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Effect of Gross Domestic Product and Exchange Rate on Yam Export Promotion in Nigeria: 2000 – 2023

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Abstract

This study investigated the Effects of GDP and exchange rate on Yam export promotion in Nigeria from 2000 to 2023. The study employed time series data. The Ordinary Least Squares (OLS) and Autoregressive Distributed Lag methods were used for the estimation of the models. The variables are stationary at level. The result of the trend estimation shows positive and significant at (P>1%) for Exchange Rate. The result of the trend estimation shows negative and significant at (P>1%) for Gross Domestic Product. The result of the trend estimation shows positive but not significant for Yam Export. The estimated Ordinary Least Square result shows that the coefficient of Exchange Rate (EXR) is negative and not significant in explaining Yam Export. The result also shows that the coefficient of Gross Domestic Product (GDP) is positive but not significant in explaining Yam Export. The estimated Autoreggressive distributed lag result shows that the

coefficient of GDP (-1) is positive and significant at (P>5%) in explaining yam export . The result further shows that the coefficient of Exchange Rate is positive and significant at (P>10%) in explaining yam export. The result shows that exchange rate granger causes gross domestic product i.e unidirectional relationship in explaining yam export competitiveness. The result shows that GDP and exchange rate does not have causal relationship with yam export which implies that yam export is not competitive in Nigeria. It is therefore recommended that investing in modern farming, supply chains, and storage; diversifying export markets to Asia and the Middle East; stabilizing exchange rates for price predictability; and promoting value-added products like yam flour and chips. These measures can enhance yam export earnings and strengthen Nigeria's economy.

Keywords: Yam Export, Trends, Gross Domestic Product, ARDL, OLS Model

Introduction

Yam export plays a vital role in Nigeria's non-oil export sector, contributing significantly to foreign exchange earnings and economic diversification. As a leading producer of yam globally, Nigeria has the potential to increase its market share in the international trade of agricultural commodities. However, the country's yam export performance is influenced by key macroeconomic variables such as the Gross Domestic Product (GDP) and exchange rate. GDP reflects the overall economic health and production capacity of a nation, while the exchange rate determines the competitiveness of Nigerian yam in global markets.

This study aims to examine the effect of GDP and exchange rate on yam export promotion in Nigeria from 2000 to 2023. By understanding how these variables impact yam exports, policymakers can design targeted interventions to boost export performance, enhance foreign exchange inflows, and contribute to Nigeria's economic growth.

The broad objective of the study is to examine the trends of rice export, exchange rate and GDP, determine the causal relationship of Rice Export, examine the policy strategies for rice export competitiveness.

Literature Review

Exports are goods produced within a country and sold abroad, generating foreign exchange revenue that drives economic growth (FocusEconomics, 2023). Exports enable nations to leverage their resources and skills to access foreign markets, fostering employment, foreign investment, and economic resilience (John, 2023). Gross Domestic Product (GDP) measures the total value of goods and services produced within a

country, serving as a key indicator of economic health (Chappelow, 2023; Mahr & Nash, 2021). Exchange rate, the value of one currency relative to another, influences trade and capital flow. As of August 2024, 1 USD equaled 1,632.99 NGN (Forbes, 2024). Terms of trade measure the rate at which a country's exports exchange for its imports, improving when export prices rise relative to import prices.

Dunmola et al. (2021) found that while food, live animals, and crude materials negatively impacted Nigeria's agricultural exports, animal and vegetable oils had a positive but insignificant effect on growth. The study recommended boosting production quality, supporting non-export crops, and increasing low-interest credit to the agricultural sector.

Onuora (2018) assessed the impact of cassava, groundnut, millet, yam, and maize on Nigeria's GDP from 1985 to 2017. The study found a significant positive relationship between GDP and these exports, concluding that non-oil exports are vital for economic growth. It recommended addressing challenges in non-oil export activities and improving environmental transparency in industrial production.

Methodology

The study was carried out in Nigeria. Nigeria is a prominent country in West Africa, known for its large population and significant economic influence. Time series data was used for this research. Secondary data sources were utilized for this study which include government reports, trade statistics, academic publications, and industry reports related to yam production, export trends, currency exchange rates, and Gross Domestic Product indicators in Nigeria. These data sources provided comprehensive information on the variables of interest and enabled a thorough analysis of the research questions. Data collection involves accessing and compiling existing datasets from online reputable sources retrieved from the websites of organizations such as the Food and Agricultural Organization (FAO), Central Bank of Nigeria, the National Bureau of Statistics, international trade organizations, and scholarly databases. The collected data cover relevant time periods and geographical regions to ensure a comprehensive analysis of currency fluctuation, yam export, and capital formation dynamics in Nigeria.

