Original Research Article

Impact of Financial Sector Reforms on Agricutural Output in Nigeria, 1981 – 2016

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Abstract

This study examined the impact of financial sector reforms on agricultural output in Nigeria. The specific Objectives were to; compare the output of the different agricultural subsectors in the different reform era, compare the contribution of loans to output of the different agricultural subsectors and toanalyze the impact of reforms on farmer's output. Data for the study were obtained from Central Bank of Nigeria Statistical bulletin, annual report, federal budget allocation report, annual reports. Data obtained were analyzed using both descriptive and inferential statistics. The results showed that agricultural output of the crop sector was consistently higher than that of other agricultural subsectors in virtually all the reform periods; the contribution of loan to output in the livestock and fisheries subsectors were consistently below 12% and 3% respectively all through the financial reform periods; the volume of loan disbursed by bank to agricultural sector and the reforms had a significant impact on farmers' output.
Keywords: Financial reforms, agricultural sub-sectors, output.

INTRODUCTION

Background of the study

In Nigeria, one of the major problems confronting farmers is poor access to adequate credit. Credit provides cash reserves required to fast track the process of consumption in the next cycle. It provides an opportunity for the farmers to meet their consumption requirements and input needs [1, 2].The extent of credit access is measured by the maximum amount a household can borrow at a time from a given source. Access to affordable agricultural credit enables farmers, who constitute the majority of population in most developing countries, to adopt new technology and take advantage of new economic opportunities to increase production and income. Interest in access to finance has increased significantly in recent years, as growing evidence suggests that lack of access to credit prevents lower-income households and small firms from financing high return investment projects, having an adverse effect on growth and poverty alleviation. Credit facility is a type of loan made in a business or cooperate finance context, including revolving credit, term loans, committed facilities, letters of credits and most retail credit accounts [3]. According to Nyoro [4], lack of access to credit facilities has been highlighted a key constraint to farmers investment. The demand for credit by farmers has been high and increasing. It includes

access to credit to cover lump sum and smooth farmers' consumption among others. The expenditure requiring lump sum includes purchase of farm inputs, ploughing, top dressing, and labor and irrigation activities. Many farmers have hardly been able to meet these farm expenditures due to lack of financial command and potential.

The thrust of this study draws from the premise that access to credit by farmers is a key to increasing productivity. In this respect, one of the major reasons is that purchased seasonal inputs and requisite labor are rarely affordable by farmers on a "cash" basis. The majority of these farmers face liquidity constraints that compromise the crucial investments in agriculture and other sectors necessary in increasing productivity [5].

Rural credit markets in developing countries are full of imperfections. The imperfections manifest in the generally accepted fact that, despite numerous government policies to increase household's access to credit, many rural households remain credit-constrained. The formal banking sector does not satisfy the growing demand for credit, and many borrowers turn to informal loan sources (relatives, private moneylenders, etc.) to meet their production and

consumption needs. It has been estimated that only five percent of the farmers in Africa and about fifteen percent in Asia and Latin America have had access to formal credit; and on an average across developing countries five percent of the borrowers have received eighty percent of the credit [6].

Overtime, financial sector reform had been adopted by the Nigerian Government as a part of their economic reform programin a bid to regulate the financial sector and make agricultural credit widely available., [7]. Through this reform program government liberalized the financial sector andmade entry into the banking sector easy. There had been various segments of the reform in Nigeria. The first occurred during 1986 to 1993, when the banking industry was deregulated in order to allow for substantial private sector participation. Hitherto, the landscape was dominated by banks which emerged from the indigenization programme of the 1970s, which left the Federal and state governments with majority stakes. However, the major financial reforms within this period have therefore been classified as Exchange Rate Reforms commencing from 1986 with the establishment of the first-tier and second-tier (autonomous) foreign exchange markets. The Government in July 1986 launched the Structural Adjustment Programme (SAP) that had economic and financial deregulation as a major feature. According to Olomola [8], SAP was designed to restructure and diversify the productive base of the economy, achieve fiscal balance, balance of payment equilibrium, intensify growth potential of the private sector and set the economy on the path of steady and balanced growth. One thing that the reform of SAP sorts to achieve was to make agricultural credit properly priced and readily available to farmers. A major blank of this programme is the restructuring of the fiscal sector and the liberalization of the control and regulation of financial institutions and markets. In 1988 the Bureau de change was established, likewise 1992, the devaluation of the official exchange rate took place

The second was the re-regulation era of 1993-1998, following the deep financial distress; the third segment was initiated in 1999 with the return of liberalization and the adoption of the universal banking model. The fourth segment commenced in 2004 with banking sector consolidation as a major component and was meant to correct the structural and operational weaknesses that constrained the banks from efficiently playing the catalytic role of financial intermediation. This round of reform, therefore, seeks to substantially improve the financial infrastructures, strengthen the regulatory and supervisory framework, and address the issue of impaired capital and provision of structured finance through various initiatives, so as to provide cheap credit to other sectors. In Nigeria, government adopted financial reform policies aimed at achieving specified objectives, such as; interest rate ceilings and selective sectoral policies to ensure that adequate financial services, particularly loans are directed at the agricultural sector. Despite these policies, farmers still face the challenge of grappling with these reforms during each reform era. The question is how has the financial reforms impacted on the agricultural output over time?

