*Science World Journal Vol. 20(No 4) 2025* https://dx.doi.org/10.4314/swj.v20i4.60
*www.scienceworldjournal.org*
*ISSN: 1597-6343 (Online), ISSN: 2756-391X (Print)*
*Published by Faculty of Science, Kaduna State University*

Full Length Research Article

# DYNAMICS BETWEEN CONSUMPTION EXPENDITURE AND GROSS NATIONAL INCOME IN NIGERIA

*[1]Wilson Simon Barguma, [1]Daniel Samuel and [2]Thomas Kefas

[1]Department of Statistics, Federal University Lokoja, Kogi State, Nigeria
[2]Department of Business Education, Adamawa State College of Education, Hong, Nigeria

*Corresponding Author Email Address: Simon.wilson@fulokoja.edu.ng

**ABSTRACT**
This study examines the relationship between Gross National Income (GNI) and Consumption Expenditure (CE) in Nigeria from 1990 to 2023. Using secondary data sourced from the World Bank and the National Bureau of Statistics (NBS), the study applies descriptive statistics, trend analysis, and regression analysis to establish the dynamics between these key macroeconomic indicators. Descriptive analysis reveals consistent growth in both GNI and CE, with average annual growth rates of 5.2% and 4.8%, respectively. Trend analysis indicates that while both variables exhibit cyclical fluctuations, they follow a long-term upward trajectory. The regression model shows a strong positive relationship ($R = 0.982$) between GNI and CE, with an $R^2$ of 0.964, implying that 96.4% of the variation in CE is explained by GNI. Hypothesis testing confirms the significance of this relationship ($p < 0.05$), supporting the proposition that increases in GNI lead to corresponding increases in CE. The study concludes that national income remains a vital determinant of consumer spending and economic growth in Nigeria. It recommends policies that enhance productivity, diversify income sources, and strengthen consumer confidence to sustain growth in household expenditure.

**Keywords**: Gross National Income, Consumption Expenditure, Regression Analysis, Economic Growth, Nigeria.

## INTRODUCTION

Nigeria, Africa's most populous nation, boasts abundant natural resources and a diversified economy dominated by the oil sector. Despite this potential, the nation's economic performance has been uneven, reflecting persistent dependence on oil revenues and sensitivity to global market shocks (Adepoju& Idowu, 2019). Gross National Income (GNI), representing the total domestic and foreign income earned by Nigerian residents, serves as a key indicator of the country's economic well-being. Conversely, Consumption Expenditure (CE) measures the total spending by households and government on goods and services, capturing demand-side activities in the economy (Oladimeji,2021).

Fluctuations in Nigeria's income and spending levels mirror its broader macroeconomic challenges, including unstable oil prices, inflation, and limited diversification. Between 1990 and 2023, Nigeria experienced episodes of expansion and contraction in both GNI and CE, reflecting responses to oil price cycles, structural reforms, and external shocks. Understanding the link between GNI and CE is essential, as income growth typically fuels consumption, which in turn stimulates economic activity. However, in Nigeria, this relationship is complicated by income inequality, inflationary pressures, and inconsistent policy implementation (Oyelola & Adeniyi, 2020)

While prior studies establish a broad income–consumption link, few extend data beyond 2020 or assess the cumulative effect of post-COVID income fluctuations. This study bridges that gap by employing data up to 2023 and applying robust regression diagnostics to confirm model reliability.

Despite extensive literature on Nigeria's economic growth and fiscal performance, limited empirical evidence directly explores the long-term relationship between gross national income and consumption expenditure. Policymakers require a clearer understanding of how variations in national income translate into consumption trends to design policies that support inclusive growth. Hence, this study addresses the question: What is the nature and extent of the relationship between Consumption Expenditure in Nigeria from 1990–2023? The primary aim of this study is to analyze the relationship between Gross National Income (GNI) and consumption expenditure in Nigeria from 1990 to 2023. By examining this relationship, the study seeks to provide insights into how changes in national income influence consumption patterns, contributing to the formulation of effective economic policies that promote sustainable growth and development in Nigeria, with specific objectives on:

1. To examine the trends in gross national income and Consumption Expenditure in Nigeria from 1990 to 2023.
2. To quantify the relationship between gross national income and Consumption Expenditure using regression analysis.
3. To evaluate the statistical significance and reliability of the relationship between gross national income and consumption expenditure.

