

Agricultural Credit and Economic Growth in Nigeria: An Empirical Analysis

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Abstract

In most developing countries, agriculture is both the main sector that provides employment to large segments of the population and the key to sustained economic growth of the countries. In the light of this, the study presents an empirical analysis of the impact of agriculture credit on economic growth in Nigeria. Equally highlighted are the problems of agricultural production in Nigeria and the strategies for agricultural transformation of the economy. A review of the various policies of the government was discussed. Our finding revealed that agricultural variables have impact on economic growth and their contribution to export growth has been encouraging. Consequently, the macro-econometric model in this study contributes to the development of policy and programming by shedding light on the choice to be made and indicating the magnitude and direction of responses that can be expected from changes in key agricultural policy.

Keywords: Agricultural Credit; Economic Growth; Empirical Analysis.

1. Introduction

Agriculture is the cultivation of land, raising and rearing of animals for the purpose of production of food for man, animals and industries. It involves and comprises of crop production, livestock and forestry, fishery, processing and marketing of those agricultural production [11]. The development of agriculture in Nigeria has been slow inspite of the various agricultural policies. In fact, the government recognized the unhealthy condition of Nigerian agricultural sector since 1970, and has formulated and introduced a number of programmes and strategies aimed at remedying this situation. These measures included the setting up of large-scale mechanized farms by state and federal government, introduction of scheme such as the River Basin Development Authority. Other measures include, National Accelerated Food Production (NAFP), Operation Feed the Nation (OFN), Green Revolution (GRP) and the Directorate for Food, Roads and Rural Infrastructure [14]. In addition to these measures, financial measures such as the establishment of agricultural credit scheme were introduced by successive governments.

Inspite of these measures, the development of the agricultural sector has been slow and the impact of this sector on economic growth and development has been minimal [4]. This slow growth of agricultural production has generated some issues, among them are, the role of agriculture in providing food for the population; its role in supplying adequate raw materials to a growing industrial sector, its roles as a major source of foreign exchange earner. Some of these issues will be addressed in this paper. However, the main objective of the study is to examine the impact of agricultural credit on economic growth in Nigeria or the contribution of agriculture to GDP (GDP). In order to examine this impact, we specified a functional and operational form, therefore establishing a causal relationship between GDP and agricultural variables.

In the light of the above survey, this paper is presented for easy comprehension as follows. Section one introduces the topic, section two presents agriculture and economic development; agricultural policies and economic growth in Nigeria. In section three, the method of investigation is presented. Section four presents the empirical results while section five concludes the study.

1.1 Agricultural and Economic Development

In the theories of economic development propounded by Lewis [8], he saw agriculture as the basis for industrial growth and development. He saw agriculture as freeing disguised labour for industrial production and hence the engine of growth and development of any society must obviously start with agricultural production. In this sense, with heavy modernization and mechanization of agriculture, labour is free for industrial development [6].

In developing countries where industrial production is at a minimal level, the need for agricultural development has been recognized in the following areas:

(a) Providing Food for the Teemed Population

Population growth in most developing countries is far more than agricultural growth. The fear of a Malthus is becoming evident in these countries; hence, there is the need to develop agriculture to meet the food need of the people. This fear coupled with the fact that if food supplies fail to grow with increase in demand for it, then it becomes likely that food prices will rise. This effect could put pressure on workers wages, which will subsequently affect industrial profits; investment and economic growth in an economy [13].

(b) Supplying Adequate Raw Material to a Growing Industrial Sector

Agricultural development has been seen by many researchers [4,13,1] as a requirement for industrial development because of its role in providing raw materials for industries. It is in this direction that the need to increase agricultural productivity have be advocated and that it is more natural to increase domestic output rather than relying on the expansion of export to finance growing food export. In this sense, agriculture as the dominant sector in developing countries should make a net contribution to the overhead investment requirement in industry such as reducing foreign supply of raw materials by increasing the output produced locally.

(c) Constituting the Major Source of Employment in a Country

Based on these roles of agriculture in the history of developed economy, we can easily generalize that the process of human resources development in agricultural transformation must precede the process of economic transformation in a country. In most developing countries, agriculture provides employment for over seventy percent (70%) of the entire population. This role in itself makes agriculture the singular provider of jobs in developing countries [9]. However, it has been observed equally that the basic problem facing most agricultural production in developing countries are acute shortage of high-level manpower. It is well known that scarcity of highly trained management personnel in agricultural production has militated against the rapid expansion of agricultural output and hence growth in the industrial production in Nigeria [9].