Objectives of the study

The main objective of the study was to examine the impact of financial sector reforms on farmer's output. The specific objectives were to:compare the output of the different agricultural subsectors in the different reform era, compare the contribution of loans to output of the different agricultural subsectors and to analyze the impact of reforms on farmer's output.

Theoretical issues

This study benefits from the credit channel theorywhich suggest that policies may have an effect on credit supply and demand in an economy. In credit channel theory Dobrinsky and Markov [9] noted that the recently advanced "credit channel view" implies that monetary policy shocks affect real economic performance through the supply of credit by financial intermediaries due to shifts in the supply schedule of the latter. In turn, they noted, the literature makes a distinction between a "bank lending channel" which pertains to banks only and is related to their dual nature of holders of deposits and generators of loans to firms and a "broad credit channel" which treats the supply of external funds to firms by all financial intermediaries [10], [11], [9]. The credit channel view is also consistent with the assumption of the existence of market imperfections, in particular, information asymmetries between borrowers and lenders which give rise to the above mentioned monitoring cost premium [12]. One implication of the existence of a credit channel in the monetary transmission mechanism is that it induces a heterogeneous response both of the credit market and of the firms due to which the increase in the cost premium for external finance will not be uniformly distributed across firms. The reason for this heterogeneity is the fact that the existing credit market imperfections are likely to impact in a different manner on various categories of firms in the event of a monetary shock. In particular, the credit channel view is consistent with the empirical finding that the effect of a monetary shock should be more severe for small firms (that are more likely to face information costs) than for large firms [10] or that the negative effect of a monetary contraction on investment is greater for highly leveraged firms (which are more likely to suffer a reduction in their collateralizable net worth due to the monetary shock) than for less leveraged firms [13], [11]. It is worth noting that Nigerian agricultural sector is largely dominated by small-scale farms (or firms) and going by the foregoing empirical findings it would not be out of place to expect monetary policies having some

effects on their collaterizable net worth and hence their credit requirements which banks tend to respond to when they supply credit to the agricultural sector. The indicators of financial development which can influence credit supply used in empirical studies can be classified roughly into three broad categories: monetary aggregates, stock market indicators, and structural and institutional indicators. The disaggregated variables for financial variables used in the empirical model for this paper represent the monetary aggregates and stock market indicators. These were applied by Afangideh [14] study which indicated that bank lending to agriculture equation was significantly influenced by domestic credit to the private sector, stock market capitalization, real income and previous period bank lending to agriculture. All had direct and positive effects on bank lending to agriculture except value traded ratio which had a direct but negative effect. Soyibo and Adekanye [15] stressed the special influence of financial reforms on the financial sector and he exemplified the influence by the proxy of exchange rate and interest rate which were acknowledged as the drivers of growth of real sectors of the economy including agriculture. From the foregoing analyses we arrive at the choice of some variables as proxies for agricultural lending and it's banking sector and monetary policy variables determinants. Three models that can be used to capture the relationship suggested by the foregoing credit supply theories are linear multiple regression function, growth model (semi-log model) and Cobb Douglas (double log) function [16], [17].

RESEARCH METHODOLOGY
Study Area
The study area is Nigeria. Nigeria has a total geographical area of 923,768 square kilometers, a North-South length of about 1450km and West-East breath of about 800km. Its total boundary is 4047km, while the coastline is 853km and a population estimate of about 167 million [18]. Nigeria is located 4^016^I and 13^053^I north latitudes and 2^040^I and 14^041^I east longitudes. It comprises 36 states and the Federal Capital Territory is located in Abuja.

Nigeria is located in the tropics, which is characterized by high temperatures, high humidity and intense heat. Its rainfall ranges between 2000 to 3000mm. Nigeria encompasses six (6) major agro-ecological zones with rainfall diminishing along a South-North gradient. The forest zone borders the coast in the south, and going north-ward way to the Guinea and Sudan Savannah. Nigeria's North-Eastern fringe falls within the Sahel zone. Agriculture is the largest single sector of the economy, providing employment for a significant segment of the work force and constituting the main stay of Nigeria's large rural community which accounts for nearly two-third of the population. The population of the GDP attributed to agriculture hovers between 30-40%. Nigeria is distinguished by the diversity of its ecosystems, an advantage for growing a broad range of crops. The main staple food crops produced are yam, cassava, rice, maize and beans.

