Institutions, Macroeconomic Policy and the Growth of the Agricultural Sector in Nigeria

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Abstract

In this study we set out to examine the impact of institutional support and macroeconomic policy on the growth performance of the agricultural sector in Nigeria. Data on relevant variables were collected from the Central Bank of Nigeria Statistical Bulletin, 1970-2008. The data series were examined for unit roots and cointegration. The series were characterized as 1(1) and are also cointegrated. A model which relate the index of agricultural production to exogenous variables such as the volume of credit to the agricultural sector, interest rate spread, dummy for institutional reforms, deficit financing, were estimated using a cointegrating regression method. The Fully Modified Ordinary Least Squares option was used in our regression. The results indicate that the volume of credit to the agricultural sector, deficit financing income (GDP) and institutional reform (Dum) were positively and significantly accounted for innovations in agricultural output for the period studied. The interest rate spread has a negative relationship with agricultural output growth but not significant. The study recommends liberalized interest rate policy and enhanced institutional support to the agricultural sector.

Index terms— Institutions, Agricultural sector, Nigeria, Interest rate, cointegration, Growth.

1 INTRODUCTION

he link between institutions and economic development of nations has commanded much attention in theoretical and empirical research since the emergence of the endogenous growth theories. It is now being increasingly recognized that institutional quality (e.g economic and legal institutions) matter for economic growth, just as other factors such the resource endowment and technical skills. Adebiyi (2004) contends that institutions have direct and indirect benefits on economic growth and development. For example, strong legal institutions that define and enforce property rights attract productive investments from both within and outside the country. They also promote ethical values which promote good conduct and stability in the business environment. These factors have positive effects on economic development. North (1990) opines that a well designed and functioning institutional framework creates productive opportunities and economic performance. It is further argued that a suitable legal and "economic environment requires reforms of the rules and institutions that govern the strategic interaction of the participants in the political Author : Department of Economics, Delta State University, Abraka. E-mail : buomojimite@yahoo.com game" ??Khalil et al, (2007, p.68).

For a developing country like Nigeria that has embraced macroeconomic adjustment and deregulation, the need for strong institutions cannot be overemphasized. ??halil (2007, p. 68) suggests that for will :

? Protect property rights, defend the rule of law and fight against corruption;

? Provide appropriate rules or regulation of products, factors and financial markets to offset the sources or cost of market failure;

? Support macroeconomic stabilization, including protecting the value of money and ensuring a sustainable fiscal and monetary balance; and

? Promote social unity and strength.

Of the four roles that efficient institutions play in the development process as listed above, the first, i.e. "good governance" and the forth, i.e., promoting peace, social unity and strength are the more crucial for corruption, "bad governance", social disharmony, political crisis and sometimes armed conflicts have recorded monstrous levels, no meaningful development would take place One main component of the Structural Adjustment Programme(SAP) in Nigeria and the deregulation measures that followed it, is the deregulation of the financial sector of the economy especially the deregulation of interest rates. This institutional arrangement has had various impacts on the different sectors of the economy especially the agricultural sector, Nigerian agriculture is largely subsistence and access to adequate funds have been a major bottleneck. Against this background this study attempts to empirically establish the impact of some macroeconomic variables including institutions, on the agricultural sector using Nigerian data. The remainder of the paper is structured as follows. Following this introduction, section 2 provides the review of related literature. In section 3, we provide an overview of the agriculture sector in Nigeria. Section 4 provides the empirical methodology. Section 5 reports the results while section 5 concludes. II. LITERATURE REVIEW / THEORETICAL FRAMEWORK North (1990) describes "institutions" as limitations which human beings impose on themselves with a view to moderate and modernize human behavior especially in politics, economic and society. Institutions are by and large a means to an end as they facilitate efficiency in resource allocation and the maximization of overall societal welfare function. Beck et al (2002) classifies institutions based on the unit of analysis. Accordingly, institutions may be classed as legal institutions, political institutions, and economic institutions. Legal institutions are those that laws of the land. Political institutions concern party politics, the political opposition and the political process. Economic institutions define production relations, distribution and consumption process. Jutting (2003) posits that social institutions make and enforce rules concerning access to education, health, sports and community affairs. Adebayi (2004) in a review of the classification notes that institutions may be classed according to the degree of formality embedded in them. Formal rules are made up of "constitutions, laws, property rights, charter, by-laws, statutes and common law and regulations" ??Adebiyi 2004, p4). Informal rules in many instances provide the platform for formal rules. They are socially sanctioned norms of behavior, including taboos, customs, traditions and festivals. La Porta et al (1998) contends that economic freedom, political Rights and press freedom are highly correlated to economic growth. In a cross country study Barro (1997) concludes that economic and political institutions are important factors that explain differences in growth across countries. In a study of OECD countries Khalil et al (2007) concludes that more than 80% of the variation in GDP per capita in the OECD countries can be explained by both economic and legal determinants. The study also posits that " counties can develop faster by enforcing strong property rights, fostering an independent judiciary, attacking corruption, dismantling protecting political rights and civil liberties" ??Khalil et al 2007, p.74).

