agricultural financing.

The aim of agricultural financing is to prop up farmers to make substantial investment in agriculture and stimulate increased productivity. Since traditional agriculture cannot sustain any capital formation, the capital required for investment in agriculture must necessarily be injected from outside. Thus, an agricultural credit scheme is considered an important component of the Nigerian agricultural development programme, if productivity must increase. It is also asserted that, the increasing recognition of the need for agricultural financing stems from the desirability to enhance the position of on-farm capitalization in Nigeria agriculture and the fact that the farmers own saving are normally inadequate to finance the various farming activities. Thus, capital injection into the agricultural sector is imperative in view of the unfavourable terms of trade facing agriculture, declining productivity, low level of adoption of improved technologies and the fact that many investors are in favour of low cost quick returns and less risky business ventures compared to agriculture (Oni and Olomola, 1989).

Nigeria is endowed with huge expanse of fertile agricultural land, as well as a large active population that can sustain a highly productive, and profitable agricultural sector. This enormous resource base if well managed could support a vibrant agricultural sector capable of ensuring self-sufficiency in food crop production and raw materials for the industrial sector as well as, providing gainful employment for the teeming population and generating foreign exchange through export. The Nigeria agricultural sector is our readily available alternative to oil. The issue of agricultural finance could easily be said to be the most critical of the constraints in achieving this position, as it is vital to the development and procurement of appropriate technology, design and construction of necessary infrastructure, development

and maintenance of adequate marketing system, as well as modernization of the land tenure system. Agricultural financing in its broadest sense, involves pre-project planning and feasibility evaluation, taking investment decisions, actual investment and funding of projects, profitable management of project and post project evaluation. This broad concept of agricultural financing ensures that funds channeled to agriculture are profitably used for its development, with a concomitant spillover and multiplier effect to the other sectors of the economy.

Considering the importance of the agricultural sector exposed by various past studies, and considering the Nigeria quest for diversification occasioned by the frequent fluctuations in the international oil market, this research attempt to show the effect of finance in accelerating agricultural productivity in Nigeria.

Methodology

Modelling Agricultural Output

Production function relates inputs to output. Traditionally, output of any sector depends on labour and capital. In modern day output modelling, other factors have been included depending on the nature of the production, circumstance and time frame. While there are proxies for employment (labour) and capital (Gross Fixed Capital Formation), we do not have local data that identifies what quantities of each of these factors go into each sector, say agricultural sector. For this reason, labour and capital tend to be excluded in the estimation of agricultural output in Nigeria. It is hoped that being necessary factors, they are treated as constants and are captured by the error term.

Assessing role of finance on agricultural output, we identified two major sources of finance-private sector financing which includes personal contribution and commercial banks loan to agricultural sector and secondly public sector which we have restricted to Agricultural Credit Guaranteed Scheme Fund. Since personal contribution is not available to the public, we model agricultural output as follows:

$AGOUTP = f(L_a, K_a, ACGSF2, CBLAX, C_a)$ Implicit Specification

AGOUTP= Agricultural Output

L_a = Labour to Agricultural Sector

K_a = Capital to Agricultural Sector

ACGSF2= Agricultural Credit Guaranteed Scheme Fund

CBLAX= Commercial Banks Loan to Agricultural Sector

C_a= Other control variable(s), for which we used annual rainfall data (AARAIN)

In explicit terms, the model is written as thus:

$$AGOUTP_t = ACGSF2_t + CBLAX_t + AARAIN_{t-1} + u_t, \dots \dots \dots \text{Explicit Specification}$$

The choice of 1-year lag value of AARAIN is premised on the fact that previous season’s rainfall determines current agricultural yield. It is also believed that u_t captures left-over variables.

Data Sources

Secondary data was used for this study. Variables used in the study include agricultural output (dependent variable), Agricultural Credit Guaranteed Scheme Fund (ACGSF, independent variable), Commercial Banks’ Loan to Agricultural Sector (independent variable) and annual rainfall statistics (main control

variable). While there are other control variables worthy of use, we believe that rainfall statistics remains a major climatic factor that drives agricultural output in Nigeria as evident in some previous findings in this area of agricultural productivity

Results and Discussion

Table 1 Descriptive Statistics

	AGOUTP	ACGSF2	AARAIN	CBLAX
Mean	3.58E+12	2.59E+09	1120.188	3.93E+12
Median	1.60E+12	2.42E+08	1124.546	3.23E+11
Maximum	1.47E+13	1.00E+10	1311.704	3.64E+13
Minimum	1.95E+10	24654900	876.1770	8.58E+09
Std. Dev.	4.37E+12	3.61E+09	83.63719	8.22E+12
Skewness	1.109504	1.015208	-0.485806	2.924870
Kurtosis	2.984928	2.307271	4.023677	11.15427
Jarque-Bera	7.181159	6.711923	2.904918	146.8709
Probability	0.027582	0.034876	0.233994	0.000000
Sum	1.25E+14	9.07E+10	39206.57	1.37E+14
Sum Sq. Dev.	6.50E+26	4.42E+20	237836.1	2.30E+27
Observations	35	35	35	35

