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BUILDING CAPACITIES FOR A SUSTAINABLE AFRICAN CASHEW INDUSTRY



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DETERMINANTS OF CASHEW NUTS EXPORT EARNINGS IN NIGERIA

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Introduction



- Cashew (*Anacardium occidentale* L.), originated in Brazil and was originally planted to assist in the prevention of soil erosion (Ogunwolu *et al.*, 2020).
- Today, cashew provides people and countries with raw materials, food, income and also seeing an increase in industrial demand on global markets.
- In Nigeria, 7–8% of non-oil export revenue comes from cashew nut exports. The projected export value ranges from US\$25 to US\$35 million yearly (ITC, 2011).
- Exports recorded an annual average amount of US\$33.10 million for the product (Lawal and Uwagboe, 2017). In 2020, cashew nut exports from Nigeria yielded around 192 million U.S. dollars (Statista, 2022).
- The continuous increase in export earnings from cashew nuts will depend on the production, export supply, international competitiveness and the effects of policy intervention.



Materials and methods



- Secondary data of forty (40) year's annual time series data covering the period between 1980 and 2020 were extracted from FAO and FAOSTAT dataset.
- Data were specifically collected on Nigeria's cashew nut production and export supply quantity, value of cashew nut export quantity, producer prices of cashew nut, gross domestic product (GDP), interest rates, inflation rates and exchange rate for the period under study (1980-2020).
- Nigeria's cashew nut production and export supply quantity was measured in metric tonnes (MT), value of cashew nut export quantity and producer prices of cashew nut were measured in millions United States Dollar (USD), inflation rates was measured in percentage, exchange rate was measured as number of Naira exchanged for USD, the interest rate in the economy measured in percentage and GDP measured in millions USD.
- The means, standard deviation, coefficients of variation, percentages and average growth rate were used to analyze trends in cashew nuts production, export quantities, and cashew nuts export earnings.
- The Augmented Dickey-Fuller statistics was used to examine the stationarity of time series data.
- The Johansen's method was used in verifying co- integration among the variables of the model.

- The error correction mechanism (ECM) was used to investigate the factors influencing cashew nut export earnings over the study period using the implicit model specified as:

$$\Delta \ln Y_t = \alpha_1 + \alpha_2 \Delta \ln Y_{t-1} + \alpha_3 \Delta \ln X_{2t-1} + \alpha_4 \Delta \ln X_{3t-1} + \alpha_5 \Delta \ln X_{4t-1} + \alpha_6 \Delta \ln X_{5t-1} + \alpha_7 \Delta \ln X_{6t-1} + \lambda_1 ECT_{t-1} + u_{t1} \dots (1)$$

- where:
- Y is the export supply of cashew nuts in metric tonnes; X₁ is the agricultural land area in square kilometres; X₂ is cashew nuts production quantity measured in metric tonnes
- X₃ is the exchange rates was measured as amount of Naira exchanged for USD
- X₄ is the interest rate in the economy measured in percentage
- X₅ is the inflation rate in the economy measured in percentage
- ECMt is the error correction factor.
- Δ is the difference operator; t-1 is the lagged values of variables;
- Ln is the logarithm operator; Uts are stochastic random errors
- α1, α2, α3, α4, α5, α6, and λ1 are parameters to be estimated.



Results and Discussion

- Nigeria's cashew nuts production between 1980 and 2021 are presented in Table 1.
- There was an increasing trend between 1980 and 2009, and which declined from 2010 and 2021.
- On the average, the annual cashew nuts production over the study period was 241,315.60MT.
- There was high fluctuation in the change in annual cashew nuts production, ranging from -0.52 to 37.72% over the period of study.
- The coefficient of variation reflects a high degree of instability in cashew nuts production ranging between 0.00 and 99.68%.
- There was consistent increase in average export supply of cashew nuts in the economy across the sub-periods with an average of 36,707.71MT over the study period (Table 2).

Table 1: Averages and Coefficients of variation in production of cashew nuts (MT) in Nigeria (1980-2020)

Sub-period	Average production (metric tonnes) per annum	Annual Percent change in production	Co-efficient of variation
1980-1989	25000.00	0.00	0.00
1990-1999	118900.00	33.73	93.47
2000-2009	590926.60	37.72	17.49
2010-2021	232248.90	-0.52	99.68

Table 2: Averages and Coefficients of variation in export supply of cashew nuts (metric tonnes) in Nigeria (1980-2020)

	Average export supply (metric tonnes) per annum	Annual Percent change in export supply	Co-efficient of variation
1980-1989	311.04	1.14	116.14
1990-1999	17052.80	0.23	58.16
2000-2009	15916.00	1.57	41.09
2010-2021	98410.99	11.72	63.60



Average export earnings of cashew nut per annum declined progressively over the study period ranging from 0.51 in the 2010-2020 sub-periods to 7.44% in the 1980-1989 sub-periods, with all period average of 0.46% (Table3).

