Research Article

Abiola John Asaleye*, Henry Inegbedion, Adedoyin Isola Lawal, Oluwayemisi Kadijat Adeleke, Uche Abamba Osakede*, Elizabeth Bolatito Ogunwole

Revamping agricultural sector and its implications on output and employment generation: Evidence from Nigeria

https://doi.org/10.1515/opag-2022-0140
received January 31, 2021; accepted September 10, 2022

Abstract: The Nigerian government has implemented a comprehensive spectrum of policies and programmes to diversify the economy and encourage broad-based growth through investment in the agricultural sector. However, the steady increase in the poverty and unemployment rate has raised controversial issues among scholars. In light of this, the study investigates the impact of selected macroeconomic variables on Nigeria's agricultural performance using two models for output and employment. The Error Correction Model (ECM) approach was used to establish the short and long-run behaviours. In the first model, output in the agricultural sector was used as the independent variable, while in the second model, employment in the agricultural sector was used as the independent variable. The study's findings showed that output positively relates to credit to the agricultural sector and exchange rate. However, it was depicted that output and employment in the agricultural sector in both the short-run and the long-run are not statistically significant. The implication drawn from the study is that credit granted to the agricultural sector can foster aggregate output in the sector, which will promote long-term employment. The study suggests considerable investment in the agricultural sector and the need to strengthen institutions for proper management of resources to ensure effective evaluation of funds disbursed for improving the agricultural sector, among others.

Keywords: agricultural sector, financing, employment, production

JEL classifications: Q10, G20, E24, E20

1 Introduction

The agricultural sector has been recognised worldwide to improve aggregate employment and welfare [1]. Likewise, the United Nations Sustainable Development Goals (SDG) emphasise the importance of the agricultural sector in improving social well-being. SDG No. 1, No Poverty stressed the need to reduce poverty by improvement in agricultural production and SDG Goal No. 2, pointed out that investment in agriculture is crucial to increasing productivity and supporting the sustainable food systems necessary to alleviate hunger worldwide. Likewise, the agricultural sector has been envisaged as a means of living, especially for developing economies to achieve SDG No. 4 and finally SDG Goal No. 12, which can be achieved by enhancing sustainable production in the agricultural sector.

Over time, the Nigerian government has introduced a wide spectrum of policies and programmes to diversify the economy and promote inclusive growth through investment in the agricultural sector. However, a steady increase in the poverty rate and employment has raised questions about the efforts [2]. A few of the programmes include the National poverty eradication programme, Operation Feed the Nation, and green revolution. Before the oil boom era in the 1970s, the agricultural sector served as the major revenue source in Nigeria. The low contribution of agricultural productivity to GDP has led to a decline in the welfare of low-income earners in Nigeria. Likewise, the recent

* **Corresponding author: Abiola John Asaleye,** Economics Department, Bowen University, Iwo, Nigeria, e-mail: abiola.asaleye@bowen.edu.ng
* **Corresponding author: Uche Abamba Osakede,** Economics Department, Bowen University, Iwo, Nigeria, e-mail: uche.osakede@bowen.edu.ng
Henry Inegbedion: Business Administration Department, Bowen University, Iwo, Nigeria, e-mail: henry.inegbedion@bowen.edu.ng
Adedoyin Isola Lawal: Economics Department, Bowen University, Iwo, Nigeria, e-mail: adedoyin.lawal@bowen.edu.ng
Oluwayemisi Kadijat Adeleke: Economics Department, Redeemers University, Ede, Nigeria, e-mail: adelekeolu@run.edu.ng
Elizabeth Bolatito Ogunwole: Economics Department, Bowen University, Iwo, Nigeria, e-mail: ogunwoleelizabeth5@gmail.com

reduction in the international market's oil price has raised a question about economic sustainability. The agriculture sector in Nigeria in the 1960s contributed about 80% of receipts on exports, 65% of GDP and about 50% of the government revenue. This contribution to Nigerian economic growth has taken a downward turn over the years. The contribution of agriculture to GDP was about 26.84% in 2021 [3]. Although in recent times, agriculture's contribution to the output and employment has declined [4].

The level of unemployment rate in Africa compared to other European countries, North and South America showed a higher rate in Africa [5]. According to the official statistics as of 2020, the unemployment rate is 6.01, 5.66, 9.3, and 8.40% in Belgium, Denmark, Honduras and Jamaica respectively; whilst in Nigeria and Rwanda is 33 and 16.5%, respectively [4]. The manufacturing sector contributed significantly to employment generation in most developed countries; this is due to the abundance of capital relative to labour. The manufacturing sector for employment creation may not solve the unemployment problems in developing economies, especially Nigeria, with the rapid population increase. In this regard, agriculture has been presumed as one of the sectors to promote employment generation and income. Despite all the attempts made by the Nigerian government to revamp the sector, the country has not been able to meet the internal demand and has to import a considerable amount of food products. Growth in the activities and exploration of wider markets in the agricultural sector is required to promote productivity, which will increase the value-adding capacity of agriculture for economic production [6].

