

# “Tax revenue and agricultural performance: evidence from Nigeria”

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## TAX REVENUE AND AGRICULTURAL PERFORMANCE: EVIDENCE FROM NIGERIA

### Abstract

The responsibility of the government of any economy cannot be overemphasized. Likewise, the resources generated and infrastructural development helps to boost the economic growth of any nation. There has been overdependency of Nigerian economy on the oil sector, the major source of revenue. However, this sector has experienced several challenges ranging from devaluation in naira and fall in prices of crude oil in the international market. This serves as a revelation for the Nigerian government to seek an additional source of income. To this end, the main aim of this paper is to examine the impact of total tax revenue on agricultural performance in Nigeria. The study uses Engel and Granger approach to cointegration to establish the long- and short-run behavior, it was found that a positive and significant relationship exists between revenue obtained in the agricultural sector, capital in agricultural sector proxy by loan and agricultural output, while employment and total tax generated are not significant in the short run. In the long run, employment, capital and total revenue are statistically significant with agricultural output, while tax is insignificant. The implication of the result showed that tax has not yielded desirable result in promoting the agricultural sector in Nigeria. To promote pro-poor growth, long-run employment and improve overall welfare, there is a need to incorporate benefit from tax into agricultural performance. The study recommends among others the need for a systemic approach, given a significant percentage of the total tax generated to boost the development of the agricultural sector.

**Keywords** agriculture output, taxation, employment

**JEL Classification** E62, O4

### INTRODUCTION

The government of any economy is saddled with the responsibility of increasing the welfare and standard of living of its citizens, protection of lives and properties, provision of social welfare service, maintenance of law and order and the promotion of economic development amongst others. To carry out these functions, there is a need for various sources of revenue generation. Guerra and Harrington (2018) noted that the revenue of a country could be generated via the external and internal structured tax system. The amount of revenue generated also has impacted the economic growth of such nation. Generally, taxation is a sustainable and authentic source of government income and an instrument for macro-economic policy and fiscal management. Saad (2014) described taxation as an instrument for social and economic reforms that permeates every facet in the economy including individuals, corporations, citizens and foreigners. As an economic tool (Bayer & Cowell, 2016; O. Uwuigbe, U. Uwuigbe, Jafaru, Iginoba, & Oladipo, 2016) equates its efficiency to power to destroy.

Mittone and Saredi (2016) see taxation as a tool employed in order to ensure the redistribution of economic wealth and to ensure socio-eco-

conomic growth. Developed countries have a well-structured tax system and thus enable them to generate a significant amount of their annual revenue from the tax. Examples of such countries are the United States of America (USA), United Kingdom (UK), Canada and the Netherlands. As a result of this, economic growth has been boosted. Taxation is also one of the major sources of revenue in the country, but due to mismanagement, leakages and corruption in the system, the revenue generated annually is affected (Eluyela et al., 2019; Asaleye et al., 2018). Although taxation contributes a significant amount to the country's GDP, Nigeria's tax contribution is seen as the lowest compared to that of other countries. PricewaterhouseCoopers (PwC) stated that Nigeria's tax contribution to GDP is the lowest in the world when compared to other nations. The highest value of tax to GDP is 5.46% in 2008, while the lowest value is 0.91% (Onwe, 2015).

On the other hand, agriculture is seen as the bedrock of any economy especially in Africa (Adama, Asaleye, Oye, & Ogunjobi, 2018). Solid rock economies are built on its ability to explore its potentials and opportunities using natural resources, except in technologically developed countries like Japan. Agriculture plays a vital role in the national development of the most developed economy. They see agriculture as a means of reducing overdependency on some particular sector or activities of the economy like oil sector. Some benefits that will accrue to such countries are an increase in the rate of exportation, enhancement of foreign exchange, provision of employment opportunities, reduction in poverty levels and contribution to economic growth (Ojeka, 2016; Asaleye et al., 2018). In 1960, the agriculture sector contributes to about 70 per cent of Nigerian exports. This later reduced to 40 per cent in the late 1970s and gradually decreases to 2 per cent in the late 1990s. In recent times, agriculture has been neglected by the majority in Nigeria. Agriculture is only practised on a small scale in rural societies of the country. Although Nigeria has been described as one of the top countries endowed with natural resources and massive land area, only 40% of its land area is cultivated and used for agricultural purposes. There is a lack of motivation amongst the farmers due to lack/poor financing, poor transportation due to bad roads and also lack of market (people rather import foods).

