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ECONOMETRIC ANALYSIS OF FACTORS INFLUENCING EXPORT PERFORMANCE OF SOYBEAN (*GLYCINE MAX*) PRODUCTION IN NIGERIA: AN AUTO-REGRESSIVE DISTRIBUTIVE LAG (ARDL) APPROACH

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Abstract

This study presents an econometric analysis of factors influencing the export performance of soybean (*Glycine max*) production in Nigeria using an auto-regressive distributive lag (ARDL) approach. The study used a secondary data covering the period from 2011 to 2022. The used data were collected from CBN (Central Bank of Nigeria), NBS (National Bureau of Statistics), FAO (Food and Agriculture Organization), and the General Household Survey-Panel (GHS-P) in conjunction with the Federal Ministry of Agriculture and Rural Development, and the World Bank publication. The data analysis included descriptive statistics, Augmented Dickey-Fuller (ADF) unit root test, Bound test, ARDL, and principal component model. The result of the ADF unit root test showed that the trade openness, consumer price index, exchange rate, population growth, world trade in oil seeds, agricultural labor, and soybean production were stationary at first difference I (1), while agricultural machinery was stationary at level I (0). The results of ARDL method showed that the consumer price index, population growth rate, world trade in oil seeds, agricultural labor, and agricultural machinery were significant factors influencing export performance of soybean in Nigeria. The trade openness and exchange rate were not different significantly from zero. The trade openness could not expand market access due to non-competitiveness of the Nigerian's soybean. The exchange rate has lost its role with respect to soybean seed partners in international trade. The policies that would encourage exportation of this crop should be pursued by provision of storage facilities, granting of tax holidays, long term export credit at concessionary interest rate to exporters, and research activities towards improving the quality of produced agricultural products.

Keywords: Export Performance, Augmented Dickey-Fuller, Auto-Regressive Distributive Lag, Soybean Production, Nigeria

INTRODUCTION

Nigeria is the major producer of soybean in the West and Central Africa (Root et al., 2017). Nigeria produces 1 150 000 metric tons of soybean in 2023, the World soybean production rose from 159.8406 million metric tons in the year 2000 to 348.86 million metric tons in the year 2022 (USDA, 2023). Nigeria exported 9 279.22 metric tons of soybean with an export value of 6.84 billion Naira in 2022 (NBS, 2023). The quantity of oil seed exported by Nigeria in 2022 amounted to 308 159 metric tons. The total Nigeria agricultural export in 2022 reached 598.2 billion Naira (NBS, 2023). Soybeans are an important source of high quality and cheap protein and oil. Soybean has the highest protein content of all food crops and,

in terms of oil content, it is second amongst food legumes after groundnut. Soybeans are used in the production of milk, edible oil and animal feed. Nigeria offers growing market opportunities for exporter of oilseed and its products. Oilseeds and their products in Nigeria include: palm oil/palm kernel, soybean oil, peanut, cotton seed, coconut, sesame, mustard seeds, castor seed, sunflower seed, and linseed. Production of oilseeds and their products is trending upwards in Nigeria, but domestic supply still lags behind an increasingly growing demand. Local processors of edible vegetable oil also seek higher quality flavors, nutrients and processing agents for export purposes and to supply the domestic market.

Agriculture has been the most significant single activity in the economy of Nigeria, with about 70% of the total working population involved in it. It is the biggest single sector of the economy, giving employment for an important segment of the workforce and make up the mainstay of the Nigeria large rural community which records for nearly two-third of the population (Ijishar, 2015). The percentage of the Gross Domestic Product (GDP) credited to agriculture holds approximate 30 and 40% (CBN, 2017). The favorable vegetation and climatic condition makes Nigeria able to supply crops and livestock. Generally, the increase of agricultural export has been a major success and this has brought many benefits to Nigeria hence, the significant of export to the nation's economic development and growth cannot be exaggerated (Abou-Stait, 2005). Available statistics indicate that in 1960, agricultural export commodities provided well over 75% of total annual merchandise export in Nigeria and the country was the biggest exporter of palm oil and palm kernel, ranking second in cocoa, and occupied third in groundnut production. It has a prominent role in economic development by delivering the needed foreign exchange proceeds for other capital development project (Alabi et al., 2022).