Three Model were employed

Trend Model:

To examine the trends in the value of yam export, exchange rate, inflation, and GDP, a simple trend analysis will be conducted. The model specification for this can be written as:

$$Yt = \alpha + bt + \varepsilon t$$

Where:
Yt = the variables (yam export value, exchange rate, GDP)
t = time trend (2000-2023)
α = constant term
b = coefficient of the time trend
εt = error term
apriori expectation: b>0

Ordinary least square (OLS) regression Analysis:

To estimate the determinants of yam export in Nigeria, the following multiple regression model will be used:

$$YEt = \beta 0 + \beta 1\ EXRt\ + \beta 2\ GDPt + \varepsilon\ t$$

Where:
YEt = Yam export value
EXRt = exchange rate
GDPt = Gross Domestic Product rate
εt = stochastic error term
Apriori expectation: β1 >0; β2 > 0

Autoregressive Distributed Lag (ARDL)

Impact of Yam Export on GDP: To assess the impact of yam export on Nigeria's GDP, this study employed Autoregressive Distributed Lag (ARDL)

$$GDPt = \alpha 0 + \alpha 1 YEt\text{-}1\ + \alpha 2\ EXRt + \alpha 3\ GDPt + \varepsilon t$$

Where:
YEt-1 = Lag of yam export
EXRt = Exchange Rate
GDPt = Gross Domestic Product of Nigeria
t= time (2000 to 2023)
εt = Stochastic error term
Apriori expectation: α1>0; α2>0; α3>0

Result and Discussion

Data Presentation

This chapter presents methodology for the study and the procedures and processes involved in the analysis were outlined. To this end, a model was specified to capture the relationship between macroeconomic variables. This therefore embodies the presentation, analysis and discussion of data from secondary sources. We hoped to present data on the variable specified in the model equation (i). These data will be used to content the model while we carry out the estimation. The regression is carried out using Eviews. It therefore entails presentation of model based result, regression line/equation,

standard errors of estimates and t-values, coefficient of multiple determination, F-statistics, Durbin-Watson Statistics.

Summary Statistics for all the variables

Table 1 presents the summary statistics for exchange rate (EXR), GDP, and yam export (YAM) from 2000 to 2023. The result shows that value of Skewness for inflation, exchange rate, and GDP are are less than 1, Yam export, however, has a skewness of (2.79). The result also reveals that the values of Kurtosis for all the variables are greater than 1. The result reveals further that the values for Jarque-Bera for all the variables are greater than 1. Hence, ordinary least square and autoregressive distributed lag methods were employed.

Table 1: Summary Statistics for all the variables

	EXR	GDP	YAM
Mean	11.55046	5.050559	5.125000
Median	10.10376	5.612804	0.000000
Maximum	23.86438	15.32916	53.00000
Minimum	0.686099	-1.794253	0.000000
Std. Dev.	6.352681	3.630260	13.26752
Skewness	0.571234	0.430121	2.792827
Kurtosis	2.512784	4.287476	9.647982
Jarque-Bera	1.542614	2.397611	75.39519
Probability	0.462408	0.301554	0.000000
Sum	277.2112	121.2134	123.0000
Sum Sq. Dev.	928.2008	303.1120	4048.625
Observations	24	24	24

Unit Root Test of the variables

Table 2 shows the unit root test result of the variables used in the study. The results show that all four variables—exchange rate (EXR), GDP, and yam export (YE)—are stationary at level i(0)

Table 2: Unit Root Test of the variables

Variables	Level	First difference	Second difference	Order of Integration
EXR	-4.131856***			i(0)
GDP	-4.382761**			i(0)
YE	-4.934770***			i(0)

***Significant at 1%, ** Significant at 5%, * Significant at 10% Probability Levels
Where EXR= Exchange Rate, GDP= Gross Domestic Product, YE= Yam Export

Trend Analysis of the variables

Table 3 shows the trend equation of Exchange rate. The result shows that the coefficient of time variable is negative and significant at 1 percent level of probability. This implies that it has a negative trend. Figure 1 below

shows the trend of growth in the Exchange Rate (EXR) from 2000 to 2023. From the graph, the exchange rate shows a sharp rise around 2016, likely due to the economic recession and reduced oil revenues, which pressured the naira. This period also saw the introduction of the Central Bank's flexible exchange rate policy in an attempt to stabilize the currency. The exchange rate begins to level out in later years, possibly due to government interventions aimed at protecting foreign reserves. The trend equation indicates an overall downward trend despite these fluctuations.