Strands of literature exist between taxation and agriculture as tools for economic growth (Omorogiwa, Zivkovic, & Ademoh 2006; Simeon & Marinos, 2009; Worlu & Emeka, 2012; Afuberoh & Okoye, 2014; Guerra & Harrington, 2018), but most of these studies ignored the relationship between taxation and agricultural performance. In addition, vast literature has provided different revelations, opinions and explanations of taxes, agriculture, and its connection with the economic development of the country. Worlu and Emeka (2012) examined the connection between tax revenue and economic growth in Nigeria using a macro-economic approach. The study by the authors found that tax revenue has an impact on economic growth via infrastructural development. Similarly, Afuberoh and Okoye (2014) assessed the influence of taxation on revenue generation in Nigeria. The sample size used was the federal capital city and some selected states. Results of the regression analysis showed that a significant connection exists amidst taxation and revenue generation. Also, the study shows that taxation has a significant influence on Gross Domestic Product (GDP). More so, using the ordinary least square (OLS) regression technique, Onwucheka and Aruwa (2014) analyzed the effect of value-added tax on economic development in Nigeria. Findings from the study reveal that Value-added Tax (VAT) contributes greatly to the total tax revenue of the government and finally has a significant influence on economic development in Nigeria.

Consequently, Adegbe and Fakile (2011) further examined the influence of company income tax on economic development in Nigeria. The research used Chi-square and multiple regression analysis. Findings from the scholars' research show that a significant consonance exists between company income tax and economic development of Nigeria. The study highlighted tax evasion and avoidance as major hindrances to revenue generation. Nwadiakor and Ekezie (2016) found the impact of tax policy on economic development in Nigeria. The research observed 19 years of data from 1994 to 2013. Ordinary least squares regression analysis was utilized to analyze the study data. The findings showed that tax has a significant

influence on economic development in Nigeria. Tolulope and Chinonso (2013) used Granger causality test to analyze the contribution of agriculture to economic development in Nigeria. They found that the agricultural sector has contributed positively and consistently to economic development in Nigeria, reaffirming the sector's importance in the economy. Simeon and Marinos (2009) used the simulations model to analyze the role of agriculture in Nigeria's economic development. The result shows that some subsectors in the agricultural sectors outperform some of the oil and manufacturing sectors in terms of return on investment. Omorogiwa, Zivkovic, and Ademoh (2006) assessed the role of agriculture in the economic growth of Nigeria. The study used trend analysis. Results from the findings revealed that it is plausible for Nigeria to diversify into the agriculture market in their attempt to become more self-sustainable and a world economic power. However, despite different studies established a strong connection between tax and economic development in Nigeria, the influence on agricultural performance have not been looked into. Likewise, mismanagement of resources, inconsistency of policies, low capital and investment rate have been pointed by scholars as main issues affecting the development of the Nigerian economy (Asaleye, Adama, & Ogunjobi, 2017; Ogundipe, Ogunniyi, Olagunju, & Asaleye, 2019).

Tax can be considered a compulsory obligation imposed by the public authority on taxpayers. This is irrespective of the amount of service rendered to the taxpayer (Perez-truglia & Troiano, 2018). In simple terms, tax can be seen as a contribution from taxpayer to revenue generation of an economy. This source of government revenue assists the government in providing and meeting public needs. Tax may be imposed on income, properties, land and goods or services (Modan, 2016). Against this backdrop, the main goal of this research is investigate the influence of tax revenue on agricultural performance in Nigeria.

## 1. MODEL SPECIFICATION AND TECHNIQUE OF ESTIMATION

Following the study by Popoola, Asaleye, and Eluyela (2018) that examines the relationship between domestic revenue mobilization and agricultural productivity, the empirical model for this study is slightly adjusted and given as follows:

$$AGDP = f(EAGR, CAGR, TAGR, TAX). \quad (1)$$

Equation 1 is the implicit form of the model, where  $AGDP$  is the output in the agricultural sector.  $EAGR$  is employment in agricultural sector,  $CAGR$  is capital in agricultural sector,  $TAGR$  is agricultural revenue, while  $TAX$  is the total revenue. The model can be explicitly given as:

$$AGDP_t = \alpha_0 + \alpha_1 EAGR_t + \alpha_2 CAGR_t + \alpha_3 TAGR_t + \alpha_4 TAX_t + \mu_t. \quad (2)$$

In equation 2,  $\alpha_0$  is the intercept where  $\alpha_1$ ,  $\alpha_2$ ,  $\alpha_3$  and  $\alpha_4$  are the parameters on the independent variables  $EAGR$ ,  $CAGR$ ,  $TAGR$  and

$TAX$ , respectively,  $t$  is the period of observation. Theoretically, it is assumed that  $EAGR$  and  $CAGR$  have a positive relationship with  $AGDP$ . This is directly from the output model, capital and employment are essential to increase the aggregate output. Likewise, increase in revenue is presumed to have a positive response on output. This is as a result of increase in economics of scale initiating a positive response on productivity, sales and income. The implication of tax can be neutral, positive or negative depending on the objectives and implementation to the tax system.