Consequently, in most developing countries like Nigeria, a large percentage of the population reside in rural areas and is mainly poor with more than 40% overall classified as poor despite the annual average economic growth of about 3% [7,8]. Nigeria depends on the oil sector as the major revenue source. The Nigerian government has emphasised the diversification of the economy and promoted employment through the agricultural and manufacturing sectors. Nigeria has 90.4 million hectares of land, and more than the average of the population lives in a rural environment where agriculture serves as a means to meet their needs. The agriculture sector's importance to promote employment and income generation in rural areas cannot be undervalued.

There are various debates among scholars on the inability of the agricultural sector to generate income, promote employment and reduce poverty. Likewise, growth-output literature has received more attention with divergent views, especially for developing economies [9]. The divergent views among scholars may be attributed to a result of the relationship between output and employment has not been examined in time frame perspectives, examining the long and short-run and long-run effects. Also, most of the previous studies have focused on the impact of agricultural subsidies, emissions, poverty, and rainfall, among others [10–12]. Examining the impact of the agricultural sector to promote employment has not been fully ascertained in the literature [13,14].

Theoretically, the classical theory of unemployment stressed that employment and output are influenced by the demand for labour and the production function's labour supply. There is a direct relationship between the total number of labour available and other input factors, such as technology and capital stock; this implies that production's total output is a function of capital, technology, and labour. Labour demand is also dependent on the marginal productivity of labour. In addition, the success of the agriculture sector depends on factors that affect the inputs and environment [15]. Similarly, the Keynesian theory emphasised that aggregate demand changes, whether anticipated or unanticipated, have their greatest short-run effect on real output and employment, not on prices; this implies that effects or impacts in the short-run differ from impacts in the long-run. From the theoretical perspective, it can be depicted that employment has a positive relationship with output, and these effects are subject to a period perspective.

Empirically, most of the studies focused on agricultural subsidies, emissions in the agricultural sector, poverty, and population growth with studies relating to agricultural employment and output in time frame perspectives are still growing [10–12,16–21]. Using a dynamic computable general equilibrium model [11] documented that agricultural policies on investment and subsidies positively influence economic development, women's employment, poverty, and inequality. However, it was stressed by ref. [11] that investment subsidies in agricultural industries have a greater long-term impact on eliminating gender disparity and poverty. In a similar study by ref. [10], it was reported that total subsidies have a positive effect on agricultural wages and employment in Hungary and family labour in Slovenia. More so, ref. [22] revealed that policies implemented to promote the non-farm sector resulted in a positive effect on the rural area's agricultural sector. Ref. [13] reported that a negative rainfall shock has an adverse effect on agricultural productivity and household consumption. Other studies in Nigeria focused on non-economic factors, and crop production with scanty studies on the effect of agricultural performance [6,9].

The theoretical outlooks have shown that the impact of output on employment is due to the time frame. This study contributes to the existing literature by investigating the

effect of selected macroeconomic variables on agricultural employment and output in Nigeria; this is necessary given the diverse efforts by the Nigerian government to revamp the agricultural sector. The study uses the Engle-granger model to examine the long-run and short-run effects.

The rest of the study is structured as; Section 2 discusses the method that explains the theoretical framework and empirical model specification. Section 3 presents the result, while Section 4 discusses the result. Section 5 is the conclusion.

2 Material and method

2.1 Framework of the study

This study uses the growth model, given as

$$Q = f(K, L). \tag{1}$$

In equation (1), Q is the output, where the factor inputs are labour (L), and capital (K). This model is based on the assumption: that the production function shows constant returns to scale such that it differs from the original classical thought of scarce land or any resources. Also, there is the flexibility to substitute labour for capital and vice, which implies that any amount of capital can be efficiently used with the right amount of labour. Therefore, this assumption explains that capital–output ratio can take a non-negative value and the function exhibits a quasi-concave relationship. The factors of production grow at constant rates; marginal labour and capital are given as follows:

$$L^1t = nLt, \tag{2}$$

$$K^1t = sKf(K, L). \tag{3}$$

In equation (3), sK is the saving rate, which is exogenous parameter. The marginal productivity of the inputs is given as:

$$Vt = \mathrm{d}Qt/\mathrm{d}Lt, \tag{4}$$

$$Rt = \mathrm{d}Qt/\mathrm{d}KAt. \tag{5}$$

In equations (4) and (5), "V" and "R" are the marginal productivity of the input's labour and capital. Equation (1) describes an output function using two inputs, and the condition of production fulfils the Inada assumption. That is, the elasticity of substitution must have asymptotically resulted in unity.