African agricultural production is primarily subsistence in nature, with a high reliance on rain. Smallholder farmers face price competition with large-scale farmers from more advanced countries, who use advanced production methods and flood the African markets. Meanwhile, the export volume of locally produced agricultural goods from Africa remains minimal (Mkpado, 2013). Other disturbing agricultural features and trends shared by African countries include high degree of production fluctuations, relatively poor crop yields and reliance on primary export with small income elasticity and high price volatility. Relative to other emerging regions, African's agriculture is undercapitalized, uncompetitive, and underperforming, the sector is relatively weak as its production lags below that of other regions (Abiodun & Solomon, 2010). Smallholder farmers are caught in a vicious cycle of risks, limited use of inputs, low productivity, and low income. There are many obstructions restraining the potential that soybean represent for smallholder farmers in Nigeria as a producing country. These obstructions are associated with rainfall variability, inappropriate land tenure, harvest and post-harvest losses, poor quality of seeds, weak links in their value chains, ineffectiveness of agricultural extension, low or no use of improved technologies, frequent mono-cropping, and use of non-certified seed (Yousif, 2015).

The macroeconomic policies reported by the high inflation rate and distorted exchange rate market may also constraint soybean production and export. It has also been noted that the loss of market power, an unfavorable domestic terms of trade for agricultural exports, and declining output are the principal contributors to the poor performance of traditional export, and these factors reflect in the interaction on inappropriate pricing policies and external shocks (Abiodun & Solomon, 2010).

Abolagba et al. (2010) emphasized that Nigeria has lost its position as one of the world's best exporters of agricultural commodities. At present, Nigeria is experiencing both a reduction and a variation in the income due to its heavy reliance on oil exports. With the current situation in the oil market, it has become important for the country to rethink its agricultural commodity export position (Abolagba et al., 2010). The outcome of this study will form a formidable basis for formulating appropriate sub-sectoral policies and dependable platform for taking informed decisions

Objectives of the Study

The main aim is to perform an econometric analysis of factors influencing export performance of soybean (*Glycine max*) production in Nigeria: an auto-regressive distributive lag (ARDL) approach. The specific objectives are:

(i) to determine the trends in quantity (tons) of exported and produced soybean in Nigeria;

(ii) to estimate the percentages of quantity soybean export to soybean produced and oilseed export in Nigeria;

(iii) to evaluate the factors influencing export performance of soybean in Nigeria;

(iv) to evaluate the effects of exchange rate and trade openness on export potential of soybean production;

(v) to determine the presence of long-term relationships among the predictors influencing export potential of soybean production, and

(vi) to determine the constraints faced by the soybean farmers in Nigeria.

METHODOLOGY

This work was conducted in Nigeria. Nigeria is a West African Nation located between Longitude 3° and 14° East and Latitude 4° and 14° North (NBS, 2016). The country has a land mass of 923, 768,000 km^2 and is bordered by the Republics of Benin to the west, Niger to the north, Chad to the north-east, and Cameroon to the east, and the Atlantic Ocean to the South. Nigeria's population was calculated at 229, 152,217 persons growing at a rate of 2.39% per annum (NPC, 2024). Agriculture remains the base of the Nigerian economy, providing food for most Nigerians and seeds/crops and fruits are also exported to other countries. Agriculture provides an employment for a two-third of Nigeria's labor force, contributes over 40% to the Gross Domestic Product (GDP) and provides about 88% of non-oil earnings. This study utilized a secondary data covering the period from 2011 to 2022 (12 years). The data were obtained from statistical bulletins and annual reports of the Central Bank of Nigeria (CBN), NBS, FAO, the general household survey-panel (GHS-P) which sourced from national bureau of statistics in conjunction with the Federal Ministry of Agriculture and Rural Development, and the World Bank (WB) publications. Data were evaluated using descriptive and inferential statistics as follows:

Descriptive Statistics: This employed mean, frequency distributions, percentages, line graph, standard deviation, skewness, kurtosis.

Augmented Dickey-Fuller (ADF) Model: The unit root test was conducted to determine primarily the level of integration among variables under examination. The unit root test was evaluated through the application of ADF. Dickey and Fuller (1979, 1981) developed method for testing formally non-stationary. The ADF model is stated as follows:

$$\Delta Y_t = \pi Y_{t-1} + \sum_{j=1}^{P} \gamma_j \Delta Y_{t-1} + \varepsilon_t \dots\dots\dots\dots (1)$$

Where,

Δ = Symbol for the 1st Difference Operator,

π and γ_j =Estimated Parameters

ε_t = Disturbance Error Term

Y_t = Time Series to be Tested

P = Proxy for the Maximum Lag Length for the Variables.