### Research Hypotheses

$H_{01}$: There is no significant relationship between gross national income and Consumption Expenditure in Nigeria.
$H_{02}$: Changes in gross national income do not significantly impact Consumption Expenditure in Nigeria.

The theoretical framework presents various economic theories and models that underpin the relationship between gross national income and Consumption Expenditure. These theories provide a conceptual basis for understanding how changes in gross national income affect consumption patterns and economic activity within the Nigerian context.

Keynes (1936) posited that consumption is primarily determined by disposable income. According to the Keynesian consumption function, as income rises, consumption also increases but at a diminishing rate. The theory underscores government spending and fiscal stimulus as tools to raise aggregate demand, particularly relevant to Nigeria, where public expenditure drives much of economic activity.

Nigeria's oil-dependent economy aligns with Keynesian dynamics: higher income during oil booms drives consumption growth, while

*Science World Journal Vol. 20(No 4) 2025* https://dx.doi.org/10.4314/swj.v20i4.60
*www.scienceworldjournal.org*
*ISSN: 1597-6343 (Online), ISSN: 2756-391X (Print)*
*Published by Faculty of Science, Kaduna State University*

recessions constrain spending.

Permanent Income Hypothesis (Friedman, 1957): The Permanent Income Hypothesis (PIH) proposes that consumers base spending decisions on long-term expected income rather than current income fluctuations. In Nigeria, where income volatility is high, the PIH suggests that temporary income changes (e.g., oil price surges) may have limited short-term effects on consumption patterns.

Empirical studies consistently support a positive relationship between income and consumption. Adepoju& Idowu (2019) found that increases in gross national income significantly enhance consumption and gross domestic product growth in Nigeria. Oladimeji (2021) identified oil prices and policy changes as major determinants of gross national income fluctuations. Similarly, Oyelola& Adeniyi (2020) confirmed that consumption expenditure strongly influences Nigeria's gross domestic product using an Autoregressive Distributed Lag (ARDL) approach.

Comparative analyses of these studies reveal that income growth consistently boosts consumption expenditure but that external shocks (oil dependency) can moderate this relationship.

## MATERIALS AND METHODS

The study adopts a quantitative, time-series method to analyze the relationship between gross national income and consumption. It employs descriptive statistics, trend analysis, correlation, and linear regression to evaluate annual data covering 1990–2023.

Sources of Data

Data were obtained from secondary sources: World Bank Open Data https://data.worldbank.org and the National Bureau of Statistics (NBS). https://www.nigeriastat.gov.ng. Both provide validated macroeconomic datasets on gross national income and consumption expenditure.

Model Specification

The model is expressed as:

$$CE_t = \beta_0 + \beta_1 GNI_t + \epsilon_t \qquad (1)$$

$CE_t$= Consumption, Expenditure at time t, $GNI_t$=Gross National Income at time t, $\beta_0$=Intercept, $\beta_1$= Regression coefficient, $\epsilon_t$= Error term

**Assumptions of the Regression Model and Error Term**

1. Linearity of the model: The relationship between consumption expenditure (CE) and gross national income (GNI) is linear. That is, CE is a linear function of GNI and the parameters $\beta_1$
2. Zero Mean of the Error Term: The expected value of the error term is zero $E(\in_t) = 0$
3. Homoscedasticity: The variance of the error term is constant for all observations: $Var(\in_t) = \sigma^2$
4. No Autocorrelation Errors: The error term are independently distributed over time: $Cov\ (\in_t, \in_{t-1}) = 0$
5. Normality of error term

The error term is normally distributed: $\in_{t\ \sim N(0,\sigma^2)}$

6. Exogeneity of the Regressor: The explanatory variable (GNI) is uncorrelated with the error term: $Cov(GNI_{t,\in_t}) = 0$

Time Series Trend Model Specification. A deterministic time series trend model is employed. Trend analysis is used to examine the long-run movement of gross national income and consumption expenditure over time.