Table 3: Trend equation of Exchange Rate

Variable	Coeffiecient	t-stat	Probability
YEAR	-0.399876	-2.331352	0.0293
R-squared	0.198111		
Adjusted R-squared	0.161661		
F-statistic	5.435203		
Durbin-Watson stat	1.742809		

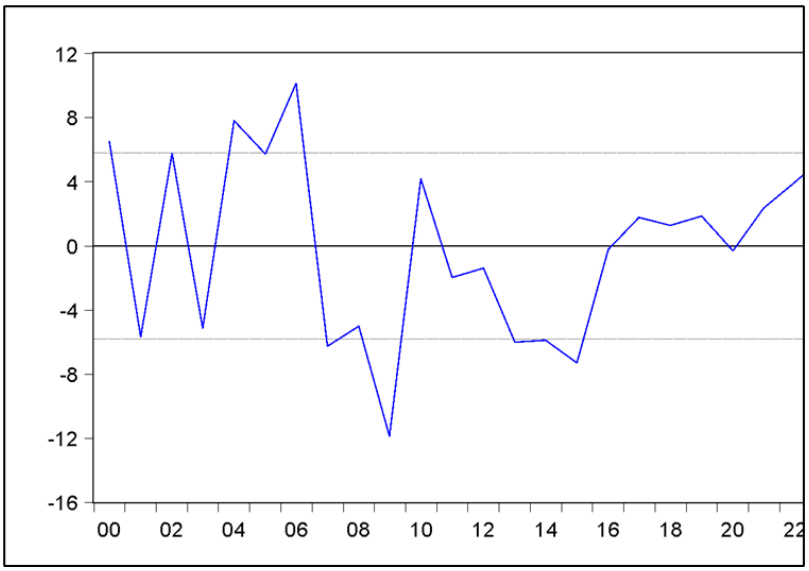

Figure 1: Graphical trend of Exchange rate: 2000 - 2023

Trend equation of Gross Domestic Product

Table 4 shows the trend equation of Gross Domestic Product. The result shows that the coefficient of time variable is negative and significant at 1 percent level of probability in explaining Gross Domestic Product. This implies that it has a negative trend. Figure 2 below shows the trend of growth in the Gross Domestic Product (GDP) from 2000 to 2023. From the graph it shows a general growth trend up to 2014, likely due to increased government spending and favorable oil prices. However, a sharp decline around 2016 reflects the recession and effects of reduced oil exports. Government recovery efforts, such as the ERGP, aimed to boost GDP, but the graph

shows minimal recovery post-2016, reflecting persistent economic challenges. The trend equation confirms a significant downward trend in GDP over the years.

Table 4: Trend equation of Gross Domestic Product

Variable	Coeffiecient	t-stat	Probability
YEAR	-0.357142	-4.541952	0.0002
R-squared	0.483923		
Adjusted R-squared	0.460465		
F-statistic	20.62933		
Durbin-Watson stat	1.709233		

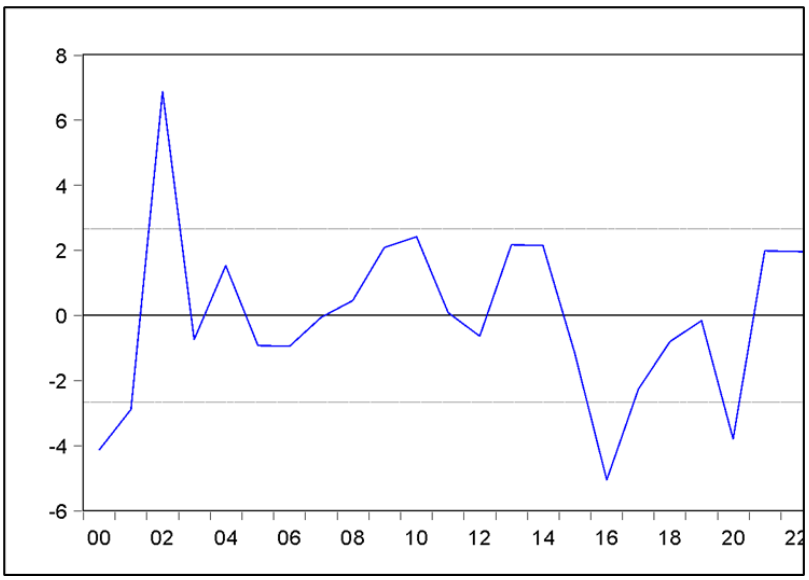

Figure 2: Graphical trend of Gross Domestic Product: 2000 - 2023

Trend equation of Yam Export

Table 5 shows the trend equation of Yam Export. The result shows that the coefficient of time variable is positive and significant at 1 percent level of probability in explaining Gross Domestic Product. This implies that it has positive trend. Figure 3 below shows the trend of growth in Yam Export (YE) from 2000 to 2023. The graph shows a stable but low-level trend in yam exports, with slight increases around the early 2010s, potentially due to the government's Agricultural Transformation Agenda (ATA), which encouraged export growth. However, limited infrastructure and market access kept exports relatively flat throughout the period. The trend equation aligns with this pattern, showing only a small, statistically insignificant increase in yam exports