(d) Constituting a Major Source of Foreign Exchange Earnings

Increments in the export of agricultural productions are a major option of increasing income and foreign earning in most developing countries [14]. Substantial expansion agricultural export is usually a rational policy for enlarged foreign exchange earning in the non-oil sector in most developing countries and a rational policy even when world supply demand conditions are unfavourable. Although some researchers like Longe [9] argue that expansion in agricultural production for export is associated with higher risk of price decline and this tends to have a disincentive effect on farmers. Again, as income of individuals in the world increase the demand for agricultural products fall because of the nature of agricultural output.

(e) Providing Market Product for Industrial Sector

There is the conflict between the function of agricultural sector's contribution to the capital requirement for overall development and it role in increasing farmers' purchasing power. However, the role of agriculture as providing market product for industrial product is not debatable in literature [14]. In this sense, the interaction between agricultural development and economic development especially regarding the industrial development is vital for all economy.

1.2 Agricultural Policies and Economic Growth in Nigeria

In the early 1950's and 1960's agriculture played a vital role in stimulating economic growth and development in Nigeria. It provides employment to millions of Nigerians. Over seventy percent (70%) of the labour force mostly from rural areas were employed in agriculture [1]. In the same period, agriculture contributes over 70 percent to our export earning (see Central Bank of Nigeria [2] for this). Indeed agriculture provided the main stimulus to the Nigerian economic growth despite the small farm holding and primitive systems. The contribution of agriculture to the nation dominant others sectors contribution to GDP. However, in 1970's till date, agriculture contribution has been negligible, contributing 34 percent in the year 2006 to GDP [3].

As a result of this decline in the percentage contribution to GDP, there have been a lot of measures in terms of programmes, strategies and policies to remedy the worsening situation in Nigeria. For example in 1976, Operation Feed the Nation (OFN)

programme was launched to encourage the people to pay greater attention in mobilizing internal resources for domestic agricultural production. This programme did not make any significant impact in increasing food production and GDP. It however increased awareness on the need for increased food production [12]. In 1980, the Green Revolution programme (GDP) was launched to replace OFN, with the aim of food sufficiency in agricultural food production, reducing import food price inflation. This programme again failed to impact on GDP and could not achieve its aims and objectives.

With the introduction of structural adjustment programme in 1986, a lot of policy packages and programmes were introduced such as the World Bank-assisted Agricultural Development Project (ADP), Directorate of Food, Roads and Rural Infrastructures (DFRRI), National Agricultural Land Development Authority (NALDA). In addition to these programmes a lot of schemes such as River Basin Development Authority were introduced. All these measures aimed at increasing agricultural production had little success in northern Nigeria but failed in southern part of the country [1]. However, it was during this period of SAP that agricultural production attained the highest growth rate of 5.0 percent [3].

Other measures aimed at increasing agricultural output were in terms of credit schemes; there was the establishment of Nigerian Agricultural Cooperative Bank in 1973, establishment of Rural Banking programme in 1977. These entire credit schemes were made to allocate more funds to rural farmer with the intention of increasing food supply. Still on this scheme, Central Bank of Nigeria (CBN) prescribed different lending rates for agricultural sector with lower interest rate enjoyed by farmers. In the year 2004, the president of Nigeria together with some African countries' leaders launched New Partnership for Africa's Development (NEPAD), whose objective was to reduce hunger and poverty. Agriculture was seen as the engine of growth to propel African economies out of hunger and poverty. The main instrument for achieving this was a comprehensive African Agriculture Development programme (CAAP). This programme aimed at achieving higher growth through increase in farm output. It equally aimed at encouraging private-public participation in agriculture production. For example [7] expressed Ondo State Government willingness to attract foreign investment in the area of agriculture by collaborating with foreign firm in Thailand and Republic of China. This collaboration was in the areas of establishing rice and cassava processing plants in the State. The indications are that other states governments are making move to attract foreign investors into agriculture.

2. Methods

2.1 Data Sources

The data source for this study include publication from Central Bank of Nigeria (CBN) various issues, of annual report and statement of account and statistical bulletin; National bureau of statistics various issues and internet publication of policy issues on agriculture in Nigeria. 1988 broad based agricultural policies in Nigeria. The data from this period present a considerable degree of freedom that is necessary to capture the net effect of explanatory variables on the dependent variables. The data spans the period 1986 to 2007 (21 years).

2.2 Theoretical Framework

It has been observed by researchers Chidi, Marc, [4,10] that countries at the early stages of development depend almost fully on agricultural growth for employment, foreign exchange, government revenue and food supply to the teemed population. In this sense, agricultural growth is the key impetus to the growth of non-oil export in most countries of Sub-Saharan regions.