The general linear model is specified as:

$$Y_t = \alpha + \delta t + \mu_t$$

Where:

Data Analysis Techniques

Data analysis was conducted using SPSS (Version 25).

Descriptive Statistics: To examine the mean, standard deviation, and distribution of variables.

Trend Analysis: To identify long-term movement in GNI and CE.

Regression Analysis: To test the relationship between GNI and CE.

Hypothesis Testing: Conducted at a 5% significance level ($p < 0.05$).

Collinearity Diagnostics: Ensure the absence of multicollinearity using VIF and tolerance values.

Analysis of (ANOVA) for Regression Model

The analysis of variance(ANOVA) techniques was employed to assess the overall statistical significance and goodness of fit of the regression model used to examine the relationship between gross national income and consumption expenditure in Nigeria.

| Source of Variation (SV) | Sum of squares (SS) | Degree of freedom (DF) | Mean sum of squares (MSS) | F-ratio |
|---|---|---|---|---|
| Regressiopn | $\sum(\widehat{CE}_i - \overline{CE})^2$ | k | $\frac{\sum(\widehat{CE}_i - \overline{CE})^2}{k}$ | $\frac{MSR}{MSE}$ |
| Error | $\sum(CE_i - \widehat{CE}_1)^2$ | n-k-1 | $\frac{\sum(CE_i - \widehat{CE}_1)^2}{n-k-1}$ | |
| Total | $\sum(CE_i - \overline{CE})^2$ | n-1 | $\frac{\sum(CE_i - \overline{CE})^2}{n-1}$ | |

Where CE=Consumption expenditure

$\widehat{CE}$=Predicted Consumption expenditure

$\overline{CE}$=Mean consumption expenditure

n= Number of observations

k= Number of independent variables

*Science World Journal Vol. 20(No 4) 2025* https://dx.doi.org/10.4314/swj.v20i4.60
*www.scienceworldjournal.org*
*ISSN: 1597-6343 (Online), ISSN: 2756-391X (Print)*
*Published by Faculty of Science, Kaduna State University*

## RESULTS AND DISCUSSION

**Table 1:** Descriptive Analysis

| | N | Minimum | Maximum | Mean | Std. Deviation | Skewness | | Kurtosis | |
|---|---|---|---|---|---|---|---|---|---|
| | Statistic | Statistic | Statistic | Statistic | Statistic | Statistic | Std. Error | Statistic | Std. Error |
| Gross National Income Figures (in billions of dollars) | 34 | 25.41 | 555.02 | 242.6197 | 181.02788 | .141 | .403 | -1.692 | .788 |
| Annual Consumption Expenditure in Billions dollar | 34 | 13.03 | 411.96 | 167.5176 | 135.54326 | .275 | .403 | -1.494 | .788 |
| Valid N (listwise) | 34 | | | | | | | | |

Table 1 shows the mean GNI of $242.62 billion, accompanied by a standard deviation of $181.03 billion, indicates considerable variability in income levels. Across the years. The median value of $242.62 billion aligns closely with the mean, indicating a relatively symmetric distribution, further supported by the slight positive skewness (0.141), suggesting a slight tail towards higher income figures. The kurtosis value of -1.692 indicates a flatter distribution compared to a normal distribution, reflecting a wider range of income values. Similarly, annual consumption expenditure shows a mean of $167.52 billion and a standard deviation of $135.54 billion, with comparable skewness (0.275) and kurtosis (-1.494) values, suggesting similar distribution characteristics.