Table 5: Trend equation of Yam Export

Variable	Coeffiecient	t-stat	Probability
YEAR	0.491739	1.273775	0.2160
R-squared	0.068685		
Adjusted R-squared	0.026352		
F-statistic	1.622504		
Durbin-Watson stat	2.193730		

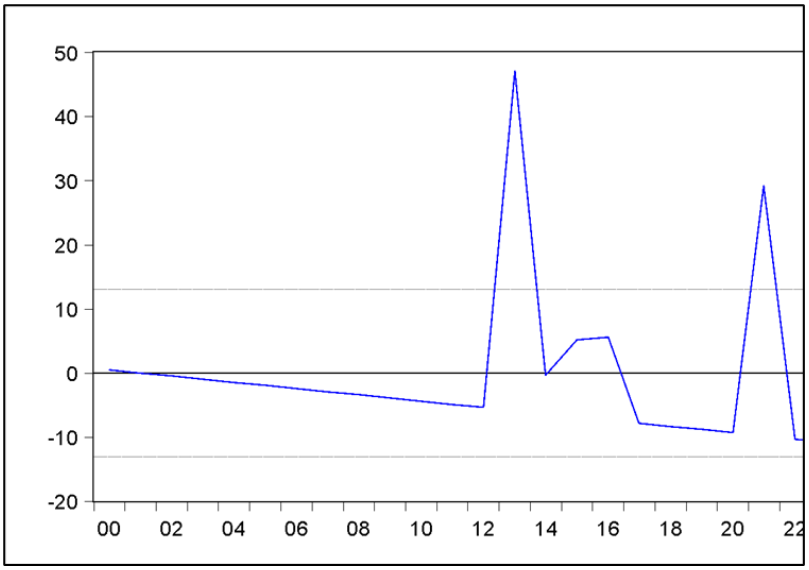

Figure 3: Graphical trend of Yam Export: 2000 - 2023

Estimated result of the relationship between (YAM Export) and the Independent variables (EXCH, and GDP)

Table 6 shows the estimated result of the dependent variable (YAM export) with the independent variables (EXR and GDP). The R-Square showing that the explanatory variable explained the variations in the dependent variable by 20.4 percent, while the error term explained 80.6 percent. The F-Statistics is 1.535009 and Durbin-Watson statistics is 1.535009. The coefficient (-0.09807) of EXR is negative and significant at one percent level of probability in explaining Yam Export. This implies that a unit increase in EXR led to about 0.098 units decrease in Yam Export. The result again shows that the coefficient (2.58E-13) of GDP is positive and significant at one percent level of probability explaining Yam Export. This implies that a unit increase in GDP led to about 2.5 units increase in Yam Export. The result shows that no coefficient of any of the variables is significant, hence; none of the variables of (EXR and GDP) has an impact on yam export.

Table 6: The estimated result of the relationship between (YAM export) and the independent variables (EXR and GDP)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXR	-0.098070	0.109633	-0.894534	0.3828
GDP	2.58E-13	2.04E-13	1.264813	0.2221
C	7.452762	9.880789	0.754268	0.4604
R-squared	0.203717			
Adjusted R-squared	0.071003			
F-statistic	1.535009			
Durbin-Watson stat	1.535009			

***Significant at 1%, ** Significant at 5%, * Significant at 10% Probability Levels
where YE = (Yam Export) EXR = (Exchange Rate) and GDP = (Gross Domestic Product)

Autoregressive Distributed Lag (ARDL) co-integration technique of the relationship between (YAM export) and the independent variables (EXR and GDP)

The R-Square is 0.5546 showing that the explanatory variable explained the variations in the dependent variable by 55.5 percent, while the error term explained 45.5 percent. The F-Statistics is 2.1354 and Durbin-Watson statistics is 2.1800.