Equation 2 is estimated using Engel-Granger approach to cointegration. This approach is chosen based on its strength and suitability. Firstly, the stochastic properties of the time series are tested using the Augmented Dickey-Fuller (ADF) approach. Estimate non-stationary series with ordinary least square may result in spurious regression. The ADF, on the other hand, has been popular in the literature to investigate stationarity in time series. After the ADF test and if the outcome shows that all series are integrated of the same order, that is order 1. Engel and Granger give a suitable one equation, which can be used to investigate the long-run behavior and short-run dynamics. The cointegration among the

non-stationary data involves matching the degree of the series and ensure that the error term and the residual of the estimated equation became stationary; this helps to overcome the spurious regression. Assuming the series  $M_t$  and  $N_t$  are both non-stationary, that is  $I(d)$ , then the linear combination  $J_t \equiv M_t - aN_t$ , will also be  $I(d)$ . Hence, if  $M_t$  and  $N_t$  are  $I(1)$  with dominant long-run components. Therefore,  $J_t$  is  $I(0)$ . The long-run equation and short-run dynamics can be estimated.

Output (*AGDP*) in equation 2 is proxy by agriculture contribution to GDP, Capital (*CAGR*) is proxy by loan credit given to agriculture sector, Agriculture employment (*EAGR*) is proxy by employment in agricultural sector, Revenue from agriculture (*TAGR*) is proxy by total income in agricultural sector and Amount of Tax (*TAX*) is proxy by total tax generated. *AGDP* and *CAGR* are sourced from Nigerian Central Bank Statistical Bulletin (Various issues), *EAGR* is obtained from Nigerian National Bureau of Statistics, *TAX* and *TAGR* are obtained from Federal Inland Services, Nigerian Budgetary of Federation and Nigerian Institute of Social and Economic Research. Finally, the study carried out diagnostics' checks to determine if the model is correctly specified. For a model to be correctly specified, the residual must be normally distributed, the variance of the residual must be equal over time, and the residuals must not be serially correlated (Asaley, Lawal, Popoola, Alege, & Oyetade, 2019; Fashina, Asaley, Ogunjobi, & Lawal, 2018).

## 2. PRESENTATION OF RESULT

In this section, we provided the unit root test (using Augmented Dickey-Fuller test) to know which variable is stationary at either first or second difference. Following the unit root test, we presented the least square results that show the relationship between the dependent and independent variables.

### 2.1. Result of stationary test (unit root test)

Table 1 presents the unit root result using Augmented Dickey-Fuller (ADF). The null hypothesis that the series are not stationary is tested at level and first differenced forms. All the series are not stationary at the level form. However, the series became stationary at the first-differenced forms at 5 per cent significance level since the probability values are less than 5 per cent. Also, using 5 per cent significance level, the ADF statistics in Table 1 in absolute terms is greater the critical values at 5 per cent for all the series, this indicates that null hypothesis is rejected and all series are integrated of order one. The ADF statistics for *AGDP*, *EAGR*, *CAGR*, *TAGR* and *TAX* are -4.164263, -5.885864, -5.073177, -4.318265 and -4.953909, respectively, in absolute term are greater than their corresponding critical values of -3.098896, -2.948404, 2.948404, -3.144920 and -3.098896.

**Table 1.** Unit root test

Source: Authors' compilation (2019).

Variables	ADF statistics	Prob.	Critical values		Order
<i>AGDP</i>	-4.164263	0.0075	1%	-4.004425	I(1)
			5%	-3.098896	
			10%	-2.690439	
<i>EAGR</i>	-5.885864	0.0001	1%	-3.632900	I(1)
			5%	-2.948404	
			10%	-2.612874	
<i>CAGR</i>	-5.073177	0.0002	1%	-3.632900	I(1)
			5%	-2.948404	
			10%	-2.612874	
<i>TAGR</i>	-4.318265	0.0073	1%	-4.121990	I(1)
			5%	-3.144920	
			10%	-2.713751	
<i>TAX</i>	-4.953909	0.0019	1%	-4.004425	I(1)
			5%	-3.098896	
			10%	-2.690439	

**Table 2.** Presentation of short-run dynamics

Source: Authors' compilation (2019).