Modeling the interaction between agricultural growth and economic growth has generated the following models.

$$Y_p = f(r, Exc, crd) \dots (1)$$

$$X_{no} = f(Exc, crd) \dots (2)$$

$$Grdp = f(r, Exc, crd,) \dots (3)$$

Equation (1) is a theoretical equation, which states that agricultural output growth (Y_p) is a function of interest rate (r), Exchange rate (Exc) and credit to the agricultural sector (crd). The theoretical specification is evidence in the works of Enoma, Isedu [5,7].

Equation (2) theoretically states that non-oil export (Xno) is a function of exchange rate, credit to agriculture. This again is evidence in the work of Enoma [5]. Equation 3 is the growth rate of GDP (GRDP), it is hypothesized that GRDP is a function of interest rate, exchange rate and credit to agriculture. It is important to note the problem of aggregation in this equation (3) because we are using a part to explain the whole. The problem could be solve if we used the percentage of agricultural credit to total credit (PCRD) and the percentage of XNO to total export (PXNO). Equation 3 changes to

$$\text{Grdp} = f(r, \text{Exc}, \text{Pcrd}, \text{Pxno}) \dots \quad (4)$$

Equations 1, 2 and 4 can be operationalised for the purpose of estimation into the following equations

$$\text{Ln YP} = a_0 + a_1 \text{Lnr} + a_2 \text{Lnexc} + a_3 \text{Lncrd} + a_4 \text{Lnyp}_{t-1} + ut \dots \quad (5)$$

$$\text{Ln XNO} = b_0 + b_1 \text{LnExc} + b_2 \text{Ln crd} + b_3 \text{LnXNO}_{t-1} + Vt \dots \quad (6)$$

$$\text{Ln Grdp} = c_0 + c_1 \text{Lnr} + c_2 \text{Ln Exc} + c_3 \text{Lnpcrd} + c_4 \text{Lnpxno} + \text{LnGrdp}_{t-1} + bt \dots \quad (7)$$

The above equations are transformed into log linear to facilitate easy estimation; we introduced lagged variables to indicate that the model is in a continuous process of adjustment and finally incorporate an error term, which is common to all econometric models given that by their nature, they are non-deterministic. The behavioural assumptions, the apriori, or the presumptive signs are stated as follows.

$a_1, c_1, < 0, b_1, a_2, c_2 > > 0, a_3, a_4, b_2, b_3, c_3, c_4, c_5 > 0$ while ut, vt and bt are expected equals to zero. Specifically, interest is negatively related to output while exchange rate is ambiguously related to output. Credit lagged values of the dependent variables are directly related to outputs.

2.3 Techniques of Analysis

The techniques of analysis or investigation are in three stages first we estimate equations 1, 2 and 4 using a three stage least square estimation technique, the reason being that the models are overidentified. Secondly, we derived the historical simulation from the dynamic series to see how the macro-econometric models track the actual series. This is important for counter-factual analysis and to see if the models effectively evaluate the structure of agricultural production in the economy. Thirdly, we generate a policy simulation to discover the alternative policies scenario. In particular, we examine how changes in credit policy affect agricultural production, non-oil export and growth rate of GDP.

3. Discussion

We present the empirical results of equations 1, 2 and 4 below.

3.1 Models Estimation

$$\text{LnYP} = 18.74 - 0.19r \quad 0.11\text{crd} + 0.16\text{Yp}_{t-1} \dots \quad (8)$$

(4.4) (-5.9) (-6.5) (1.2)

$$R^2 = 0.89 \quad R^2 = 0.88 \quad D-W = 2.09 \quad F = 60.5$$

$$\text{LnXNO} = 0.035 + 1.09\text{Exr} + 0.004\text{crd} + 0.04\text{XNO}_{t-1} \dots \quad (9)$$

(0.3) (22.0) (21.1) (18.9)

$$R^2 = 0.91 \quad R^2 = 0.89 \quad F = 193.5, \quad DW = 1.71$$

$$\text{LnGrdp} = 0.85 + 2.00r - 2.71\text{Exr} + 0.44\text{pcdr} + 0.38\text{pxno} + 0.25\text{Grdp}_{t-1} \dots \quad (10)$$

$$(0.2) \quad (2.3) \quad (-41.0) \quad (3.6) \quad (1.6) \quad (21.5)$$

$$R^2 = 0.97, R^2 = 0.96, F = 295.8, Dw = 2.31$$

All the diagnostic tests were generally satisfactory in all the estimated equations 8, 9 and 10. For example, the coefficient of determination and the adjusted coefficient of determination for all the equations range from 89 and 88 percent to 97 and 96 percent in all the estimated models. The f-statistics in all the equations are significant at the one percent level of significant and the Durbin Watson (DW) test show the absence of autocorrelation in all the models. This shows that the models are highly dependable.