Sources: Authors’ Computation (2016)

Table 4.1A presents descriptive statistics of data of variables engaged in this study. Essentially, the table provides us with information that tells us about normality status of our variables. Jarque-Bera Test is the test of normality adopted here. The null hypothesis says no variable is significantly different from normal. At 5% level of significance, only annual rainfall (mm) is normally distributed as p-value of 0.2340 suggests that we cannot reject the null hypothesis. However, other variables-agricultural credit guaranteed scheme fund, commercial banks’ loan to agricultural sector

and agricultural output are not normally distributed because their JB test statistics are significant, implying rejection of null hypothesis.

Trend Analysis

Below are the trends of annual rainfall (mm), agricultural output, Agricultural Credit Guaranteed Scheme Fund and Commercial Banks Loan to Agricultural Sector in Nigeria for the years 1981-2015.

Figure 1: Annual Rainfall (mm)

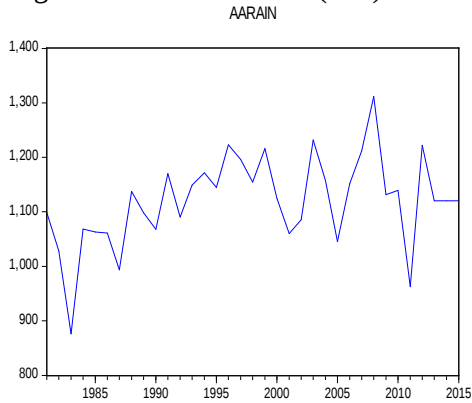


Fig. 1 above shows the trend in annual rainfall over the period of study. From the above, it can be inferred that annual rainfall has been on progressive trend over the years. As expected in a natural phenomenon, the

trend is characterised with continuous ups and downs (natural shocks) but overall picture says rainfall shocks are still, on the average, progressive.

Figure 2: Agricultural Credit Guaranteed Scheme Fund (‘#)

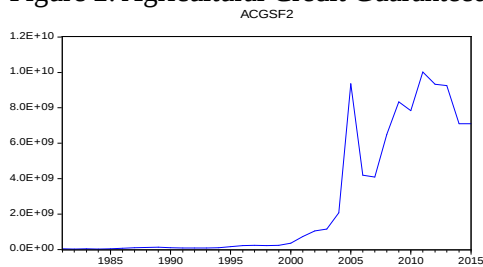


Figure 2 above depicts trend in Agricultural Credit Guaranteed Scheme Fund. The fund was on the increase until 2005 when it fell only to continue its

rising trend from 2007. Following this, the fund experienced ups and downs till date.

Figure 3: Commercial Bank Loans to Agricultural Sector (‘#)

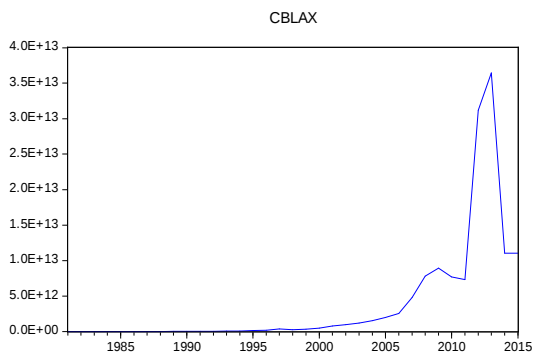


Figure 3 shows volume of Commercial Banks' loans available to Agricultural Sector over the period of 1981-2015. One key observation is that from 1995, a noticeable increase was observed until 2013 when a major continuous decline was experienced.

Figure 4: Agricultural Output ('#)

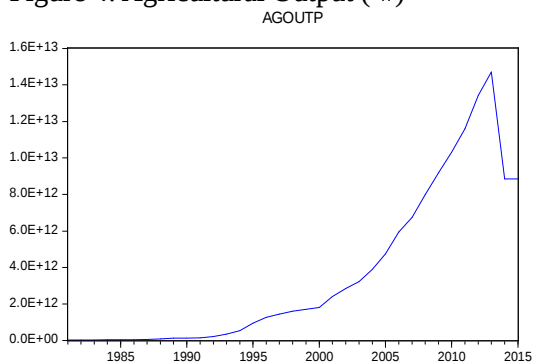


Figure 4 presents trend in agricultural productivity. From 1986, obviously agricultural productivity experienced a rise which was sustained until 2013. The peak of this rise is coincidental with a major and only peak in commercial banks' loan to agricultural sector and also with a peak in Agricultural Scheme Fund. Could this mean that the trend in agricultural financing is an indicator of changes in agricultural productivity? This is a question among questions that this paper intends to address.