In summary, the average GNI during the study period was $242.6 billion, while CE averaged $167.5 billion, reflecting Nigeria's expanding economic base. Both variables displayed moderate positive skewness, indicating upward movement in income and spending levels

### Time Series Analysis

Time series trend model results form the basis for the graphical illustrations of GNI and CE. Both variables exhibit a positive long-run trend, with observable downturns during periods of economic recession, particularly around 2015-2016.

### Trend Analysis

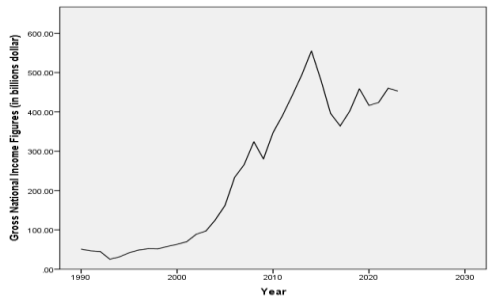


**Figure 1:** Trends in Gross National Income (GNI) in Nigeria

Figure 1 displays the trends in Nigeria's Gross National Income (GNI) from 1990 to 2023, indicating a long-term upward trajectory with periods of volatility. From 1990 to 2000, GNI grew at an average annual rate of approximately 4.2%. This growth accelerated significantly from 2000 to 2014, with an average annual growth rate of around 9.1%, reflecting robust economic expansion driven by increased oil revenues and economic reforms. The data reveals a sharp decline in GNI around 2015 and 2016, showing a decrease of approximately 12.6%, corresponding to the global oil price crash and economic recession. Following this downturn, GNI recovered with an average annual growth rate of 3.8% from 2017 to 2022. The overall trend underscores a positive growth trajectory, with GNI increasing by more than 800% over the 33-year period, despite periodic downturns.

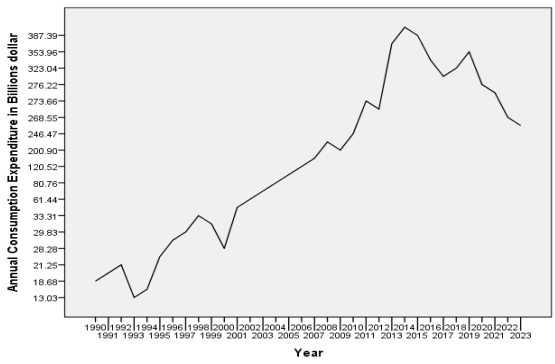


**Figure 2:** Trend in consumption expenditure in Nigeria (1990-2023)

Figure 2 depicts the trends in Nigeria's consumption expenditure from 1990 to 2023, showing a general upward trend with notable fluctuations. From 1990 to 2000, consumption expenditure grew at an average annual rate of approximately 4.7%. A significant acceleration is observed post-2000, with an average annual growth

*Science World Journal Vol. 20(No 4) 2025* https://dx.doi.org/10.4314/swj.v20i4.60
*www.scienceworldjournal.org*
*ISSN: 1597-6343 (Online), ISSN: 2756-391X (Print)*
*Published by Faculty of Science, Kaduna State University*

rate of around 10.3% from 2000 to 2014, indicating increased economic activity and consumer spending. The data reveals a marked decline in 2015 and 2016, corresponding to a 14.4% decrease, reflecting the economic impact of the global oil price collapse. Post-2016, consumption expenditure exhibits a recovery, with an average annual growth rate of 4.5% up to 2021. The overall trend indicates a strong positive correlation between economic growth and consumption expenditure, with periodic downturns highlighting the sensitivity of consumer spending to economic shocks.

In summary, between 1990 and 2000, GNI grew modestly by about 4% annually, accelerating to over 9% between 2000–2014 due to oil boom revenues. The 2015–2016 oil price collapse triggered a notable contraction, but recovery resumed post-2017, albeit at a slower pace. CE followed similar fluctuations, confirming its dependence on income levels.