The framework of this study derives from the works of Jutting (2003) and extended by Adebiyi (2004).

Gross domestic Product Growth) is determined by both exogenous and endogenous variables. For our present purpose, the growth and development of the agricultural sector is determined by exogenous variables such as climatic conditions, traditional practices, availability of fertile land and other exogenous institutions such as financial institutions. These exogenous variables interact with the endogenous variables such as formal and informal institutions. Such institutions create incentive and disincentives that shape human choices that ultimately impact on cost of transactions. The incentive and disincentive structures determine the extent of political instability, existence of corporate governance, degree of corruption and fraudulent practices and monetary and fiscal policy choice which ultimately determine agricultural sector outcomes. From the foregoing it is clear that the level of activities and growth in the agricultural sector is influenced not only by macroeconomic variables but also the institutions that have direct and indirect relationship with the agricultural sector. is one of the leading sectors in the country in terms of its contributions to income, employment, foreign exchange earnings and domestic food supply. Nigeria with its several ecological zones and climatic conditions supports the cultivation of a wide variety of food and tree crops. Farming in Nigeria is largely dualistic in structure, with a predominantly traditional subsistence segment and a small modern, fairly mechanized commercial segment. Farming systems are many and are fashioned by traditions, land availability and weather conditions. The common systems include but not limited to: crop rotation, mixed cropping, shifting cultivation, terrace farming, sole cropping and irrigated farming.

Many institutions, policies and programmes have been put in place to create incentive and disincentive structures for stakeholders in the sector. Some of such institutions/ programmes are:

? The commodity marketing boards ? Nigerian Agricultural and Cooperative Bank (NACB)? Agricultural Insurance company ? Agricultural credit Guarantee scheme fund ? Agricultural Research and Training ? Agricultural extension ? Agricultural Development Programmes

? Agricultural pricing and marketing policy programmes that were set up in the sector was to improve the performance of the sector over time. Specifically, institutions, policies and programmes were targeted at:

? Promoting self-sufficiency in food and raw materials for domestic industries and possible exports ? Improving the socio-economic welfare of rural people engaged in agriculture Diversifying the economic base of the country and reduce the reliance on crude petroleum oil as the main revenue earner for the country ??CBN, 2000).

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Although the agricultural sector recorded about the largest number of support institutions, policies and oversee the legal system in general and enforce all the burdensome regulation, allowing press freedom and In its original form income growth (i.e. Gross domestic

3 III. AGRICULTURE SECTOR IN NIGERIA

4 Stylized facts. The agricultural sector in Nigeria

The broad objective of institutions, policies and programmes, the targeted goals were not significantly realized in the past four decades. For example, the commodity marketing boards were later abolished due Authorities have not done well either. Several reasons have been adduced to the poor performances of the institutional framework for enhancing agriculture in Nigeria. First, it has been noted (Okuneye 2011) that the agricultural sector is underfunded. For example in 2001 only N7.4bn out of the budgeted N10.5bn was released. In 2002, N3.5bn out of the budgeted sum of N12.6 was released, second, it has also been noted that many of the support by the institutional framework went to unintended beneficiaries. And third, the level of official corruption and bad governance also affected the institutional framework and its service delivery.