Dependent variable: AGDP				
Variables	Coefficient	Standard error	T-statistics	Prob.
Constant	-9.584773	6.125410	-1.564756	0.1269
EAGR	0.000336	0.000181	1.856782	0.1441
CAGR	0.002111	0.000378	5.586672	0.0000
TAGR	0.001596	0.000731	2.183310	0.0440
TAX	0.007476	0.006164	0.824563	0.5453
ECM	-0.045013	0.002482	18.13844	0.0000

Table 2 presents the short-run dynamics result since the series is not stationary; hence, the Error Correction Model (ECM) or Engel and Granger approach is most suitable. The ECM shows the short-run behavior and the long-run behavior. The significance of the error correction term, indicated by ECM in Table 2 validates that there is long-run behavior among the series. The ECM must be negative, less than one and significant to capture the speed of adjustment and confirm the long-run implication. It is depicted from Table 2 that the system will adjust at the rate of 4 per cent yearly given the value of the ECM is  $-0.045013$ , which is statistically significant at the level of 5 per cent, since the probability value is 0.0000, which is less than 5 per cent. The independent variables are *EAGR*, *CAGR*, *TAGR* and *TAX*, while *AGDP* is used as the dependent variable. The constant term, *EAGR* and *TAX* are not statistically significant at the level of 5 per cent, since the corresponding probability values of 0.1269, 0.1441 and 0.5453 are greater than the value of 0.05. The variables *CAGR* and *TAGR* are statistically significant. Hence, the short effect is as follows: holding all the variables constant, one unit change in *CAGR* will cause approximately 0.2 per cent increment in agricultural output. Also, holding all the variables constant, one unit change in *TAGR* will cause approximately 0.7 per cent increment in the output.

Table 3 presents the long-run effects. The Durbin-Watson statistics value is 2.275916, which is close to two, within the region of no autocorrelation. The *R*-squared and the adjusted *R*-squared is the coefficient of determination, which measure the goodness of fit. A value of more than 50 per cent shows that more of the variation in the dependent variable is been explained by the independent variables. The *R*-squared and the adjusted *R*-squared values are 0.776763 and 0.748858, respectively; this shows that there is a good fit, since more than 70 per cent variations in the dependent variable has been explained by the independent variables. The *F*-statistics measure the joint significance of the variable. The value of the *F*-statistics is 27.83635, with the probability value of 0.0000, which is less than 5 per cent. Hence, the independent variables jointly explained the dependent variable at the level of 5 per cent. The variable *TAX* has probability value of 0.3524, which is not statistically significant at the level of five per cent. The variables *EAGR*, *CAGR* and *TAGR* have the probability values of 0.0000, 0.0417 and 0.0412, respectively, which are statistically significant at the level of five per cent. *EAGR* and *TAGR* have positive relationship with *AGDP*, while *CAGR* has a negative relationship with *AGDP*. Holding all other variables constant, one unit change in *EAGR* will increase *AGDP* by about 0.2 per cent, while, holding all oth-

**Table 3.** Presentation of long-run relationship

Source: Authors' compilation (2019).

Dependent variable: AGDP				
Variables	Coefficient	Standard error	T-statistics	Prob.
Constant	-0.991340	0.008962	-11.06102	0.0000
EAGR	0.002111	0.000378	5.586672	0.0000
CAGR	-0.000586	0.001223	-2.10856	0.0417
TAGR	0.000079	0.000037	2.135135	0.0412
TAX	-0.0131918	0.155839	-0.08465	0.3524
R-squared: 0.776763		F-statistics: 27.83635 Prob. (F-statistics): 0.0000		
Durbin-Watson statistics: 2.275916		Adjusted R-squared: 0.748858		

**Table 4.** ECM unit root test and diagnostic checks

Source: Authors' compilation (2019).

Residual unit root test					
	ADF statistics	Prob.	Critical values	Order	
ECM	-11.06102	0.0000	1% -3.626784 5% -2.945842 10% -2.611531	I(0)	
Diagnostic checks					
			Chi-square value	Jarque-bera stat	Prob.
Serial correlation			3.671540	-	0.1595
Heteroskedasticity test			1.594381	-	0.2067
Normality test			-	0.847748	0.6545

er variables constant, one unit change in *TAGR* will increase *AGDP* with about 0.0079 per cent. For *CAGR*, one unit change in the variable will cause about 0.0586 per cent reduction in *AGDP*.