**Regression Results**

Prior to estimation, the regression model was subjected to analysis of variance (ANOVA) to evaluate its overall statistical significance. The regression results are presented in Tables 2-4

**Table 2**: Model Summary of Regression Analysis for Gross National Income and Consumption Expenditure (1990-2023)
Model summary

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | R Square Change | F Change | df1 | df2 | Sig. F Change |
| 1 | .982[a] | .964 | .963 | 26.23569 | .964 | 848.815 | 1 | 32 | .000 |

a. Predictors: (Constant), Gross National Income Figures (in billions of dollars)

From Table 2 (model summary), it was observed that the multiple correlation coefficient (R) is 0.982, indicating a very high degree of correlation between GNI and CE. The $R^2$ value of 0.964 means that 96.4% of the variance in consumption expenditure can be explained by suggesting an excellent fit of the model to the data and implying that changes in GNI are highly predictive of changes in consumption expenditure. The adjusted $R^2$, which adjusts for the number of predictors, is 0.963, indicating that the model remains robust and does not overfit the data. The standard error of the estimate is 26.23569, indicating the average distance that the observed values fall from the regression line.

**Table 3**: ANOVA Results of the regression model
**ANOVA[a]**

| Model | | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 584249.236 | 1 | 584249.236 | 848.815 | .000[b] |
| | Residual | 22025.965 | 32 | 688.311 | | |
| | Total | 606275.201 | 33 | | | |

a. Dependent Variable: Annual Consumption Expenditure in Billions of dollars
b. Predictors: (Constant), Gross National Income Figures (in billions of dollars)

The ANOVA results show that the regression model is statistically significant at the 5% level of significance. It was observed that the Regression Sum of Squares is 584249.236, and the Residual Sum of Squares is 22025.965, with a Total Sum of Squares of 606275.201. The degrees of freedom for the regression and residual are 1 and 32, respectively. The Mean Square for the regression is 584249.236, and for the residual, it is 688.311. The F-statistic is 848.815, which is highly significant ($p < 0.000$). This indicates that the model explains a significant portion of the variance in Consumption Expenditure and that GNI is a significant predictor.

*Science World Journal Vol. 20(No 4) 2025* https://dx.doi.org/10.4314/swj.v20i4.60
*www.scienceworldjournal.org*
*ISSN: 1597-6343 (Online), ISSN: 2756-391X (Print)*
*Published by Faculty of Science, Kaduna State University*

**Table 4**: Coefficients of Regression Analysis for Gross National Income and Consumption Expenditure (1990-2023)

Coefficients[a]

| Model | Unstandardized Coefficients | | Standardized Coefficients | T | Sig. | Correlations | | Collinearity Statistics | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | B | Std. Error | Beta | | | Zero-order | Partial | Part | Tolerance | VIF |
| (Constant) | -10.812 | 7.597 | | -1.423 | .164 | | | | | |
| Gross National Income Figures (in billions dollar) | .735 | .025 | .982 | 29.134 | .000 | .982 | .982 | .982 | 1.000 | 1.000 |

a. Dependent Variable: Annual Consumption Expenditure in Billions of dollars

From Table 4 (Coefficients), it was observed that the intercept (Constant) is -10.812 with a standard error of 7.597. The t-value for the intercept is -1.423, with a p-value of 0.164, indicating that it is not statistically significant. The coefficient for GNI is 0.735, with a standard error of 0.025. The t-value for GNI is 29.134, with a p-value of 0.000, indicating that it is highly significant. This means that for every billion-dollar increase in GNI, Consumption Expenditure increases by 0.735 billion dollars. The standardized coefficient (Beta) for GNI is 0.982, reinforcing that GNI is a strong predictor of Consumption Expenditure. The correlations section shows a Zero-order correlation of 0.982 between GNI and CE, indicating a very strong linear relationship. Both partial and part correlations are also 0.982, suggesting that GNI maintains its strong relationship with Consumption Expenditure even when controlling for other variables. The Collinearity Statistics show a Tolerance value of 1.000 and a VIF (Variance Inflation Factor) of 1.000, indicating no multicollinearity issues in the model.