Sources and method data collection
Data for the study were obtained from secondary sources. Secondary data were obtained from CBN Statistical bulletin, CBN annual report, federal budget allocation report, annual reports and used for the study.

Analytical techniques
Data were analyzed using descriptive and inferential statistics. In particular, the empirical model used to establish the relationship between credits and farmer's output is as below;

$Y = f(C)$ …………………..……………………..………. (1)

Where,

Y = output

C = credit

where credit consist mainly of credit in use (loans) and credit in reserve (credit capacity).

Then the equation was re-written as;

$Y = (Cr_u + Cr_R)$ ……………………………..…..………. (2)

Where,

Cr_u = credit in use

Cr_R = credit in reserve

Based on the function (equation 2) developed above, an empirical aggregate model was developed to capture the impact of credit on the aggregate production of the various sub-sectors of Agriculture in Nigeria as follows;

$$Y_{st} = \beta_0 + \beta_1 Cr_U + \beta_2 Cr_R + \mu_t \quad …………………..…………(3)$$

Where Y_{st} is total output of the respective sub-sectors of the Nigerian agriculture in year t (measured in MT), Cr_u is total amount of formal loan in use allocated to the sub-sector in year t (measured in millions of Naira) and Cr_R is the credit in reserve in year t(measured in millions of Naira) . From a practical point of view, the GDP, expressed in millions of Naira, is considered a more plausible and easier measurement of sectoral output. Thus, the study substituted Y_{st} with GDP_{st}. The model then became:

$$RGDP_{st} = \beta_0 + \beta_1 Cr_t + \beta_2 D + \mu_t \quad ………………..……..…(4)$$

$$Cr_t = Cr_u + Cr_R$$

Where GDP_{st} represent the output of each subsector of Nigerian Agriculture, measured in millions of Naira.

Replicating equation (4) the following three models were developed for this study:

$$RGDPC_{st} = \beta_0 + \beta_1 CrC_t + \beta_2 D_t + \mu_t \quad ………………...(5)$$

$$RGDPF_{st} = \beta_0 + \beta_1 CrF_t + \beta_2 D_t + \mu_t \quad ………………...(6)$$

$$RGDPL_{st} = \beta_0 + \beta_1 CrL_t + \beta_2 D_t + \mu_t \quad ………………...(7)$$

Where;

$RGDPC_t$ = aggregate output of the crop sector of the Nigerian agriculture in year t (in millions of Naira)

CrC_t = total amount of formal credit made available to the crop sector in year t (in millions of Naira) used as proxy for financial reforms

$RGDPF_t$ = aggregate output of the fishing sector of the Nigerian agriculture in year t (in millions of Naira)

CrF_t = total amount of formal credit made available to the fishing sector in year t (in millions of Naira) used as proxy for financial reforms

$RGDPL_t$ = aggregate output of the livestock sector of the Nigerian agriculture in year t (in millions of Naira)

CrL_t = total amount of formal credit made available to the livestock sector in year t (in millions of Naira) used as proxy for financial reforms

Cr_R = credit in reserve

D_t = Dummy, Financial reform dummy, indicating policy shift between 1981-1990(regulated period represented by 0) and 1991-2016(deregulated period represented by 1).

RESULTS AND DISCUSSION

The Output of the Different Agricultural Subsectors in the Different Reform Era, Agricultural output of the crop sector was consistently higher than that of other agricultural subsectors in virtually all the reform periods. This was closely followed by the livestock and fisheries subsectors, respectively. However, the reforms of the 2001 – 2010 impacted more on output of the subsectors as evident in the largest growth rates for crops, livestock and fisheries subsectors. Table 1.0 shows the growth rate in output of the various agricultural sub – sectors in the financial reform periods considered. According to this table, the agricultural output recorded positive growth rates in virtually all the reform periods considered except the financial reforms of 1991 – 2000, which resulted in a negative growth rate in the livestock subsector. On the whole the reforms of 2001 – 2010 impacted more on the agricultural sector comparatively.

Table-1: Growth Rate in Agricultural Output for Various Reform Periods.

Financial Reform Period	Crops Output	Growth Rate	Livestock Output	Growth Rate	Fish Output	Growth Rate
1981 – 1990	385.6026	100	181.264	100	22.3067	100
1991 – 2000	1457.425	278	158.054	- 12.8	23.35	4.68
2001 – 2010	29605.43	7300	6121.712	3290	2114.765	9376
2011 – 2016	37544.099	2059	10595.62	2468	2722.051	5850

Source: Computed from CBN data.