The Auto-Regressive Distributed Lag (ARDL) Model: The ARDL model was based on its potentials to provide values for relatively small research period. Pesaran et al. (2001) explained the ARDL model as very flexible since it integrates the short and long results in a single equation. The implicit form of the model is given as:

SOP=*f*(TOP, EXR, CPI, POG, WOT, ALB, AGM) …… (2)

Where,

SOP = Soyabean Production (tons)
TOP = Trade Openness (Index)
EXR = Exchange Rate (The Rate of Exchange of Naira against US dollar) (%)
CPI = Consumer Price Index of Nigeria (Index Point)
POG = Nigeria Population Growth Rate (%)
WOT = World Trade on Oil Seed (Metric Tons)
ALB = Agriculture Labour (Number of Persons)
AGM = Agriculture Machinery (Naira Billion)

The ARDL model is presented as follows:

$$\Delta \mathrm{SOP}_t = \alpha_0 + \sum_{i=1}^{k} \alpha_{1i} \Delta SOP_{t-1} + \sum_{i=1}^{k} \alpha_{2i} \Delta TOP_{t-1} + \sum_{i=1}^{k} \alpha_{3i} \Delta EXR_{t-1} + \sum_{i=1}^{k} \alpha_{4i} \Delta CPI_{t-1} + \sum_{i=1}^{k} \alpha_{5i} \Delta POG_{t-1} + \sum_{i=1}^{k} \alpha_{6i} \Delta WOT_{t-1} + \sum_{i=1}^{k} \alpha_{7i} \Delta ALB_{t-1} + \sum_{i=1}^{k} \alpha_{8i} \Delta AGM_{t-1} + \gamma_1 SOP_{t-1} + \gamma_2 TOP_{t-1} + \gamma_3 EXR_{t-1} + \gamma_4 CPI_{t-1} + \gamma_5 POG_{t-1} + \gamma_6 WOT_{t-1} + \gamma_7 ALB_{t-1} + \gamma_8 AGM_{t-1} + \varepsilon_t \quad \ldots\ldots (3)$$

Where,

α_0 = Constant Parameter
α_{1i} -α_{8i} = Short Run Parameters
γ_1 - γ_8 = Long Run Multipliers
Δ = First Difference Operator
k = Maximum Lag Order
ε_t = Error Term

Principal Component Analysis

The constraints faced by the soybean exporters and farmers was subjected to principal component analysis or factor analysis. The principal component model is stated as follows:

$$\alpha_K = (\alpha_{1k}, \alpha_{2k}, \alpha_{3k}, \ldots \alpha_{pk}) \quad (4)$$

$$\alpha_k^T X = \sum_{j=1}^{p} \alpha_{kj} X_j \quad (5)$$

Where,

X_i= Vector of p Random Variables
α_k = Vector p Components
λ_K = Eigen Value
T = Transpose
S = Covariance Matrix

RESULTS AND DISCUSSION

The Soybean Production and Export in Nigeria

Table 1 presents the quantity of soybean, and oil seeds export in Nigeria and also the quantity of soybean production from 2011 to 2022. The percentage of soybean export to soybean production and the percentage of soybean export to oil seed export were also presented in Table 1. In 2011 and 2012, the soybean production was 492 852 and 650 000 metric tons, out of which 8 000 and 11 400 metric tons was exported representing 1.62% and 1.75% of production, respectively. There has been a consistent rise in soybean production in Nigeria from 2011 to 2022. In 2017, the soybean production reached 993 955 metric tons, the export market was boosted with 123 019.51 metric tons representing the highest value for that period with 12.38% of production. Interestingly, the soybean production continued growth in output, but since 2017, the percentage exported declined to 0.80% of production in 2022 (Figure 1).

In 2017, the quantity of oil seed export was 296 392 metric tons, out of which the soybean export represents 41.51% of the total oil seed export for that year. In 2018, the quantities of soybean export and oil seed export were 34 587.09 and 193 803 metric tons and which represent 17.84% of the oil seed export. Since 2018 the percentage of soybean export to oil seed export in Nigeria decline to 3.01% in 2022.