Unit Root Tests

We conducted unit root tests on the variables used in our estimation. The essence is to check their stationary status as it matters for the choice of further estimation techniques in our analysis. Using Augmented Dickey-Fuller Test and Philip-Perrons Unit Root Tests, we found the following results presented in the table below.

Table 2: Unit Root Tests

Variable		Augmented Dicky Fuller (ADF) (Unit root) Test		Order of Integration	Philip-Perron's Unit Root Test		Order of Integration	Source: Authors'
		Intercept	Intercept/ trend		With Intercept	With intercept & Trend		
AARAIN	Level	-4.2823*	-4.8460*	I(0)	-4.2607*	-4.8504*	I(0)	
	1 st difference							
ACGSF2	Level	-1.1982	-2.7500	I(1)	-1.1982	-2.5963	I(1)	
	1 st difference	-7.6746*	-7.5885*		-8.2359*	-8.4435*		
CBLAX	Level	4.0401	3.6096	I(1)	-2.1412	-2.9762	I(1)	
	1 st difference	3.9670	3.8078		-10.7392*	-11.1551*		
AGOUTP	Level	-0.5244	-1.9547		-0.5729	-2.0304		
	1 st difference	-5.4191*	-3.1044		-5.1501*	-5.0697*		

Computation (2016) *denotes the rejection of the null hypothesis at 1%, ** at 5% and *** at 10%

From the above table, we found that annual rainfall data is stationary at level (I(0)) while data for agricultural credit guaranteed scheme fund, commercial banks' loan to agricultural sector and agricultural output are I(1). When variables'

stationarity statuses are of different levels, Bounds test becomes necessary. Consequently, these variables were subjected to Bounds Test in an attempt to test for the presence of long run relationship among the variables.

Table 3: Bounds Tests for Long Run Relationship

CRITICAL VALUES	F-STATISTICS	5.0072****
	LOWER BOUND 1(0)	UPPER BOUND 1(1)
1%	5.17	6.36
5%	4.01	5.07
10%	3.47	4.45

Source: Authors' Computation (2016)

Bounds test result conducted above reveals F-statistics of 5.00072, significant at 10%. As a rule thumb, when F-Statistics of Bounds test exceeds upper bound value, then there is long-run relationship. If less than lower bound value, then there is no long-run relationship. If it falls within the range of the bound values, then there is the result becomes

inconclusive. As it can be seen from our result above, long-run relationship exists at almost 5% and more obviously at 10% level of significance. This informs us that we can assess long run impact of our explanatory variables on the main independent variable.

Long-Run Impact

Table 4

Dependent variable:	LOG(AGOUTP)	
Variables	Coefficient	Standard Error
Log(ACGSF2)	-0.2800***	0.1432
Log(AARAIN(-1))	3.1898***	1.0611

Log(CBLAX)	0.3578***	0.2033
C	-1.4252	8.9007
@TREND	0.1608*	0.0525
R-square	0.9538	
Adjusted R-sq.	0.9492	
P(F-Statistics)	0.0000	

*denotes rejection of the null hypothesis at 1%, ** at 5% and *** at 10%

The major results of this study are contained in the table above. The choice of log values were intended to harmonise differences in various units of the variables adopted in the study. The decision to use one year lag value of annual rainfall (which itself is a sum of 12 months annual rainfall) in the estimation of current agricultural output is premised on the natural phenomenon that rainfall season usually precedes season of agricultural engagements.

From the above, the small size of finance co-efficient implies under-financing of the sector on general notes. We found that commercial banks loan to agricultural sector and annual rainfall are positively and significantly related to agricultural productivity in Nigeria for the period concerned in this study. Agricultural Scheme Fund is negative but significant in its relation with agricultural output. This might not be unconnected with political ills that impede policy measures in implementing funds allocated for use of the sector which might drive away real targets of such funds. It is also predicted that the negative sign in the co-efficient of agricultural scheme fund might suggest a crowding-out effects between the two sources of finance as more money to the Scheme Fund might mean farmers will demand less agricultural loans from commercial banks. This is in the light of the fact that the two sources emanate from two different sectors which are public sector and private sector. Hence, we conclude that a priori, all our variables are well-behaved.

In terms of diagnostics, R^2 and its adjusted value both confirm that about 95% variation in agricultural output is accounted for by the explanatory variables used in the study. The significance of F-Statistic value also suggests that the model here estimated is well-fitted and that our variables are jointly significant.

Conclusion

We conclude that adequate financing from both sources and sectors matter for rising agricultural productivity in Nigeria, essentially in terms of agricultural scheme fund.

We recommend that proper monitoring and implementation is a key to successful policy measures aimed at improving agricultural yield in the country. Also, the study therefore recommends that political ills that negatively affect policies should be done away with for policies to have it desired effect.

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