

SELECTED MACROECONOMIC VARIABLES AND CONTRIBUTION OF AGRICULTURE TO THE GROWTH OF NIGERIAN ECONOMY (1980 - 2020)

Adeniyi, B.A.

Agricultural Technology Department, Oyo State College of Agriculture and Technology, P.M.B. 10, Igboora .
adeniyibabatunde6@gmail.com +234806893566

Abstract

Nigerian economy like most other economies in the world is highly vulnerable to fluctuations of macroeconomic variables. A situation whereby a little shock in the economy subjects the macroeconomic variables to fluctuations and uncertainty may adversely affect the overall performance of agricultural sector if not well managed. This study, therefore investigates the effects of some selected macro-economic variables on contribution of Nigerian agricultural sector to economic growth from 1980 to 2020. Auto regressive distributed lag model (ARDL) is employed as inferential analytical tool based on the results of preliminary tests that were performed. The results obtained from ARDL analysis show that the coefficients of exchange rate and interest rate have the expected negative sign and also significant while the coefficient of inflation rate has the unexpected sign and also not significant at 5% level of significance. This therefore connotes that both exchange rate and interest rate have effect on the contribution of agricultural sector to economic growth while inflation rate has no effect. It is therefore concluded that the selected macro-economic variables (exchange rate and interest rate) directly influence the contribution of agriculture to the growth of Nigerian economy. Going by the findings of this study, it is recommended that monetary authorities should put in place specialized policies, programmes and institutions such as the establishment and funding of Bank of Agriculture and other specialised institutions whose mandates will include provision of low interest credit facilities and subsidized inputs to farmers in order to enhance their capacity which will in turn boost agricultural productivity and hence contribution of agriculture to economic growth. Putting in place of policies that will discourage import and encourage export is also recommended.

Keywords: Economic growth; Agriculture; Exchange rate; Interest rate

Introduction

Agriculture does not only serves as source of food for man and animal, but also serves as source of employment, foreign exchange, raw materials and market for industrial goods. In recent decades, the potential contribution of agriculture as one of the drivers of economic growth has been a subject of much controversy among researchers and development economists. While some argued that agriculture plays a passive contribution to economic growth others are of the opinion that it plays a vital and active role (Olajide *et al.*, 2012). Some also contend that agricultural development is a pre-condition for industrialization while there are others who strongly disagree and argue for a different path. Notwithstanding the difference in the views expressed by researchers as to the roles that Agriculture plays, available statistics show that the Nigerian agricultural sector is arguably the most important sector of the economy after oil in terms of its contribution to the economic growth.

Available statistics from Nigeria Bureau of Statistics (NBS, 2015), indicate that the sector has in the recent past decades contributed about 41% of the country's GDP, employed about 65% of the total population and provided employment to about 80% of the rural population. The statistics equally show that agriculture is the major source of food for both man and animals and accounts for about 70% of rural households' total incomes (Adeniji, 2013).

Unfortunately, according to Odior, (2013) and Udah *et al.* (2015), these economic and market potentials of Nigerian agriculture sector have been undermined by inappropriate and unstable macroeconomic policies among other problems. And this has within a decade (from 1973 to 1983) made agricultural output in Nigeria declined to 1.9 % from 7.9% and Agricultural imports as a share of the total imports rose from 3% in the late 1960s to 7% in the early 1980s (NBS, 2015). Similarly, agricultural share of gross domestic product proxied for contribution of agriculture to Nigeria economy declined from 36% in 2002 to 24% in 2020 while agricultural export declined from 42% of the

total export in 1970 to less than 3% in 1985 (CBN, 2019).

In the same vein, Iganiga and Unemhlin (2011) once averred that the stagnation in agriculture is the principal explanation for Nigeria poor economic performance as evident in mass unemployment, persistent increase in inflation rate, high debt profile and balance of payment disequilibrium. Regrettably, the macroeconomic environments are uncertain and there is tendency for macroeconomic variables (especially inflation, exchange rate, interest rate among other factors) to be unstable and weak in terms of their ability to withstand shocks (Mgbame *et al.*, 2015).