$$Y(t) = K(t)^{\alpha}A(t)L(t)^{1-\alpha}, \tag{6}$$

where t denotes time, $Y(t)$ represents total production, $0 < \alpha < 1$ is the elasticity of output with respect to capital, and A is labour-supplementing technology in order words AL is effective labour.

2.2 Model specification and techniques of estimation

We used two alternative variables to proxy agricultural performance measures as the dependent variable, that is, agricultural output and employment. These metrics for agricultural performance are usually used in the existing literature [8,23]. Furthermore, ref. [24] states that under specific conditions, flexible exchange rates initially improve output and employment while decreasing them afterwards. Also, ref. [25] report agricultural credit enhances production in West African countries. Other macroeconomic variables selected in this study include interest rate and consumer price index. Reference [26] pointed out interest rate is important in structural models when examining productivity growth. Likewise, ref. [27] report that global demand shocks induce a positive co-movement between foreign production and inflation, which are the principal drivers of consumer price inflation. As a result, the observed exchange rate pass-through after these shocks is the opposite sign of what is often predicted. Finally, in many other structural macroeconomic models, external shocks to the exchange rate are found to be less relevant for exchange rate volatility. In the context of Nigeria, with high demand for foreign goods, the consumer price index is introduced into the model. Therefore equation (6) is modified and adjusted slightly to achieve the objective of this study, specified as follows:

$$\mathrm{AGDP} = f(\mathrm{AEMP}, \mathrm{ACAP}, \mathrm{INT}, \mathrm{EXC}, \mathrm{CPI}). \tag{7}$$

In equation (7), AGDP represents output in the agricultural sector, AEMP is the employment in the agricultural sector, INT is the interest rate, ACAP is a credit to the agricultural sector, and EXCR is the exchange rate, and CPI is Consumer Price Index. The preliminary test was carried out to check for stationarity properties of the data using the Augmented Dickey–Fuller and Philips Peron tests. Afterwards, the Engle–Granger approach was used to determine the short-run dynamics and the long-run relationship using agricultural output and employment in the agricultural sector as the dependent variables to establish output and employment equations. The approach to cointegration by ref. [28] involves a two-step procedure. Given the long-run equation as:

$$y_t = \delta_0 + \delta_1 x_1 + \mu_t. \tag{8}$$

In equation (8), y_t is the dependent variable while x_1 is the independent variable(s). The symbols δ_0 and δ_1 are the intercept and the slope, respectively. The residual in equation (8) is obtained through the least square estimator, this measures the disequilibrium in the model, and it is given as:

$$\hat{\mu}_t = y_t - \hat{\delta}_0 - \hat{\delta}_1 x_t. \quad (9)$$

The next stage is to ascertain if the residual obtained is stationary. This study employed the Augmented Dickey–Fuller and used ref. [29] critical value to determine the residual stationarity. In the presence of residual stationarity in the model, the least square estimator can be used to explain the long-run behaviour between agricultural output and agricultural employment in Nigeria. The short-run dynamics with the error correction term (ECM) can be tested given the equation as follows:

$$\Delta y_t = \theta_0 + \sum_{j=1} \theta_i \Delta_{t-j} + \sum_{h=0} \theta_h \Delta X_{t-h} + \alpha \hat{\mu}_{t-1} + \varepsilon_t \quad (10)$$

Equation (10) is estimated using the least square method. The error correction term is the equation given by α, which must be negative, less than one and statistically significant to validate cointegration in the models. Equation (10) is used to examine the short-run dynamics. This study uses both agricultural employment and output as dependent variables to achieve the objective of the study. The models are further tested to ensure it is correctly specified. For a model to be specified correctly, the residual must not be serially correlated; the variance must be constant over time. The residuals must be normally distributed. Finally, it must be stable [7].

2.3 Information about the data and source

This study uses annual data set from the period 1981–2018. The series is acquired from the Central Bank of Nigeria (CBN), National Rolling Plan and the Nigerian National Bureau of Statistics (NBS). Credit given to the agricultural sector (ACAP), (EXC), Consumer price index (CPI), Interest rate (INT) and Agricultural contribution to GDP (AGDP) is obtained from CBN statistical bulletin various years while Agricultural employment was compiled from National Rolling Plan, NBS and NMB.