The Contribution of Loans to Output of the Different Agricultural subsectors

The percentage contribution of the total loan to the total output of the crops livestock and fisheries subsectors were 75.87%, 18.76% and 5.37% respectively. This result revealed that the loan accessed by the crop sector contributed more to the total output during the period of the study. However, this contribution was lowest in the crop(0.41%) and fisheries(0.02%) sub-sectors in the 1981 – 1990 reform period and in the livestock(0.17%) subsector during the 1991 – 2000 reform period. Table 2 shows that loans to the crop subsector contributed more(41.29%) to farm output during the 2011 – 2016 reform period compared to 32.56% of the 2001 – 2010 reform period. On the other hand, the contribution of loan to output in the livestock and fisheries subsectors were consistently below 12% and 3% respectively all through the financial reform periods.

Table-2: Percentage contributions of loan to farmers output

Sector	981- 1990	991-2000	001-2010	011-2016	Percentage Contribution to GDP
Crop	0.41	1.60	32.56	41.29	75.87
Livestock	0.20	0.17	6.73	11.65	18.76
fisheries	0.02	0.03	2.33	2.99	5.37

Source: computed from CBN data.

Analysis of the impact of financial reforms on farmer's output

The result showing the impact of loan and reforms on farmers output is presented in Table 3. Output of the various subsectors was proxied using Real Gross Domestic Product (RGDP). The result (equation 8, 9 and 10) showed that amount of loan and financial reform had a significant impact on crop, livestock and fishery output. This can be attested by the significance of the variables and the high R^2 value. The estimated impact of loan on crop (11.2423), livestock (2.3424) and fishery (2.6629) output were positive and statistically significant at 1% level of significance. However, all the variables had a high R^2 value of 0.87, 0.72 and 0.78 respectively. The high R^2 value for crop, livestock and fishery showed that volume of loan had a significant impact on their output. Furthermore, the financial sector reform had a positive impact on crop (17288.5) and fishery sector at 1% level of significance respectively. This implies that the financial reform significantly increased farmers outputs, while that of livestock sector was negative (-880.593) and significant at 5% level of significance. The negative sign of financial reform and livestock output revealed that the

reform put in place lead to a decline a livestock output. The result is in line with that of Ammani (2012) who studiedthe relationship between agricultural production and formal credit supply in Nigeria and came to the conclusion that formal credit is positively and significantly related to the productivity of the crop, livestock and fishing sectors of Nigerian agriculture. Hence the null hypothesis is rejected and it is thus concluded that loan accessed have a significant impact on farmers output.

$$RGDP_C = 30998 + 11.2423X_1 + 17288.5X_2 \dots\dots\dots\dots\dots\dots\dots\dots\dots (8)$$
$$\text{t-value} = (7.5153)^{***} \ (11.383)^{***} \ (3.1486)^{***}$$

$$RGDP_L = 7111.69 + 2.3424X_1 - 880.593X_2 \dots\dots\dots\dots\dots\dots\dots\dots\dots (9)$$
$$\text{t-value} = (22.1148)^{***} \ (9.0791)^{***} \ (-2.1379)^{**}$$

$$RGDP_F = 1030.82 + 2.6629X_1 + 356.299X_2 \dots\dots\dots\dots\dots\dots\dots\dots\dots (10)$$
$$\text{t-value} = (9.1907)^{***} \ (8.5983)^{***} \ (2.4771)^{***}$$

Table-3: Impact of loan on farmer's output

Variable	Constant	Coefficient	Reforms	R^2	$AdjR^2$	f-stat
$RGDP_c$	30998***	11.2423***	17288.5***	0.87	0.86	110.7297***
	(4.124.66)	(0.9876)	(5490.77)			
$RGDP_L$	7111.69***	2.3424***	-880.593**	0.72	0.70	42.4587***
	(321.58)	(0.2580)	(411.894)			
$RGDP_F$	1030.82***	2.6629***	356.299***	0.78	0.76	57.6229***
	(112.159)	(0.3097)	(143.836)			

Note; *** significant at 1%, ** significant at 5%, Figures in parenthesis are standard errors.
Source: Computed from CBN data, 2016.

CONCLUSION

The results showed that agricultural output of the crop sector was consistently higher than that of other agricultural subsectors in virtually all the reform periods; the contribution of loan to output in the livestock and fisheries subsectors were consistently below 12% and 3% respectively all through the financial reform periods; the volume of loan disbursed by bank to agricultural sector and the reforms had a significant impact on farmers' output. Adequate care should be taken in formulating the financial reforms for the transformation of agricultural sector especially in the livestock sector in which the reforms had a negative impact on its output, while reforms on crop and fishery subsector should be sustained.Since the reforms significantly affect the volume of loan sourced by farmers, government should adopt strong macroeconomic policies targeted at distribution of agricultural loan to farmers. This could be done by creating a well secured bank-based financial regulation, good supervision, regular and sustainable institutional reforms.In order to improve farmer's access to agricultural loan, interest rate charge by the financial institution should be regulated.

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