Hence, the need for continuous investigation of the right mix of macro-economic factors that will make agricultural sector contributes excellently to economic growth. This therefore, justifies the reason why this study investigates the effects of some selected macro-economic variables on contribution of Nigerian agricultural sector to economic growth from 1980 to 2020.

Methodology

Study area

This study used Federal Republic of Nigeria as its study area. Nigeria is located in West Africa between latitude 40-140N and longitude 30-150E. It comprises of thirty-six states and its Federal Capital Territory, Abuja. It also has a population of over 168.8 million people (2006, NPC). It is bordered on the North by Niger and Chad Republic, on the West by the Republic of Benin and the Republic of Niger, on the South by the Gulf of Guinea, and on the East by the Republic of Cameroon.

There are over 250 ethnic groups in Nigeria; the major ones being Hausa/Fulani, Igbo, and Yoruba who predominantly live in the northern, eastern and western parts of the country, respectively. These regions were amalgamated as the Colony and Protectorate of Nigeria in 1914. In 1960, Nigeria got its independence from Britain. Nigeria has a total land area of 923,768sqkm including 13,000sqkm of water, a border length of 4,047km and a coastline of 853km. The highest point in Nigeria is Chappal Waddi at 2,419m (7,936ft) and the lowest is the Atlantic Ocean (0m). The main rivers in Nigeria, River Niger and River Benue, converge in Lokoja (Kogi State) and empty into the Niger Delta, the location of a large area of Central African Mangroves. The climate and vegetation of Nigeria is equatorial in the south, tropical in the center, and arid in the north. There are two distinct seasons in the country: the rainy season

and the dry season. Nigeria is the most populous country in Africa and the second largest economy in the continent. Lagos and Kano are its largest cities. Nigeria has huge reserves of natural gas and crude oil and is the eight largest exporter of the resource in the world. Oil export accounts for about 95 percent of foreign exchange earnings and 80 percent of budgetary revenues in the country. However, recent growth in the domestic economy was driven by the agricultural sector which contributed 41% of Nigeria's GDP in 2011; employs over 60% of the workforce and is a major means of livelihood for most of the rural dwellers (50% of the population)

Theoretical framework underpinning the specified model

This study is based on the monetary transmission mechanism theory. The chain of events, which link a change in monetary policy with changes in prices and output, is known as the transmission mechanism of monetary policy. In other words, transmission mechanism describes how changes in monetary policy transmit through the financial system, via financial market prices (interest rate and exchange rate) and quantities (money supply) to the real economy, affecting aggregate spending decisions of households and firms, and thus, from there to aggregate demand and inflation.

This theory as explained by Berg (2002) and adopted by Onwuagana and Areghan (2021) stated that variables like the interest rate and the exchange rate can drive output growth if the policy environment is accommodative for growth to occur. An accommodative period would be a period of low-interest rate which allows manufacturers to borrow for purpose of production and consumers for purpose of consumption thus reducing the financial constraint for both economic agents. A weak exchange rate can boost export demand which leads to expansion in agricultural yield. Output tends to respond to interest rate and exchange rate changes in the short run. The model that is estimated in this study is derived from this macro policy transmission theory.

Model specification

The model that is used in this study is adopted from Onwuagana and Areghan (2021). Its implicit forms can be stated as:

$$AGX = F(EXCH, INFL, IR)$$

Explicitly, this can be written as:

$$AGX_t = \beta_0 + \beta_1 EXCH_t + \beta_2 INFL_t + \beta_3 IR_t + \varepsilon_t$$

where;

AGX = agricultural share of gross domestic product in Nigeria (proxy for contribution of agriculture to Nigeria economy)

EXCH = real Exchange rate movement, proxied by real effective exchange rate index
(2010 = 100)

IR = proxied by actual real interest rate (%)