Table 1: The Percentages of Soybean Export to Soybean Production and Oilseed Export in Nigeria

Year	Soybean Production (tons)	Soybean Export (tons)	Oilseed Export (tons)	% Soybean Export to Soybean Production	% Soybean Export to Oilseed Export
2022	1 060 000	9 279	308 159	0.80	3.01
2021	1 166 050	6 184	162 922	0.50	3.79
2020	1 262 280	18 967	297 394	1.50	6.37
2019	800 000	115	262 172	0.01	0.04
2018	660 000	34 587.09	193 803	5.24	17.84
2017	993 955	123 019.51	296 392	12.38	41.51
2016	936 887	9 000	207 782	0.96	4.33
2015	588 523	9 000	198 906	1.52	4.52
2014	623 815	9 000	162 663	1.44	5.53
2013	517 960	8 800	170 836	1.69	5.15
2012	650 000	11 400	160 064	1.75	7.12
2011	492 852	8 000	141 496	1.62	5.65

Source: FAO Statistical Database (2024), and the author calculations (2024)

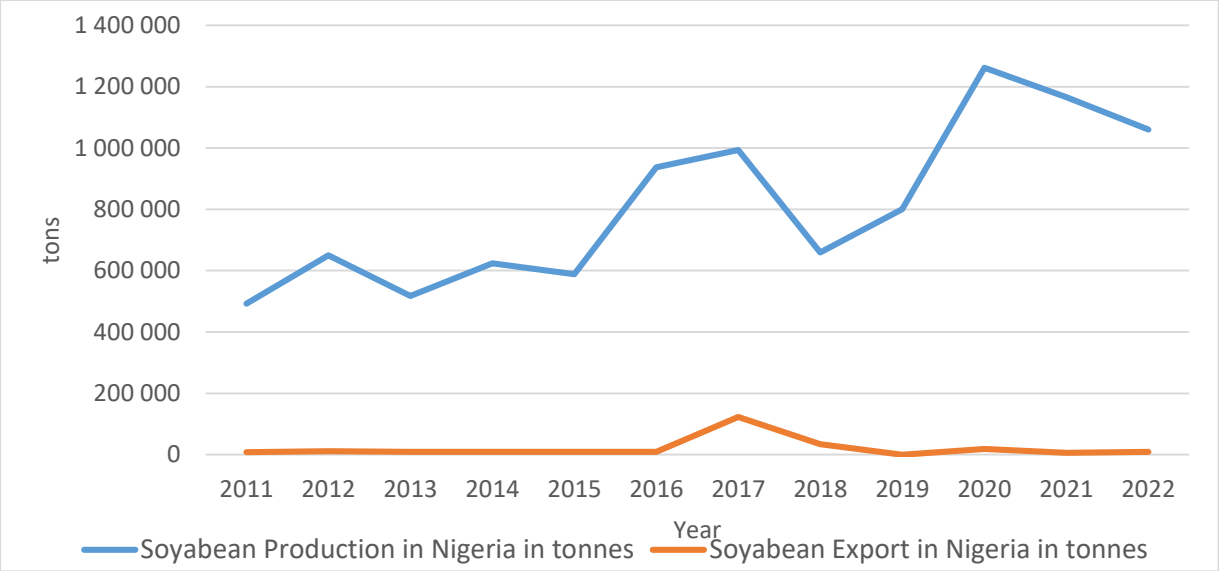

Figure 1: Trends of Soybean Production and Export of Soybean in Nigeria.

Descriptive Statistics of Variables in Export Performance of Soybean in Nigeria

The data were subjected to descriptive statistics to examine their mean, minimum, and maximum values over the period as well as to evaluate the spread (Table 2). The mean values of EXS and SOP were 20 612.65 and 812 693.5 tons, respectively. The mean values of POG, EXR and TOP were 2.54, 264.83 and 31.5972, respectively. The mean value of CPI was 241.36. The EXS has maximum value of 123 019.51 tons in 2017, while the maximum values of SOP, POG, CPI, EXR, and TOP were 1 262, 280.0, 2.75, 458.66, 426, and 53.27796 in the years 2020, 2012, 2022, 2022, and 2011, respectively. The EXS has a minimum value of 115 tons in 2019, while the minimum values of SOP, POG, CPI, EXR, and TOP were 492, 852.00, 2.38, 120.73, 153.9 and 20.72252 in the years 2011, 2022, 2011, 2011, and 2016, respectively. The skewness, kurtosis and Jarque - Bera statistic tests were for the normality of data, the skewness of 0 and kurtosis of 3 implies that the series are normally distributed, while