The findings affirm a strong, positive, and statistically significant relationship between GNI and CE, underscoring the role of income as a principal driver of consumer expenditure. Economic expansions triggered by oil revenue increases stimulate domestic demand, while recessions curtail consumption. This cyclical pattern aligns with the Permanent Income Hypothesis, suggesting that Nigerian consumers adjust spending based on long-term income expectations rather than short-term fluctuations.

Furthermore, while income growth promotes consumption, inflation and exchange rate instability often erode purchasing power. Hence, sustained increases in real income—rather than nominal gains—are crucial to maintaining consumption growth.

From the analysis of the tables, it was observed that there is a strong and significant relationship between GNI and Consumption Expenditure in Nigeria from 1990 to 2023. The model explains 96.4% of the variance in Consumption Expenditure, indicating that GNI is a highly effective predictor. The coefficient for GNI suggests that an increase in GNI leads to a substantial increase in Consumption Expenditure. The high R, R Square, and significant F-statistic confirm the model's robustness and predictive power. These findings suggest that economic policies aimed at increasing GNI are likely to have a significant positive impact on Consumption Expenditure, contributing to economic growth and well-being in Nigeria.

In summary, the regression output shows a strong positive correlation ($R = 0.982$) and high explanatory power ($R^2 = 0.964$). The estimated regression equation is:

$CE = -10.81 + 0.735(GNI)$

Hypothesis Testing

$H_{01}$ (Relationship Test): Rejected. The Pearson correlation ($r = 0.982$; $p < 0.05$) indicates a strong, significant relationship.

$H_{02}$ (Impact Test): Rejected. GNI has a statistically significant impact on CE ($\beta_1 = 0.735$; $t = 29.13$; $p < 0.001$).

These results align with Keynesian theory and corroborate findings by Adepoju& Idowu (2019) and Oyelola& Adeniyi (2020), confirming that higher national income promotes consumer spending in Nigeria.

**Conclusion**

This study concludes that Gross National Income (GNI) significantly and positively influences Consumption Expenditure (CE) in Nigeria. Between 1990 to 2023, GNI explained approximately 96% of the variation in CE, highlighting the critical role of national income growth in stimulating consumer demand. Consequently, policies that expand productive capacity, stabilize income levels, and reduce economic volatility will enhance consumption and overall welfare.

**Policy Recommendations**

Diversify the Economy: Reduce dependence on oil by expanding the manufacturing, agriculture, and services sectors to generate stable income sources.

Stimulate Inclusive Growth: Promote income equality through employment programs, SME development, and rural investment.

Enhance Fiscal Policy: Implement targeted spending to boost disposable incomes, particularly in low-income households.

Promote Consumer Confidence: Maintain price stability and reduce inflation to preserve real income and spending power.
Encourage Innovation and Productivity: Invest in infrastructure and education to enhance output and national income.

**Suggestions for Future Research**

Further research should incorporate additional variables such as inflation, interest rates, and unemployment to assess broader macroeconomic interactions. A comparative study with other African economies could offer deeper insights into income–consumption dynamics in developing nations.

**REFERENCES**

Adepoju, A., & Idowu, O. (2019). Impact of Gross National Income on Economic Growth: Empirical Evidence from Nigeria. Journal of Economic Studies, 45(2), 87–101

Oladimeji, O., Adebayo, T., & Akinola, D. (2021). Trends and Determinants of Gross National Income in Nigeria: An Econometric Analysis. Nigerian Journal of Economic Studies, 13(3), 102–118.

Oyelola, A., & Adeniyi, S. (2020). Consumption Expenditure and Economic Growth in Nigeria: An ARDL Approach. Journal of Business and Economic Analysis, 9(2), 58–73.

Adepoju A.A., & Idowu, O.A. (2019). Impact of gross national income on economic growth: Empirical evidence from Nigeria. Journal of economic studies, 45(2), 87-101

World development indicators. Data source from the World Bank. https://data.worldbank.org.

National bureau of statistics. Data sourced: https://nigeriastat.gov.ng

SPSS version 25: software used.