INFL = Inflation rate, proxied by annual % change of CPI

β_0 = intercept of relationship in the model/ constant

$\beta_1 - \beta_3$ = coefficient of each of the independent variable; and ε = Error term

Estimation techniques

Different macro-economic factors have been identified as determinants of Agriculture's percentage contribution to economic growth in the literature. However, based on theoretical exposition and following the extant literatures as evidenced in the works of Odetola and Etumnu (2013), Adegboyo (2019) and Onwuagana and Areghan (2021) among others, this study employs Interest rate, Inflation rate and exchange rate. The secondary data on these variables are sourced from World Bank Development indicators data base,. The data that used for this study covers period from 1980 to 2020 (about 40years) which is more than 25years required of any time series analysis. The choice of the time lag was because of availability of data.

To avoid the problem of spurious regression (meaningless regression result) that may result from the usage of non-stationary time series data for regression analysis, the augmented Dickey-Fuller test

was used to examine the presence (non-stationary) or absence (stationary) of unit root in each of the variables included in the model. The null hypothesis for the test is that the variable has unit root or not stationary and the decision rule is to reject the null hypothesis if the p-value of augmented Dickey-Fuller test statistics are less than 5% and then, accept the alternative hypothesis of stationary or no unit root.

If it is found that all the variables are uniformly I (0), then ordinary least square (OLS) will be used as estimation method. But when they are integrated of the same order, that is, they are uniformly I (1), either the Engle-Granger or the Autoregressive Distributed Lag (ARDL) method will be used. Also, if they are of a mixed order of integration, viz: I(0) and I(1), then only ARDL method is the appropriate econometric method that is to be used.

Furthermore, to understand the nature of the data, descriptive statistics like graphs, frequency tables, mean e.t.c. are used to describe the data. Similarly, in order to investigate influence of the selected macro-economic factors on agricultural sector share of Nigerian gross domestic product (proxy for contribution of agriculture to Nigeria economy), Augmented Dickey-Fuller (ADF) test was carried out to determine the presence or absence of unit roots in each of the variables. Based on the result of the Augmented Dickey-Fuller (ADF), Auto regressive distributed lag model (ARDL) is employed as inferential analytical tool in this study.

Presentation and Discussion of Results

Summary Statistics

Table 1 below presents the summary statistics for all the variables.

Table1: Summary Statistics

Variable	Mean	Standard Deviation	Minimum	Maximum
AGX- Agricultural share of GDP (proxy for contribution of agriculture to Nigeria economy)	22.86	4.64	12.24	36.95
IR- Expected interest rate, proxied by actual real interest rate (%)	2.54	9.95	-1.45	1.18
INFL- Inflation rate, proxied by annual % change of CPI	19.17	17.68	5.38	72.83
EXCH- Expected real Exchange rate movement, proxied by Real effective exchange rate index (2010 = 100)	130.03	99.56	8	359

Source: Author's computation, 2022

The summary statistics results in Table 4.1 show values for mean, standard deviation, minimum and maximum for each of the variables employed in the study. It is revealed that the mean of AGX, IR, INFL and EXCH are 22.86, 2.54, 19.17 and 130.03 while

their standard deviations are 4.64, 9.95, 17.68 and 99.56 respectively. Similarly, the minimum values for AGX, IR, INFL and EXCH are 12.24, -1.45, 5.38 and 8 respectively while their maximum values are 36.95, 1.18, 72.83 and 359 respectively.

The results of unit root tests

The estimates obtained from Augmented Dickey-Fuller (ADF) unit root tests that was performed on each of the four variables in order to determine their stationarity or otherwise are presented in Table 4.2. The null hypothesis for the test is that the variable has unit root or not stationary and the decision rule is to reject the null hypothesis if the p-value Augmented

Dickey-Fuller (ADF) unit root test statistics are less than 5% and then, accept the alternative hypothesis of stationary or no unit root.