By and large, the agricultural sector in Nigeria remains the mainstay of the Nigerian economy. The sector remains the leading contributor to national income (GDP). It contributed up to 64% GDP in the 1960s. Although its contribution to GDP has declined over time, it contributed an average of about 40% in the past one decade. Before the advent of crude petroleum oil as the leading export commodity, agriculture contributed the largest portion to merchandise export. Nigeria was the leading producer and exporter of palm produce and second to Ghana in cocoa exports in the position in the export of these "cash" crops.

In terms of employment the sector is the leading employment for about 65% of the adult labour force and 80% in the rural communities. The sector also provides IV.

5 MATERIALS AND METHODS

The variables used for this study are:

? Index of Agricultural Production (IAP) is dependent variables.

? Interest Rate spread (IRS) which is computed as the difference between lending and deposit rates; ? Real exchange rate (REER); ? Credit to the agricultural sector (CAG) ? Institutional framework dummy (DUM). This takes the value of one during reforms and zero otherwise ? Deficit financing (DF): defined as government deficit financing;? Inflation rate (INF)

The data for the study were obtained from the central Bank of Nigeria (CBN) publications (various editions) except REER which was obtained from

The interest rate spread is computed, i.e. the difference between the lending and deposit rates. The data for the variables cover a period of 1970 to 2009.

The structure of our model which seeks to explain the role of institutions and other macroeconomic variables on agricultural output performance is of the form IAP = (f(DUM, IRS, INF, CAS, REER Df) .

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IAP=ao+A 1 DUM-a 2 IRS-a 3 INF+a 4 CAS-a 5 REER-a 6 Df (2) a 1, a 3 and a4 > 0; a 2 , a 5 and a 6 < 0 It is in instructive to justify the inclusion of the variables in the model. The impact of institutional reforms on the agricultural sector is proxied by a dummy variable (DUM) which takes the value of 1 during reforms and 0 otherwise. Mckinnon (1973), Shaw (1973) showed that regulation in some developing countries hindered growth through high interest rates. They contended that deregulation of interest rates will raise the real returns on savings and promote investment and economic growth. Nigeria embarked on a deregulation programme since 1986. A priori, it is expected that the new institutional framework would promote investment and growth in the agricultural sector. The level of investment in the sector also would depend on the rate of interest (IRS) via the cost of capital effect and expected to have an inverse relationship with performance of the sector. The variable representing 'credit to the sector' (CAG), also captures the extent which reforms affect the sector. The exchange rate variable (REER) also enters the equation through the cost of capital effect. The ease with which farmers assess credit from financial institutions will affect the rate and cost of investment in the sector. The way governments finance their deficits (Df) will affect the volume of credit available for private investors in agriculture. If government finances their deficits by borrowing from the public, the volume of credit to the agricultural sector would diminish. And finally, it is our expectation that the rate of inflation (INF) which affects the buying power of consumers would also affect the demand for agricultural products in Nigeria.

to dismal performance. The River Basin Development 1950s and 1960s. Nigeria no longer enjoy its leading employer of labour. On the average the sector provides the bulk of food and fiber needs of the country.

The striking feature about the sector since the 1960s is the unstable trend in most of the growth indices. The instability in performance of the agriculture may be attributed to a variety of factors. First, the development of the agricultural sector was neglected following increased revenues from the sale of crude petroleum oil in

the early 1970s. Second, as we noted earlier, the sector was grossly under-funded leading to weak performance of the institutional support framework in the sector. The structural Adjustment Programme (SAP) that was introduced in 1986 underestimated the consequences of deregulating the interest rate structure and the contraction in government spending. The deregulated interest rates placed enormous burden on farmers in accessing credits from financial institutions and other credit agencies. Third, the instability in the performance of the agricultural sector may also be attributed to the severe droughts which were recorded in the early 1970 and 1980s.

International financial statistics (IFS), various editions. its estimable form equation (1) could be written as : a) Unit root test It is now common knowledge that very often economic data have unit roots. It is therefore necessary to examine the time-series properties of the data to be used in this study as a guide to subsequent multivariate modeling and inference. Hence, we proceed by testing the null hypothesis of autoregressive unit root using the Augmented Dickey-Fuller (ADF) and the Phillips-Peron (PP) tests. The ADF and PP test are based on the test regression.$Z_t = a_0 + a_1 z_{t-1} + + e_t$ (**2**)

Where ? is the first -difference operator, z is the variable under consideration, the a' s and ?' s are parameters to be estimated, and e_t is the error term. The PP test allows for the presence of autocorrelation and conditional heteroscedasticity in the error term based on the test regression (2) except that the ? s are set equal to zero (Amano and Norden 2001). For both tests, a tstatistic larger in absolute value than the critical value results is a rejection of the null hypothesis of unit root in favour of the stationarity alternative. The results of the ADF and PP tests are reported in table 1 below.