the probability of the Jarque – Bera statistics of greater than 0.05 suggests accepting the null hypothesis and the series are normally distributed. All the stimuli are negatively skewed since their values are less than 0. The variables have kurtosis less than 3 suggesting that they are not thick tailed, as kurtosis measures the symmetry of the distribution. The probability greater than the stipulated 0.05 indicated that all the stimuli are normally distributed. This result is in consensus with the findings of Abiodun & Solomon (2010).

Table 2. Descriptive Statistics of Variables in Export Performance of Soybean (*Glycine max*) in Nigeria.

	EXS (tons)	SOP(tons)	POG	CPI	EXR	TOP
Mean	20 612.65	812 693.5	2.54	241.36	264.83	31.5972
Maximum	123 019.51	1 262 280.00	2.75	458.66	426	53.27796
Minimum	115.00	492 852.00	2.38	120.73	153.9	20.72252
Std Deviation	33 343.93	263 105.34	0.1188	107.358	100.2731	9.30945
Skewness	-0.04380	-0.355714	-0.0134	-0.62543	-0.63445	-0.3207
Kurtosis	2.24869	2.486483	1.4589	1.57824	2.26740	2.3658
Jarque-Bera	0.28606	0.38491	1.18785	1.79302	1.073391	0.40678
Sum	247 351.82	9752322.0	30.50	2 896.33	3178	379.1665
Probability	*0.0657245*	*0.058894*	*0.10789*	*0.27045*	*0.22782*	*0.43720*
Observations	12	12	12	12	12	12

Source: Data Analysis (2024), Source: Bureau of Statistics, Nigeria (2024)

EXS - Soyabean Export

The ADF Unit Root Test

The ADF Statistic was used to examine the stationarity of the series and the result is displayed in Table 3. The critical values at 1% and 5% are reported in columns 3 and 4 and the ADF test statistics is reported in column 2. The unit root test was conducted to give information about characteristics of the series which were used for the explanation of the export performance of soybean. As observed in Table 3, the AGM was stationary at level I (0), the variables TOP, EXR, CPI, POG, WOT, ALB, and SOP attained stationarity after the first difference I (1). The conclusions of the unit root tests were reported in column 6. The series are of mixed order of integration, precisely of order zero I (0) and order one I (1). This give the justification for using ARDL bound test to test for co-integration and examining the link between the variables influencing export performance of soybean. This result is in consensus with the findings of Okuduwor et al. (2022) who obtained similar result while assessing agricultural export evidence on economic growth in Nigeria.

Table 3. The ADF Unit Root Test

Variables	ADF Test Statistics	1% Critical Value	5% Critical Value	Probability	Order of Integration
TOP	-5.87	-3.66	-2.96	0.0003	I(1)
EXR	-7.64	-3.66	-2.96	0.0000	I(1)
CPI	-6.81	-3.66	-2.96	0.0001	I(1)
POG	-3.05	-3.66	-2.96	0.0282	I(1)
WOT	-7.74	-3.66	-2.96	0.0000	I(1)
ALB	-3.02	-3.66	-2.96	0.0348	I(1)
AGM	-5.67	-3.66	-2.96	0.0007	I(0)
SOP	-6.87	-3.66	-2.96	0.0000	I(1)

Source: Data Analysis (2024)

The Co-Integration Test

The ARDL bound test was utilized to determine if there is long run equilibrium association among the series considered. The use of this method results from the unit root test as the series were of order I (0) and I (1). Table 4 shows the result of the upper and lower bounds for an asymptotic sample size and the actual sample size. The bound test revealed critical values of 2.596 and 3.916 for the lower and upper bound, respectively, at the 5% level of significance. The computed F-statistics of 5.688 at 5 degree of freedom is more than the upper bound value of 3.916 at the 5% level of significance. This shows that the stimuli in the model are co-integrated and that there is long run association between the variables in the model. Having established the relationship, the ARDL model was employed on the data to evaluate the details of the relationships. This result is in consensus with findings of Olojede & Micheal (2020).