Table 4 presents the ECM unit root result and the diagnostic checks. The ADF statistics of the ECM is -11.06102 with a probability value of 0.0000. Also, the absolute term of the ECM (11.06102) is greater than absolute value of the critical value at 5 per cent (2.945842). Hence, the ECM is stationary at the level. Based on the outcome of the unit root test of the residual (ECM), the study proceeds with Engel-Granger approach to cointegration to establish the long-run and short-run behavior explained in Tables 2 and 3. The diagnostic checks using the LM serial correlation, ARCH and Histogram normality test was used to determine if the model is correctly specified. Since all the probability is greater than 0.05, it means that the null hypotheses of model without serial correlation, ARCH effect and errors not normally distributed cannot be accepted. Therefore, in the model, the errors are not serially correlated, the variance of the errors is constant over time and there is normal distribution of the errors.

## 2.2. Implications of result

This study investigates the relationship between agricultural output and taxation in Nigeria. The agricultural sector in recent times have been identified by Nigerian government has one on the sector under-utilized to generate employment and potential increase in income. In order to promote sustainable growth through this sector by enhancing employment generation, increase income per capita and reduce poverty rate, this study follows Enger-Granger approach to cointegration to estab-

lish the short- and long-run behavior. Agricultural output is used as dependent variable and the independent variables considered are employment in agricultural sector, capital in agricultural sector proxy by loan to the sector, total revenue of agricultural sector and amount of tax generated. After considered the stochastic properties of the time series used in this study, it was observed that all the series and not stationary at the level form. However, there were integrated of order one. Based on this outcome, the study proceeds to estimate the Error Correction Model (ECM) also known as Engel and Granger approach to cointegration. The model showed the short- and long-run behavior. Evidence from the short-run relationship showed that employment and amount of tax generated is not statistically significant with agricultural output. This outcome contradicts the study by Guerra and Harrington (2018) that stressed that tax has positive influence on the economy. The implication of this findings displayed that despite all the efforts geared by Nigerian government towards promoting immediate employment, to increase income per capita, lower the poverty rate, improve overall welfare, among others, have not achieved desirable result. Many reasons might be responsible for this, among others, include mismanagement of resource, inconsistent in the policies or resource targeting long-run goals in agricultural sector. More so, it was evident that revenue obtained from tax have not been utilized to develop the agricultural sector. However, capital in agricultural sector proxy by loan to the sector and total revenue generated are statistically significant in the short run.

In the long run, evidence from the result showed that employment, capital and revenue from agricultural sector are statistically significant

with agricultural output. However, amount of tax generated is not significant. The finding refutes the findings of Worlu and Emeka (2012), Afuberoh and Okoye (2014) in Nigeria. The disparity in the findings is based on the scope and objectives of the studies. For example, Worlu and Emeka (2012) focused on aggregate growth, while the study by Afuberoh and Okoye (2014) limited the scope to the Nigerian federal capital city and some selected states. The general conclusion from this study is that the amount ob-

tained from tax or tax revenue have not promoted growth in the agricultural sector. Despite the importance of the agricultural sector to promote long-run employment. Financing agriculture sector for long-run benefit may not be suitable to promote sustainable growth and development. Such outcome could be achieved through promoting the sector with less liability. Hence, it is important to ensure that there is the linkage between tax generated and agricultural performance in Nigeria.

## CONCLUSION AND RECOMMENDATIONS

The conclusion drawn from this study is that Nigeria still faces administrative challenges as regards taxation and societal challenges as regards agriculture. Before the fall of the Nigerian naira, the Nigerian economy was heavily dependent on crude oil export receipts. Therefore, the potentials of taxes and agriculture as a major source of revenue for the economy has not been exploited. The need to expand the tax revenue by improving tax system and administration has become a major economic issue. Furthermore, the various bottlenecks of tax and agricultural development in Nigeria such as lack of personnel, lack of facilities, multiple taxes, cumbersome process of payment and lack of government participation, mismanagement of resources, high transportation cost, lack of technical knowledge, respectively. The study recommends the following: systemic approach of given significant percentage of the total tax generated to boost the development of the agricultural sector. There should be proper staff training annually, this is to ensure they are up to date with the latest technology and issues in taxation. This will help to reduce the level of mismanagement of resources. The government should provide special grants and soft loans with little or no interest to farmers in order to encourage the agricultural activities. Likewise, in order to enhance the agricultural knowledge of the farmers, agricultural programs can be held in order. This would enable the farmers to adopt new methods of agriculture and improve their outputs. More so, in order to improve youth interest and participation, agriculture can be included into the course outlines and taught in Nigerian institutions.

A research of this nature cannot effectively cover every area or issue of concern considering the scope and goal of the study. The following are the researchers suggested area for further studies: to examine the effect of rural and urban migration on agricultural sector. Also, investigate the implications of tax on agricultural employment and output in general equilibrium framework.

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