3 Result

3.1 Presentation of the unit root test

This section shows the various results of the tests carried out. Foremost, the Augmented Dickey–fuller and Phillip Peron are presented.

Table 1 presents a summary of the stationarity result. All series have stochastic behaviour in the ordinary form. However, series at their first difference form is stationary. The outcome of the ADF is similar to the PP. Based on the conclusion of the stationarity result, the article proceeds to estimate the long-run relationship. Two models are estimated for the long-run and short-run behaviours referred to as model 1 and model 2 for using output and employment as dependent variables.

3.2 Presentation of the long-run and short-run behaviours

3.2.1 Presentation of model 1 (using output as the dependent variable)

Table 2 shows the short-run dynamics and long-run relationship using output in the agricultural sector as the

Table 1: Summary of the unit test

Series	Augmented Dickey–Fuller		Order of integration	Phillips Peron		Order of integration
	Level	First Diff.				
AGDP	−2.205918	−6.324824**	I(1)	2.805787	−6.813738**	I(I)
ACAP	−2.379439	−10.62356*	I(1)	−1.926354	−7.111038*	I(I)
EXC	1.320067	−3.644593**	I(1)	1.501720	−3.925510**	I(I)
CPI	−2.402132	−6.032624**	I(1)	−2.168542	−6.057202**	I(I)
INT	−2.915904	−6.708129**	I(1)	−2.826061	−6.350561**	I(I)
AEMP	−1.138906	−4.336505**	I(1)	−1.202051	−4.377034**	I(I)

Source: Authors' computation using Eviews 10.
* and ** show significance at levels of 1 and 5%, respectively.

Table 2: Long-run and short-run dynamics for model 1

Variable	Coefficient	Standard error	*t*-Statistics	Probability
Long-run behaviour				
Dependent variable: AGDP				
C	0.196261	0.052665	−3.726603	0.0009
ACAP	0.085620	0.026717	3.204689	0.0039
EXC	0.022409	0.004566	4.907784	0.0000
CPI	−0.072881	0.033165	−2.197536	0.0367
INT	−0.005183	0.060727	−0.085357	0.9326
AEMP	0.028623	0.046063	0.621381	0.5390
Short-run Dynamics				
C	−0.187435	1.183623	−0.158357	0.8753
D(ACAP)	0.034459	0.029645	1.162401	0.2549
D(EXC)	0.014895	0.001826	8.157119	0.0000
D(CPI)	−0.068051	0.026834	−2.535973	0.0173
D(INT)	0.006508	0.002906	2.239310	0.0351
D(AEMP)	8.338201	37.31686	0.223443	0.8248
U(−1)	−0.497305	0.165191	−3.010483	0.0055
Durbin Watson: 1.796245		*F*-Stat: 2.469277 Prob. 0.054789		
R-Squared: 8.363215		Adjusted *R*-squared: 7.173483		

Source: Authors' Computation using Eviews 10.

dependent variable. In the long-run, credit to the agricultural sector (ACAP), exchange rate (EXC) and consumer price index (CPI) are statistically significant at the level of 1%. However, interest rate (INT) and employment in the agricultural sector (AEMP) are not statistically significant. There is a positive relationship between the dependent variable (AGDP) and the independent variables ACAP and EXC, likewise, a negative relationship with CPI.

In the short, run, EXC is statistically significant at the 1% level while CPI and INT are statistically significant at 5%. ACAP and AEMP are not statistically significant. INT and EXC have a positive relationship with the independent variable (AGDP) while CPI has a negative relationship. The positive relationship between output in the agricultural sector and interest rate contradicts the "a prior" expectation. Theoretically, an increase in the interest rate will lower investment spending, which, on the other hand, will cause a fall in aggregate output. The error correction term (ECM) measures the speed of adjustment to equilibrium. The ECM value is −0.497305 with a probability value of 0.0055, indicating about 50% adjustment annually to the initial equilibrium.

Table 3 presents the diagnostic check and the residual unit root results for model 1. The results indicate that the residual of the model is stationary at the level of 5%, which validates the presence of long-run behaviour. The Diagnostic check shows no serial correlation among the residuals, the residual has constant variance over time, and the residuals are normally distributed.