Table 4. Bounds Test for Co-Integration Result

Significant Level	I(0) Bound	I(1) Bound	Value
10%	2.176	3.480	F-Statistics = 5.688, K = 7
5%	2.586	3.916	
1%	3.589	5.34	

Source: Data Analysis (2024)

The Factors Influencing Export Performance of Soybean in Nigeria

The long run coefficient of the ARDL model is displayed in Table 5. The coefficient of TOP (Trade Openness) is positive but not statistically significant contrary to the a priori expectation. The TOP (Trade Openness) which can be expected to expand the market access of Nigeria's oil seed (SOP, Soybean Production) did not imply such effect which may have been as a result of non-competitiveness of Nigeria's oil seed in the international market. The EXR (Exchange Rate) has positive coefficient but not statistically significant, this is contrary to a priori expectation, the positive relationship indicates that Nigeria's currency (the Naira) may have been overvalued and lost its role with regard to its soybean seed partners. The country` soybean seed higher prices in the market could be the reason for loss of competitiveness and other countries` products will be cheaper and preferable to Nigeria's own. This also confirmed the reason why it could not take advantage of the global trade openness. The result indicates that for a unit change in EXR, the Nigerian soybean will get more expensive by 24%. The result implies that the value of the Naira against the US dollar can contribute to enhancing export performance of agricultural production in Nigeria if underlying domestic conditions such as energy supply and infrastructures encouraged the local production and export. This result is in consonance with the findings of Obansa et al. (2013), and Abiodun & Solomon (2010). The coefficient of CPI (Consumer Price Index) is negative and was statistically different from zero at 5% probability level, as it was expected. This suggests that for any increase/ decrease (depreciation/appreciation in prices) in CPI, the soybean production in Nigeria decreases/ increases by 8.4%. The POG (Population Growth Rate) exerts positive and significant different from zero at 1% probability level effect on soybean production. So it can be deduced that the Nigeria's increasing population growth rate of about 2.39% annually has sustained the production of the oil seed, as there are increasing demand for its production. The WOT (World Trade in Oil Seed) has negative coefficient and was statistically significant from zero at 5% probability level to Nigeria's soybean seed trade. The coefficient of -0.652 suggests that as the world trade increases by 1%, and Nigeria share of the market for oil seed will decrease by 65.2%. The ALB (Agricultural

Labour) has a positive coefficient and is statistically significant at (p< 0.05) on SOP, this is line with the preliminary expectation. It shows that a unit increase in agricultural labor will increase SOP by 21.9%. The AGM has a positive coefficient and is statistically significant (p < 0.05) as expected. This indicates that a decrease/increase of a 1% change in the use of AGM will increase/decrease SOP by as much as 78.9%. The error correction parameter (- 0.791) conforms to a priori expectation, it is negative, and statistically significant estimate. The parameter (-0.791) implies that the estimated ARDL model adjust back to long run from short run at the speed of 79.1% when there are short run disturbances. The coefficient of determination (R^2) is 0.52, this implies that 52% of the variations in export performance of soybean was explained by independent variables included in the ARDL model. The F-value of 2.598490 was significant different from zero at 5% probability level, this signifies that the model was correctly specified. The Durbin-Watson Statistics was calculated at 1.7 which indicates low level of autocorrelation.

Table 5. Long Run Coefficients of the ARDL Model

Variables	**Coefficient**	**Standard Error**	**t-Statistics**	**Probability**
Dependent Variable: SOP				
TOP	0.252	0.3842	0.656	0.620
EXR	0.248	0.2789	0.889	0.554
CPI	-0.084***	0.0214	-3.92	0.000
POG	0.735***	0.2188	3.359	0.001
WOT	-0.652**	0.2372	2.749	0.030
ALB	0.219**	0.0814	2.690	0.041
AGM	0.789**	0.2969	2.657	0.023
C	2.371	0.5423	4.372	0.000
CointEq(-1)	-0.791	0.1454	-5.437	0.000
$R^2 = 0.52$		**Durbin-Watson = 1.7**		
Adjusted R^2 =0.51		**F-Value = 2.598490****		

Source: Data Analysis (2024) ***-Significant at (P < 0.10), ****-Significant at (P < 0.05), *****-Significant at (P < 0.01),