6 b) Cointegration Tests

We use the system approach developed by among the variables. The tests for cointegration permit us to gauge the adequacy of specifying the long-run value of the dependent variables. For a description of the Johasen and Juselius approach see Amano and Norden 2000, P. 5-6).

Johansen and Juselius (1990) propose two tests with differing assumptions about the alternative hypothesis. They are the Trace statistic which tests the restriction r < q (q < n) against the completely unrestricted model r < n and the maximum Eigen value statistic which makes the alternative more precise by specifying that only one additional cointegrating vector exists (r< The log-likelihood ratio test statistics are formed thus:q + 1). Trace = -T ? max = -T ? n (1-^?q+ ?)

We use the trace statistic and the maximum eigen value statistic to determine whether the variables in our model are cointegrated. The results are reported in table 2 below.

7 i. Cointegrating Regression

As noted earlier many economic time series are difference stationary. Regressions involving the levels of 1(1) series will produce "spurious" results with conventional Wald test for coefficient significance spuriously showing a significant relations where infact none exists **??**Philips, 1986). Engle and Granger (1987) shows that a linear combination of two or more 1(1) series may be 1(0) in which case we say that the series are coitnegrated. A linear combination of such series defines a cointegrating equation with cointegrating vector of weights characterizing the long-run relationship between the variables.

Consider the n + 1 dimensional time series vector process (y_t , X_{1t}), with cointegrating equation (Startz, 2009):$y_t = X/t ? + D_{1t} / ?_t + U_{1t}$ –(**3**)

Where $D_t = (D_{1t}/, D_{2t}/)/$ are deterministic trend regressors and the n stochastic regressors x_t are governed by the system of equations:$X_t ? 21 / D_{it} + ? 22 / D_{2t} + e_{2t}$ –(4) $?e_{2t} = U_{2t}$

The P 1? vector of D_{1t} regressors enter into both the cointegrating equation and the regressors equations while the p 2 ? vector of D_{2t} are deterministic trend regessors which are included in the regressors equations but excluded from the cointegrating equation. Johansen and Juselius (1990) to test for coitnegration

The assumption ^+ ^/ -? imply that the elements of y_t and X_t and 1(1) and cointegrate but exclude both cointegration among the elements of X_t .

ii. Fully Modified Ordinary Least Squares (FMOLS) Phillips and Hansen (1990) develop an estimator which employs a semi-parametric correction to eliminate the problems caused by the long-run correlation between the cointegrating equation and stochastic regressors innovations. The FMOLS estimator is asymptotically unbiased and has fully efficient mixture normal asymptotic allowing for standard wald tests using asymptotic chi-square statistical inference. The FMOLS largely helps to overcome the main weakness of the static ordinary least squares. We employ the FMOLS approach is used in the study to estimate equation (1) in log form and in first differences. The results of the cointegrating regression are reported in table 3.

V.

8 PRESENTATION AND ANALYSIS OF RESULTS

Table 1 presents the results of the ADF and PP tests on the variables of model (1).

*significant at 1%, **at 5%; *** at 10%

From table 1, the unit root tests are unable to find significant evidence of stationarity in the variables used except DF which 1(0). All the other variables can be well characterized as 1(1) using the ADF and PP unit root tests. there is significant evidence that the variables in our model are cointegrated. This implies that a long-run

relationship exist among the dependent and independent variables. This implies that the explanatory variables can adequately capture all the permanent innovations in the performance of the agricultural sector over our sample period. Table 3 reports the results of our cointegrating regression. We recall that the focus of this paper is to establish a link between public institutions and the performance of the agricultural sector in Nigeria for the period under study. There is no doubt, public policy in general and economic reforms have had varying impacts on the performance of the agricultural sector. We should also recognize that beside the effect of institutions, other factors such as the level of rainfall and climate change affected the sector over the period under study. Our model did not capture such other variables.