3.2.2 Presentation of model 2 (using employment as the dependent variable)

Table 4 presents the long-run and short-run dynamics using employment in the agricultural sector as the dependent variable. In the long-run, ACAP and CPI are statistically significant at 1% while EXC is significant at 10%. Both INT and AGDP are not statistically significant. In the short run, EXC and AGDP are statistically significant at the level of 1%. INT is significant at the level of 5%. Both ACAP and CPI are not statistically significant. The error correction term (ECM) has a value of −0.602171 and a probability value of 0.0017; this shows that the model will adjust at

Table 3: Residual unit root result and diagnostic check

Variables	*t*-Statistics	Probability	Order of integration
Residual unit root result			
Residual (U)	−3.277366	0.0238	I(0)
Diagnostic check			
Breusch–Godfrey serial correlation LM test			
Obs. × *R*-Squared	2.055169	Prob. Chi-square	0.3579
Heteroskedasticity test: ARCH			
Obs. × *R*-Squared	0.201223	Prob. Chi-Square	0.9043
Histogram normality test			
Jargue–Bera	7.741965	Prob.	0.070838

Source: Authors' computation.

an average of 60% annually to the initial equilibrium. In the long run, the independent variable (AEMP) has a positive relationship with credit to the agricultural sector (ACAP) and a negative relationship with exchange rate (EXC) and consumer price index (CPI).

Table 5 indicates the diagnostic check and the residual unit root results for model 2. The results indicate that the residual of the model is stationary at the level of 5% given the value of *t*-statistics as −4.425331 and a probability value of less than 5%, which validates the presence of long-run behaviour. The Diagnostic check shows no serial correlation among the residual; the residual has constant variance over time and is normally distributed. Figures A1 and A2 in the appendix section present the stability graph of the two models. It can be deduced from the figures that the two models are stable for forecast; the CUSUM line falls in between the lower boundary and the upper boundary.

Table 5: Residual unit root result and diagnostic check

Variables	*t*-Statistics	Probability	Order of integration
Residual unit root result			
Residual (U)	−4.425331	0.0014	I(0)
Diagnostic check			
Breusch–Godfrey serial correlation LM test			
Obs. × *R*-Squared	3.217415	Prob. Chi-Square	0.2001
Heteroskedasticity test: ARCH			
Obs. × *R*-Squared	6.649455	Prob. Chi-Square	0.4663
Histogram normality test			
Jargue–Bera	0.312461	Prob.	0.855362

Source: Authors' computation.

4 Discussion

This study examines the relationship between agricultural performance and selected macroeconomic variables. Two models were estimated using the Engel and Granger approach to cointegration. The agricultural performance was proxy by output in the agricultural sector and employment in the agricultural sector. In the first model referred to as Model 1, output in the agricultural sector was used as the dependent variable. The result indicates that credit to the agricultural sector, exchange rate, and consumer price index is statistically significant in the long run, while interest rate and employment in the agricultural sector are not statistically significant. The relationship between output in the agricultural sector and credit to the agricultural sector is in line with the theory proposition; this finding is in line with the studies of refs [8,23]. The relationship between output in the agricultural sector and the exchange rate can be either negative or positive. According to the Marshall–Lerner Condition, the exchange

Table 4: Long-run and short-run dynamics for model 2

Variable	Coefficient	Standard Error	*t*-Statistics	Probability
Long-run behaviour				
Dependent variable: AEMP				
C	1.529830	0.662779	2.308208	0.0226
ACAP	0.080741	0.028427	2.840252	0.0052
EXC	−0.000375	0.000194	−1.929197	0.0651
CPI	−0.077940	0.027389	−2.845671	0.0087
INT	0.013401	0.058801	0.227911	0.8214
AGDP	0.008210	0.028749	0.285582	0.7778
Short-run dynamics				
C	0.009955	0.022467	0.443101	0.6618
D(ACAP)	−0.000130	0.000146	−0.891535	0.3811
D(EXC)	−0.056978	0.020263	−2.811964	0.0057
D(CPI)	−0.000190	0.000296	−0.641270	0.5277
D(INT)	−0.047014	0.023176	−2.028569	0.0533
D(AGDP)	0.082433	0.027948	2.949572	0.0038
U(−1)	−0.602171	0.169188	−3.559178	0.0017
Durbin Watson: 1.947436		*F*-Stat: 7.503101 Prob. 0.009251		
R-Squared: 0.891215		Adjusted *R*-squared: 0.783462		

Source: Authors' computation using Eviews 10.

rate's implication on the economy can be either positive or negative. However, trade improvement can only guarantee when the absolute sum of the long-term export and import demand elasticities is greater than one [30].

In addition, the findings from this study show agricultural output and employment are not significant both in the short and in long run. These findings contradict previous studies [11,10,15,6]. The insignificant relationship between output and employment both in the short-run and in long-run despite Nigerian government's attempts through different policies and programmes to revamp the agricultural sector confirmed the decline in the employment rate in the agricultural sector. The result's outcome is in line with ref. [31]. Many factors may be attributed to this, including mismanagement of resources, low-capacity utilisation in the agricultural sector and wrong perspective about the nature of the agricultural sector's job compared to other sectors.