Diagnostic Tests

The diagnostic tests were conducted on the residuals of the model and the estimated parameter to confirm the reliability of the estimates and the ARDL model as suitable for prediction purposes. The stochastic error term must be white noise (non-auto correlated) with zero mean and constant variance (normally distributed and homoscedasticity). The result of the diagnostic test presented in Table 6 suggests that the model passed the tests of serial correlation, homoscedasticity, normality (Jarque-Bera) and linearity given that their probability values are greater than 0.05. This result is in line with the findings of Okuduwor et al. (2023)

Table 6. Summary of Diagnostic Tests

Test	**F-Statistics**	**Prob (F-Statistics)**
Breusch-Godfrey LM Test (No Serial Correlation)	4.840378	0.2920
Breusch-Godfrey (Homoscedasticity)	0.784983	0.8180
Jarque-Bera (Normality)	2.881469	0.2351
Ramsey RESET (Model Specification)	0.352722	0.8690

Source: Data Analysis (2024)

Constraints Militating Against Export Potentials of Soybean Production

The constraints militating against export potentials of soybean production was subjected to principal component analysis and presented in Table 7. The constraints with Eigen-values greater than one (1) were retained by the model. All the constraints retained by the model explained about 74.39% of all constraints included in the model. Lack of the credit facilities for soybean farmers ranked the 1st among the constraints and this explained 15.03% of all constraints retained by the model. Inadequate training on the export of quality product and the lack of improved seeds were ranked as 2nd and 3rd respectively, and this explained 14.08% and 16.12% of all constraints retained by the model. The Chi square of 814.02 was statistically significant ($p < 0.01$) and the Kaiser Meyer Olkin (KMO) of 0.8218 implies that 82.18% of constraints facing export potentials of soybean are included in the model, this justify the use of the model for the analysis.

Table 7: Principal Component Model of Constraints Encountered by Producers and Exporters of Soybean

Constraints	Eigen-Value	Difference	Proportion	Cumulative
Lack of Credit Facilities	1.8316	0.0712	0.1503	0.1503
Inadequate Training on Export of Quality Produce	1.7604	0.1991	0.1408	0.2911
Lack of Improved Seeds	1.5613	0.0112	0.1612	0.4523
Inconsistent Government Policy on Exchange Rate	1.5501	0.2098	0.1702	0.6225
Lack of Fertilizers and Chemicals	1.3403	0.0399	0.1108	0.7333
Inadequate Extension Services	1.3004	0.0104	0.0106	0.7439
Bartlett Test of Sphericity				
Chi Square	814.02***			
KMO	0.8218			
Rho	1.00000			

Source: Field Survey (2024), KMO – Kaiser-Meyer-Olkin

CONCLUSION

This work has established that Nigeria has exported tons of soybean seeds to the international market with the stipulated period of 2011 to 2022. There has been increase in the potential of soybean production within this period without the corresponding increase in the export of this agricultural product. The soybean export contributes to oil seed export in Nigeria within this period. The significant factors influencing the export of soybean seeds include consumer price index, population growth rate, world trade in oil seeds, agricultural labor, and agricultural machineries. The trade openness and exchange rate were not significant, the trade openness has positive coefficient contrary to the preliminary expectations and could not expand the market access for Nigeria oil seed as a result of non-competitiveness of soybean seed in the international market. The exchange rate has a positive coefficient contrary to preliminary expectation and may have been overvalued and lost its role with respect to its soybean seed partners. The country soybean seed production seems more expensive, lower in quality, losing competitiveness, and the other countries product being cheaper and preferable to Nigeria own. The major constraints were inconsistent government policies, inadequate training on export of quality product devoid of contaminations, pesticides, mycotoxins, and lack of credit facilities to farmers and exporters. Based on these findings the following

recommendations were made: (i) the policies that would encourage exportation of these crops should be pursued. Such policies should be directed towards the provision of storage facilities, granting of tax holidays and long-term export credit at concessionary interest rates to exporters of these crops. (ii) Enhancing the productive capacities of farmers of these crops such as provision of basic farm inputs, extension services, and provision of credit facilities at low interest rates devoid of administrative bottlenecks to farmers. (iii) Research activities should be financed on improving the quality of agricultural produce devoid of contaminations, pesticides, mycotoxins, and aflatoxins. (iv) Government should be consistent on favorable policies that affect international market such as exchange rate, trade openness, and capacity buildings on proper packaging.

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