There was a high degree of instability in the export earnings of cashew nuts with the coefficients of variation ranging from 40.96 to 122.48% in the study period. All the absolute values of ADF statistics are higher than the critical values at 1, 5, and 10% respectively indicating the series is stationary or contains no unit root at its first

differences and is thus suitable for regression analysis.

Table 6, the result indicates that there is at least one co-integration equation among the variable.

Hence, a long-run relationship exists among the variable of the model, and thus Vector Error Correction Model (VECM) can be specified to obtain the short and long-run estimate of the relationship among the variables of the model.



Table 3: Averages and Coefficients of variation in export earnings of cashew nuts (thousand USD) in Nigeria (1980-2020)

Sub-period	Average export earnings (thousands USD) per annum	Annual Percent change in export earnings	Co-efficient of variation
1980-1989	1917.10	7.44	122.48
1990-1999	10344.40	2.46	87.38
2000-2009	8703.70	1.13	40.96
2010-2021	149380.10	0.51	91.63

Table 5: Result of ADF Unit root test for variables of the model (first difference values)

Variables	Test statistics (ADF)	1% critical value	5% critical value	10% critical value	Decision
Y	-3.517	-3.750	-3.000	-2.630	I(1)
X ₁	-4.814	-3.675	-2.969	-2.617	I(1)
X ₂	-7.217	-3.668	-2.966	-2.616	I(1)
X ₃	-3.492	-3.668	-2.966	-2.616	I(1)
X ₄	-3.930	-3.668	-2.966	-2.616	I(1)
X ₅	-3.860	-3.675	-2.969	-2.617	I(1)
X ₆	-3.492	-3.668	-2.966	-2.616	I(1)

Table 6: Result of Johansen tests for co-integration among variables of the model

Rank	Panus	LL	Eigen value	Trace statistics	5% critical value
0	42	-1722.545	0.825	131.284	94.150
1	53	-1690.234	0.502	66.669*	68.520
2	62	-1677.348	0.410	40.887	47.210
3	69	-1667.571	0.328	21.334	29.680
4	74	-1660.216	0.160	6.624	15.410
5	77	-1656.984	0.004	0.161	3.760
6	78	-1656.904			



RESULTS CONT'D



- The results of short and long run VECM regression analysis showed the value of R^2 is 0.580 and is statistically significant at 1%, confirming that the model has a good fit.
- In the short run, gross domestic product and exchange rate negatively influenced cashew nuts export earnings, while inflation rate positively influenced cashew nuts export earnings.
- This implies that GDP and Exchange Rate are inversely related to cashew nuts export earnings, while inflation rate is directly related to cashew nuts export earnings in the short run.

- In the long run, Cashew Nuts Export Quantity and Inflation Rate are negatively related to cashew nuts export earnings,
- while cashew nuts production quantity is positively related to cashew nuts export earnings.

Table 7: Short run vector correction model (VECM) regression analysis results
* Significant at 1% level **significant at 5%

Variables	Coefficients	Std error	z-value	p-value
Ce_1	-0.012	0.005	-3.260	0.001
Cashew nuts export earnings (Y)	0.125	0.099	1.260	0.208
Cashew nuts production quantity (X_1)	0.1322	0.201	0.660	0.511
Cashew nuts export quantity (X_2)	-0.157	0.117	-1.34	0.180
Gross domestic product (X_3)	-0.556	0.276	-2.020	0.044*
Exchange rate (X_4)	-0.427	0.260	-1.64	0.101***
Interest rate (X_5)	0.036	0.341	0.110	0.915
Inflation rate (X_6)	0.178	0.078	2.29 0	0.022 **
Constant	0.167	0.055	3.030	0.002**
R^2	0.580			
Chi-square	19.234*			
p-value	0.000			
AIC	4.081			

Table 8: Long run vector error correction model regression analysis results
* significant at 1% level

Variables	Coefficients	Standard error	z-value	p-value
Ce_1	1	-	-	-
Cashew nuts export earnings (Y)	-1.551	1.562	0.990	0.321
Cashew nuts production quantity (X_1)	4.659	1.478	3.150	0.002*
Cashew nuts export quantity (X_2)	-7.363	1.940	3.790	0.000*
Exchange rate (X_4)	-1.441	1.779	0.810	0.418
Interest rate (X_5)	2.980	6.400	-0.470	0.641
Inflation rate (X_6)	-15.442	1.511	-10.220	0.000*
Constant	112.399	-	-	-



Conclusion:



The study concludes that macroeconomic variables:

- GDP
- Inflation Rate
- Exchange Rate
- Cashew nut production
- Export supply quantities
- are significant determinants of cashew nuts export earnings over the study period.

Recommendations

- Improved production and export supply of cashew nuts for significant boost in cashew nuts export earnings.
- Reduced inflationary trend in the economy for sustainable export earnings from cashew nuts.
- Evolvement of monetary policies that will enhance agricultural exports friendly exchange rate.



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