Evidence from these findings shows that credit granted to the agricultural sector can foster aggregate output in the sector. So, the study encourages the need for proper management of funds given to the agricultural sector. In the long-term, this may help to shift dependence on the oil sector as the main revenue source. The result also confirms that the exchange rate policy favours production in the agricultural sector in the long run. However, the exchange rate may not be considered a policy instrument because it is determined in the foreign exchange market. The real exchange rate tends to determine the shift in demand either for foreign or local goods. Nevertheless, to maximise the agricultural sector's benefit due to its comparative advantage, more priority needs to be given to the agricultural sector. The study shows a negative relationship between output and consumer price index. The consumer price index is restricted to the household's spending; the negative relationship indicates that tightening the monetary policy has adversely affected the agricultural sector's output. Besides, the exchange rate, consumer price index, and interest rate are statistically significant in the short run. In the second model, credit to the agricultural sector, exchange rate and Consumer price index are statistically significant.

5 Conclusion

The Nigerian government has undertaken a wide range of policies and programs to diversify the economy and stimulate broad-based growth through agricultural investment. However, the persistent rise in poverty and unemployment has led to debates among scholars and policy-makers. Empirical studies on the output-employment nexus have documented diverse results, most especially in developing economies. The divergent views among scholars may be attributed to the relationship between output and employment has not been explored in time frame perspectives, examining the long- and short-run effects. Furthermore, most recent research has concentrated on the effects of agricultural subsidies, pollution, poverty, rainfall, and inequality. In light of this, we use two models for output and employment equations to proxy agricultural performance. And investigate the effect of selected macroeconomic variables on Nigeria's agricultural performance. The Error Correction Model (ECM) technique was utilised to examine the short and long-run behaviours. Prior to the estimation, the stationarity analysis was carried out using Augmented Dickey Fuller (ADF) and Phillips Perron (PP). All series have stochastic behaviour in the ordinary form. However, series at their first difference form is stationary. The outcome of the ADF is similar to the PP. Based on the conclusion of the stationarity result, the article proceeds to estimate the long-run relationship.

With regard to cointegration results, based on the stationarity of the residual of the two models, this validates the presence of long-run behaviour. In other words, there is a long-run relationship between agricultural sector performance and the selected macroeconomic variables. In the output equation, credit to the agricultural sector, exchange rate, and consumer price are statistically significant in the long run, while interest rate and employment in the agricultural sector are not statistically significant. In the short run, exchange rate, consumer price index, and interest rate are statistically significant while employment is not significant. In the employment equation, exchange rate and consumer price index are statistically significant in the long run while the exchange rate, interest rate and output to the agricultural sector are statistically significant in the short run.

Evidence from these findings shows that credit granted to the agricultural sector can foster aggregate output in the sector. So, the study encourages the need for proper management of funds given to the agricultural sector. In the long-term, this may help to shift dependence on the oil sector as the main revenue source. The result also confirms that the exchange rate policy favours production in the agricultural sector in the long run. However, the exchange rate may not be considered a policy instrument because it is determined in the foreign exchange market. The real exchange rate tends to determine the shift in demand either for foreign or for local goods. Nevertheless, to maximise the agricultural sector's benefit due to its comparative

advantage, more priority needs to be given to the agricultural sector. In addition, the result indicates that tightening the monetary policy has adversely affected the agricultural sector's output. More attention needs to be given to the monetary measure to promote growth in the agricultural sector as one of the macroeconomic objectives. Along with this, the Nigerian government needs to properly manage resources and effective evaluation of funds disbursed to improve the agricultural sector. Finally, sector-specific incentives such as subsidies, credit facilities for innovation and proper risk management should be introduced to promote long-term growth and employment concerning the agricultural sector.

Funding information: The authors state no funding is involved.

Conflict of interest: The authors state no conflict of interest.