The results of Augmented Dickey-Fuller (ADF) unit root tests for all the variables that were included in the model are shown in Table 4.2 below and then discussed thereafter.

Table 4.2: Results of augmented Dickey-Fuller (ADF) unit root tests

Variable	ADF Statistic at level	Critical value (0.01)	ADF Statistic at 1st difference	Critical value (0.10)	Order of Integration	Remarks
AGX	-4.089	-3.682			I(0)	Stationary
IR	-3.018	-2.97			I(0)	Stationary
INFL	-2.19	-3.69	-4.67	-3.70	I(1)	Stationary
EXCH	-2.99	-2.62			I(0)	Stationary

Source: Author's computation, 2022

The results of ADF unit root tests shown in the Table 4.2 above shows that AGX, IR and EXCH are stationary at I(0) while INFL is stationary at I(1). Since they are of a mixed order of integration, viz: I(0) and I(1), ARDL method is therefore the appropriate

econometric method that is used to determine the effects of the selected macro-economic variables on contribution of agriculture to Nigerian economic growth

The results of ARDL estimation

Table 4.3: Results of ARDL Estimation

Variables	Coef.	Std. Err.	T	P> t	[95% Conf.
AGXL1.	0.7057	0.1550	4.55	0.000	0.3863
IR	-0.1391	0.0974	1.43	0.061	-0.0615
INFL	0.0858	0.0631	1.36	0.186	-0.0441
EXCH	-0.0026	0.0065	-0.40	0.689	-0.0161
CONS	5.6403	4.8703	1.16	0.258	-4.3903

Source: Author's computation, 2022

The results in Table 4.3 above show that the coefficient of EXCH is -0.003 with P-value of 0.18, but the apriori expectation states that there should be a positive relationship between AGX and EXCH. That is an increase in exchange rate (depreciation in the value of the naira) is expected to lead to an increase in agricultural share of GDP. The result therefore partly conforms to the apriori expectation of negative and significant coefficient.

Also, the results in the same table also show that the coefficient of IR is -0.14 with P-value of 0.61 which

implies a negative or inverse relationship that is expected between IR and AGX. That is, an increase in interest rates is expected to lead to a fall in agricultural share of GDP because a high interest rate is expected to make capital for agribusinesses to be limited due or not to be available at all for investors and agribusiness owners to expand or even start up while lower interest rates is expected to make capital more available for them and the result obtained agrees with the apriori expectation.

In the same vein, an inverse relationship is expected between INFL and AGX. That is, as INFL increases, AGX is expected to be reducing because inflation will lead to less demand for agricultural commodities both at home and abroad because prices will rise and the value of the currency will appreciate leading to low foreign private investment and capital inflows and therefore, low agricultural share of GDP. The results in the Table 4.3 show that the coefficient of INFL is 0.085 with P-value of 0.18 which implies that INFL has a positive and insignificant effect on contribution of agriculture to economic growth.

Lastly, the lag value of AGX with coefficients of 0.71 and P-value of 0.00 implies that previous contribution of agriculture to economic growth has a positive and significant effect on current contribution.

Conclusion and recommendations

It can be seen from the foregoing that the coefficients of exchange rate and interest rate have the expected negative sign and also significant while the coefficient of inflation rate has the unexpected sign and also not significant at 5% level of significance. This therefore connotes that both exchange rate and interest rate have effect on the contribution of agricultural sector to economic growth while inflation rate has no effect. It can then be concluded that the selected macro-economic variables (exchange rate and interest rate) directly influence the contribution of agriculture to the growth of Nigerian economy.

It is therefore recommended that monetary authorities should put in place specialized policies, programmes and institutions such as the establishment and funding of Bank of Agriculture and other specialised institutions whose mandates will include provision of low interest credit facilities and subsidized inputs to farmers in order to enhance their capacity which will in turn boost agricultural productivity and hence contribution of agriculture to economic growth. Putting in place of policies that will discourage import and encourage export is also recommended.

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