We also wish to note that the deregulation of interest rates, the creation of agricultural support schemes and institutions such as the Agricultural Development Programmes (ADP), the Fadama schemes, and even agricultural extension services, all had some form of direct or indirect benefits to the agricultural sector.

Table 3 reveals that bank credit to the agriculture sector (CAG), the dummy for institutional framework (DUM), are positively related to agricultural productivity and are significant at the conventional level of significance. As expected the interest rate spread (IRS) and exchange rate (REER) carry negative signs but only the exchange rate variable is significant. The behaviour of the interest rate variable reflects the practice by financial institutions which make the cost of agricultural loans too prohibitive for farmers.

Table 3 indicates that the role of institutions in promoting agricultural productivity is significant as more credits were channeled to the sector during the deregulation period. The negative sign of REER indicates that a rise in the price of foreign currency diminishes agricultural productivity by way of a rise in the domestic prices of imported inputs. The results also show that as income (RGDP) rises, agricultural performance rises.

9 VI.

10 CONCLUSION

In this paper, we set out to examine the relationship between public institutions and the productivity of the agricultural sector in Nigeria. Over the years government provided several institutional support to boost agricultural production. Some of these institutions have had various direct and indirect impacts on the agricultural sector. Specifically, the World Bank/IMF inspired economic reforms have had significant impacts on the sector. In particular, the deregulation of interest rates is one significant phenomenon which has mixed impacts on the agricultural sector.

In this study time series data were collected and analyzed by means of a simple cointegrating regression proposed by Phillips and Hansen (1990). The time series properties of the data were examined using the ADF and PP tests. The tests revealed that except for DF, all the other variables were difference stationary. The Johansen cointegration test on the variables revealed that the variables are cointegrated.

The results for the model indicate that there is a positive and significant relationship between the volume of credit to the agricultural sector and the growth institutional support programmes and policies in the agricultural sector raised the volume of institutional credit to that sector and impacted significantly on the sector. The DF (deficit financing) variable is significant at 1% and positive. This indicates that government expansionary fiscal policy has expansionary effect on growth in the agricultural sector. REER has a negative but significant relationship with growth performance in the agricultural sector. Dum (i.e. dummy for institutional reforms) is significant at 10% level and has a positive sign. This implies that institutional reforms have impacted positively on the agricultural sector during the period studied.

In summary this study has found significant evidence, in support of the hypothesis that institutions matter in economic growth especially the growth of the agricultural sector in Nigeria. Arising from the findings of this study, we recommend that government should liberalize interest rates to the agricultural sector; we also recommend that government should strengthen institutional support to the sector particularly in terms of subsidized inputs and extension services to farmers. [1] [2] [3] [4] [5] [6]

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[5] Institutions, Macroeconomic Policy and the Growth of the Agricultural Sector in Nigeria performance of the sector. This indicates that the

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Figure 1:

1

Variables	At level	At first difference	Order of Integration	At levels	At first difference	Order of integration
IAG	0.47929	-7.12046*	1(1)	1.29282	-7.25999*	1

Figure 2: Table 1 :

2

Date: 11/08/11 Time: 10:43
Sample (adjusted): 1972 2008
Included observations: 37 after adjustments
Trend assumption: linear deterministic trend
Series: LAG CAG IRS DUM RGDP DF ER
Lags interval (in first differences): 1 to 1
Unrestricted Cointegration Rank Test (Trace)

Hypothesized		Eigenvalue	Trace statictic	0.05	Prob**
No. of CE(s)				Critical value	
None*		0.77144	53.69366	25.6154	0.0003
At most 1*					

Figure 3: Table 2 :

2

Figure 4: Table 2

3

Dependent Variables: LIAG
Method: Fully Modified Least Squares (FMOLS)
Date: 11/07/11 Time: 10:43
Sample (adjusted): 1971 2008
Included observations: 38 after adjustments
Cointegrating equation deterministic: C
Long-run covariance estimate (Bartlett Kernel, Newey-West Fixed Bandwidt = 4.0000)

Figure 5: Table 3 :

10 CONCLUSION

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