In equation (8), all the presumptive signs were correct apart from the level of credit to agriculture, which shows a negative sign instead of the positive sign. The t-statistic below each of the equation is significant at the one percent for interest rate and lagged value of the dependant variable. In equation (9), all the presumptive sign are correctly signed and the t-statistics were all significant at the one percent level of significance. In equation (10), all the variables apart from interest rate are all correctly signed. Interest rate, percentage of agriculture credit to total credit and percentage of non-oil export to total export are significant of at 5 percent level of significant. While exchange rate and lagged value of the dependant variable are significant at 1 percent level of significance.

3.2 Models Evaluation

Table 1: Historical simulations: Summary statistics.

Model	Correlation coefficient	Root mean square error	Root mean square percent error	Theil's Inequality coefficient	
				1961	1966
Agricultural output growth	0.87	3.54	0.21	0.031	0.071
Non-oil Export	0.99	0.02	0.013	0.001	0.011
GDP Growth Rate	0.97	20.9	0.105	0.056	0.107

A closer look at table 1 shows that the performance of the macro econometric model is satisfactory. For example, the agricultural output shows a correlation coefficient between actual and simulated series to be 0.87 while the root-mean-square simulated series gives 0.87 while the root-mean-square percent error is 21 percent. Theil's 1961 and 1966 are 0.031 and 0.071. This calibrated between 0 and 1; the closer to zero the coefficient, the better the simulated series track the actual values. In both case the value is less than 1 percent. In the case of non-oil export and the GDP all the measure performed very well like the agricultural output.

3.3 Models Policy Evaluation

Table 2: Policy simulation of a 5 and 10 percent increase in agricultural credit on endogenous variables.

Endogenous Variables	Years	Control	5% Increase	10% Increase
Agricultural output	2004	133.88	136.81	137.01
	2005	142.69	145.16	145.35
	2006	147.90	151.08	150.40
	2007	148.58	155.64	162.29
Non oil Export	2004	146.00	147.50	147.02
	2005	151.81	153.03	154.51
	2006	156.10	157.03	158.05
	2007	158.26	162.38	165.09
GDP	2004	181.02	184.50	185.40
	2005	190.59	195.69	194.50
	2006	200.31	203.01	204.33
	2007	207.41	210.51	210.00

From table 2, the results of the control solution with increase in agricultural credit and the disturbed solution 5 and 10 percent for the endogenous variables are reported. The impact multiplier at the beginning of the period gives an impressive results and the dynamic multiplier at the end of the periods were equally very impressive for example in 2004, the impact multiplier for agriculture with 5 and 10 percent gives 2.93 and 3.13 respectively while the dynamic multiplier gives 7.86 and 13.71 respectively. For non-oil export we have the value at the beginning of the period to be 1.5 and 1.02 and at the end of the period to be 4.12 and 8.83. in the case of GDP we have the value to be 3.48 and 4.38 at the end of the period we obtained 3.2 and 2.59 respectively.

The results suggest that as in most developing countries, agricultural credit is an effective instrument for counter-cyclical agricultural output, non-oil export and GDP stabilization in the Nigerian economy although the value of GDP fell at the end of the period indicating that, such policies deteriorate with time.

4. Conclusion

We examined the impact of agricultural credit on growth of GDP in Nigeria. Measures aimed at increasing agricultural production were discussed and the relationship between agricultural development and economic growth were highlighted. Functional form models were formulated based on theory and operational form of this model were formulated for estimation. In the estimated equations agricultural credit, interest rate exchange rates were all important in affect aggregate output in Nigeria.

Results of the historical simulation indicated that the macro-econometric models provide an adequate and accurate representation of the Nigeria economy. Results of the policy simulation were satisfactory. Consequently, the macro-econometric model in this study contribute to the development of policy and programming by shedding light on the choice to be made and indicating the magnitude and direction of responses that can be expected from changes in key agricultural policy. Despite difficulty in modeling a developing countries economy, results obtained from this study are sufficiently useful not only for pedagogic purposes but also for macroeconomic policy analysis.

Competing Interests

The author declares that he has no competing interests.

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