Data availability statement: All data generated or analysed during this study are included in this published article

References

[1] Bassett K, Newsome L, Sheridan A, Azeem MM. Characterizing the changing profile of employment in Australian agriculture. J Rural Stud. 2022 Jan 1;89:316–27.
[2] Popoola O, Alege PO, Gershon O, Asaleye JA. Human capital channels and productivity growth: Evidence from Nigeria. Econ Sociol. 2019 Dec;12(4):59–73.
[3] CBN. Central Bank of nigeria economic report, Abuja, Nigeria; 2022.
[4] ILO. World employment social outlook, trends 2021. Geneva: International Labour Office; 2021.
[5] Asaleye AJ, Maimako RF, Lawal AI, Inegbedion H, Popoola O. Monetary policy channels and agricultural performance: Evidence from Nigeria. Asian Econ Financ Rev. 2021 Mar 10;11(3):205–18.
[6] Adama IJ, Asaleye AJ, Oye AJ, Ogunjobi JO. Agricultural production in rural communities: Evidence from Nigeria. J Environ Manag Tour. 2018 Sep 9;9(3):428–38.
[7] Asaleye AJ, Olurinola I, Oloni EF, Ogunjobi JO. Productivity growth, wages and employment nexus: Evidence from Nigeria. J Appl Econ Sci. 2017;12(5):1362.
[8] Asaleye AJ, Alege PO, Lawal AI, Popoola O, Ogundipe AA. Cash crops financing, agricultural performance and sustainability: Evidence from Nigeria. Afr J Econ Manag Stud. 2020 May 13;11(3):481–503.
[9] Oloni E, Asaleye A, Abiodun F, Adeyemi O. Inclusive growth, agriculture and employment in Nigeria. J Environ Manag Tour. 2017 Apr 1;8(1(17)):183.
[10] Bojnec Š, Fertő I. Do different types of common agricultural policy subsidies promote farm employment? Land Use Policy. 2022 Jan 1;112:105823.
[11] Maisonnave H, Mamboundou PN. Agricultural economic reforms, gender inequality and poverty in Senegal. J Policy Model. 2022 Mar 29;44:361–74.
[12] Okorie DI, Lin B. Emissions in agricultural-based developing economies: A case of Nigeria. J Clean Prod. 2022 Feb 20;337:130570.
[13] Amare M, Jensen ND, Shiferaw B, Cissé JD. Rainfall shocks and agricultural productivity: Implication for rural household consumption. Agric Syst. 2018 Oct 1;166:79–89.
[14] Asaleye AJ, Babajide AA, Inegbedion H, Eluyela DF, Lawal AI, Maimako RF. Implications of accountability on employment and income: Evidence from Nigerian's deposit banks. J Account Emerg Econ. 2022 Jun 2. (ahead-of-print). https://doi.org/10.1108/JAEE-12-2020-0329.
[15] Liu S, Lei P, Li X, Li Y. A nonseparable undesirable output modified three-stage data envelopment analysis application for evaluation of agricultural green total factor productivity in China. Sci Total Environ. 2022 May 14;838:155947.
[16] Emerick K. Agricultural productivity and the sectoral reallocation of labor in rural India. J Dev Econ. 2018 Nov 1;135:488–503.
[17] Zhao J, Tang J. Understanding agricultural growth in China: An international perspective. Struct Change Econ Dyn. 2018 Sep 1;46:43–51.
[18] Emran MS, Shilpi F. Beyond dualism: Agricultural productivity, small towns, and structural change in Bangladesh. World Dev. 2018 Jul 1;107:264–76.
[19] Djanibekov U, Gaur V. Nexus of energy use, agricultural production, employment and incomes among rural households in Uttar Pradesh, India. Energy Policy. 2018 Feb 1;113:439–53.
[20] Wang X, Huang J, Rozelle S. Off-farm employment and agricultural specialization in China. China Economic Rev. 2017 Feb 1;42:155–65.
[21] Nolte K, Ostermeier M. Labour market effects of large-scale agricultural investment: Conceptual considerations and estimated employment effects. World Dev. 2017 Oct 1;98:430–6.
[22] Dedehouanou SF, Araar A, Ousseini A, Harouna AL, Jabir M. Spillovers from off-farm self-employment opportunities in rural Niger. World Dev. 2018 May 1;105:428.
[23] Raifu IA, Aminu A. Financial development and agricultural performance in Nigeria: What role do institutions play? Agric Financ Rev. 2019 Dec 10;80:231–54.
[24] Eichengreen BJ. A dynamic model of tariffs, output and employment under flexible exchange rates. J Int Econ. 1981 Aug 1;11(3):341–59.
[25] Kassouri Y, Kacou KY. Does the structure of credit markets affect agricultural development in West African countries? Econ Anal Policy. 2022 Mar 1;73:588–601.
[26] Cour-Thimann P, Pilegaard R, Stracca L. The output gap and the real interest rate gap in the euro area, 1960–2003. J Policy Model. 2006 Oct 1;28(7):775–90.
[27] Corbo V, Di Casola P. Drivers of consumer prices and exchange rates in small open economies. J Int Money Financ. 2022 Apr 1;122:102553.