Table 7 shows the estimated result of the dependent variable (YAM export) with the independent variables (EXR and GDP). The coefficient of EXR (-0.4362) is negative and significant at the 5% level. This implies that a unit increase in the exchange rate leads to a decrease of about 0.44 units in yam export.

The lagged value of GDP (-1) shows a negative coefficient of -4.4712, significant at the 5% level. This implies that a unit increase in the previous year's GDP results in a 4.47-unit decrease in yam export. On the other hand, the second lag (GDP(-2)) shows a positive effect, with a coefficient of 5.6512, also significant at the 5% level. This implies that a 5.65-unit increase in yam export for a unit increase in GDP from two year ago.

Table 7: Autoregressive Distributed Lag (ARDL) co-integration technique of the relationship between (YAM export) and the independent variables (EXCH, INFLA and GDP)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
YAM(-1)	-0.500473*	0.280178	-1.786268	0.0993
EXCH	-0.436173**	0.165903	-2.629090	0.0220
GDP	2.11E-13	1.11E-12	0.189535	0.8528
GDP(-1)	-4.47E-12**	1.71E-12	-2.610271	0.0228
GDP(-2)	5.65E-12**	1.97E-12	2.869491	0.0141
C	26.18860	12.58650	2.080689	0.0596
R-squared	0.554698			
Adjusted R-squared	0.294939			
F-statistic	2.135433			
Durbin-Watson stat	2.179987			

***Significant at 1%, ** Significant at 5%, * Significant at 10% Probability Levels where YAM = (Yam Export) EXCH = (Exchange Rate) and GDP = (Gross Domestic Product)

Pairwise Granger Causality Tests

The result from Table 8 indicates causal relationship among yam export, exchange rate and GDP. The result shows that exchange rate granger cause gross domestic product i.e unidirectional relationship. The result shows that GDP and exchange rate does not have causal relationship with yam export. The result implies that yam export is not competitive.

Table 8: Pairwise Granger Causality Tests

Sample: 2000 - 2023			
Lags: 2			
Null Hypothesis:	**Obs**	**F-Statistic**	**Prob.**
GDP does not Granger Cause EXR	22	0.67628	0.5217
EXR does not Granger Cause GDP		3.25582	0.0635
YAM EXPORT does not Granger Cause EXR	22	0.14015	0.8702
EXR does not Granger Cause YAM EXPORT		0.79030	0.4697
YAM EXPORT does not Granger Cause GDP	22	0.74599	0.4892
GDP does not Granger Cause YAM EXPORT		0.97323	0.3980

Conclusion

This study examined the effect of Gross Domestic Product (GDP) and exchange rate on yam export promotion in Nigeria from 2000 to 2023. The findings reveal that GDP and exchange rate are critical factors influencing yam export performance. A strong GDP reflects increased production capacity and economic stability, which support higher export volumes. Conversely, exchange rate fluctuations affect the competitiveness of Nigerian yam in global markets, with currency depreciation potentially boosting exports but also increasing uncertainty for exporters. To promote

yam export, it is essential to implement policies that stabilize the exchange rate, ensuring a more predictable trade environment. Additionally, enhancing the country's production capacity through investments in modern farming techniques, improved supply chains, and better storage facilities can increase yam export competitiveness. Diversifying export markets beyond traditional partners to regions like Asia and the Middle East can further reduce market dependency and expand Nigeria's export reach.

Conflict of Interest: The authors reported no conflict of interest.

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References:

1. Chappelow, J. (2023). *Gross domestic product (GDP).* Investopedia. https://www.investopedia.com/terms/g/gdp.asp
2. Odifa, D. (2023, June 13). *Nigeria's top 10 agric exports in Q1 2023. BusinessDay NG.* https://businessday.ng/agriculture/article/nigerias-top-10-agric-exports-in-q1-2023/
3. FocusEconomics. (2023, May 25). *Nigeria economic forecast*. https://www.focus-economics.com/countries/nigeria
4. Forbes. (2024). *Convert United States dollar to Nigerian naira*. https://www.forbes.com/finance/currency/convert?from=USD&to=NGN
5. Gavrilova, N. (2020). *Impediments to the development of Nigeria's agricultural exports. IOP Conference Series: Earth and Environmental Science*. https://iopscience.iop.org/article/10.1088/1755-1315
6. John, Y. (2023, June 20). *The economic benefits of exportation: Driving growth and prosperity. Economic Times.* https://www.economictimes.com/economic-benefits-of-exportation-driving-growth-and-prosperity
7. Onuorah, A. C. (2018). Role of non-oil exports in the economic growth of Nigeria. *Journal of Emerging Trends in Economics and Management Sciences, 9*(3), 132–140.