[28] Engle RF, Granger GWJ. Co-Integration and Error Correction: Representation, Estimation, and Testing. Econometrica. 1987;55(2):251–76.
[29] MacKinnon JG. Critical values for cointegration tests, queen's economics Department Working Paper No. 1227; 1990.
[30] Caporale GM, Gil-Alana LA, Mudida R. Testing the Marshall-Lemer condition in kenya, economics and finance Working Paper Series. Brunel University London; 2012.
[31] Odozi JC, Patience IO, Awaebe J, Agbugui M. Employment in the Nigerian agricultural labour market: Barriers and forecast; 2018.

Appendix

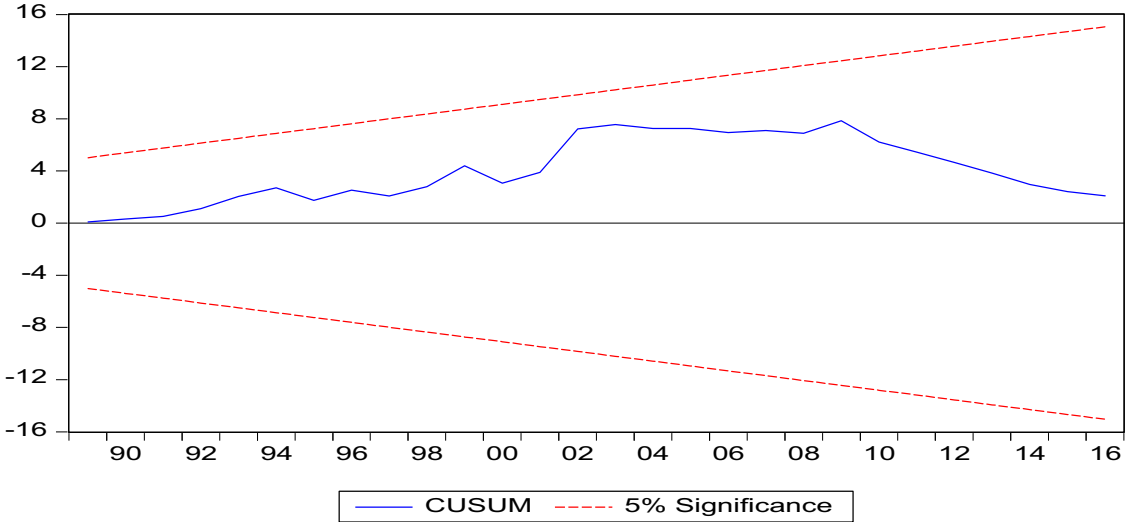

Figure A1: Stability test for model 1.

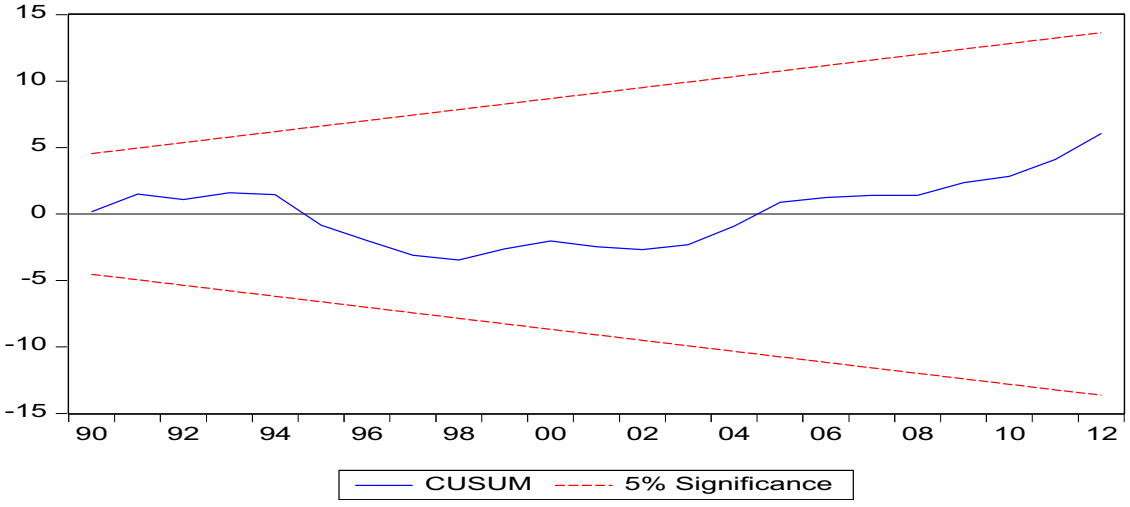

Figure A2: Stability test for model 2.