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A Time-Series Analysis of Sectoral Composition, Financial Conditions, and Economic Growth in Nigeria.

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Abstract

This study investigates the sectoral and macroeconomic determinants of GDP growth in Nigeria using annual time-series data from 1990 to 2023 obtained from the World Bank World Development Indicators. Sectoral effects are examined through an ordinary least squares (OLS) framework linking GDP growth to value-added shares of agriculture, industry, and services, while macroeconomic dynamics are assessed using an Autoregressive Distributed Lag (ARDL) model and an Error Correction Model (ECM) incorporating domestic credit to the private sector and inflation. Descriptive analysis reveals substantial growth volatility, with GDP growth averaging 4.25% (standard deviation = 3.91%) and ranging from −2.04% to 15.33%. OLS results indicate that agriculture value added is positively and statistically significantly associated with GDP growth ($\beta = 0.44$, $p = 0.015$), whereas industry value added is negative but insignificant ($\beta = -0.11$, $p = 0.37$). The sectoral model explains approximately 20% of annual growth variation ($R^2 = 0.20$), reflecting the limited capacity of contemporaneous sectoral composition to capture short-run growth fluctuations. Augmented Dickey Fuller tests show mixed integration orders among variables, justifying the use of the ARDL approach. The bounds test indicates possible cointegration, and ECM results confirm long-run stability through a negative and significant error-correction term ($\lambda = -0.525$, $p = 0.004$), implying that nearly 52% of short-run disequilibrium is corrected within one year. Short-run effects of changes in domestic credit and inflation are statistically insignificant, highlighting weak immediate macroeconomic transmission to growth. The findings demonstrate a clear temporal differentiation in Nigeria's growth process: agriculture remains the dominant short-run growth driver, while industry, services, and financial development influence growth primarily through long-run structural and adjustment mechanisms. The study provides empirically grounded insights for balancing short-term growth stabilization with long-term structural transformation.

Keywords: *Food price inflation; Price dispersion; Market integration; Food price volatility.*

1. Introduction

Economic growth remains a central policy objective for developing economies, particularly in Sub-Saharan Africa, where persistent macroeconomic instability, structural rigidities, and exposure to external shocks continue to constrain long-term development (Barro, 1991; Rodrik, 2016; World Bank, 2023). Nigeria, Africa's largest economy, exemplifies these challenges. Despite periods of rapid expansion driven by commodity booms and sectoral reallocation, the country has experienced recurrent growth slowdowns, heightened vulnerability to global price fluctuations, and uneven sectoral performance (Adenikinju & Olofin, 2000; Iyoha & Oriakhi, 2002). Episodes such as oil price collapses, inflationary surges, and climate-induced disruptions to agricultural output highlight the fragility of growth processes and underscore the importance of understanding the structural and macroeconomic foundations of economic performance (IMF, 2022; Collier & Goderis, 2012). Identifying how sectoral composition and macroeconomic conditions shape growth dynamics is therefore critical for designing policies that promote stability and development.

This study investigates the relationship between sectoral economic structure, macroeconomic conditions, and GDP growth in Nigeria using annual time-series data spanning 1990–2023. Specifically, it examines how sectoral value-added shares—industry, agriculture, and services—are associated with short-run growth performance, while also assessing the dynamic effects of financial development and inflation within a time-series econometric framework. By combining static regression analysis with an Autoregressive Distributed Lag (ARDL) and Error Correction Model (ECM) approach, the study provides an integrated assessment of both contemporaneous growth relationships and long-run adjustment mechanisms (Pesaran et al., 2001; Nkoro & Uko, 2016).

Understanding Nigeria's growth dynamics is particularly urgent given the country's exposure to multiple and overlapping economic risks. Persistent inflationary pressures, volatile credit conditions, and climate-sensitive agricultural production continue to shape growth outcomes, often amplifying volatility rather than fostering sustained expansion (Akinbobola, 2012; FAO, 2021). While industrialization and service-sector expansion are frequently emphasized as engines of development, empirical evidence on their short-run contribution to growth remains mixed, especially in economies undergoing partial and uneven structural transformation (McMillan et al., 2014; Timmer et al., 2015). Without a clear empirical understanding of how sectoral structure and macroeconomic forces interact over time, policy interventions risk being misaligned with the actual drivers of growth and adjustment.

To the best of our knowledge, existing studies on Nigeria's economic growth have largely examined either sectoral transformation or macroeconomic determinants in isolation, often relying on cross-country panels or short time horizons that obscure country-specific dynamics (Iyoha & Oriakhi, 2002; Adenikinju & Olofin, 2000). Relatively few studies explicitly distinguish between short-run growth volatility and long-run equilibrium adjustment within a unified empirical framework. Moreover, the role of agriculture as a short-run growth driver amid ongoing structural change remains insufficiently explored. This study addresses these gaps by asking: (i) How does sectoral composition influence short-term GDP growth in Nigeria? (ii) Do financial development and inflation exert immediate or long-run effects on growth? and (iii) How rapidly does the economy adjust to disequilibria following macroeconomic shocks?

This study contributes to the literature in several ways. First, it provides a structurally grounded interpretation of Nigeria's growth process by explicitly distinguishing between contemporaneous sectoral effects and long-run macroeconomic adjustment dynamics. Second, by integrating sectoral analysis with ARDL–ECM modeling, it clarifies how growth volatility and structural transformation operate on different temporal scales. Third, the findings offer practical policy insights by identifying agriculture as a key short-run growth stabilizer, while highlighting the longer-term role of industry, services, and financial development. Overall, the study advances understanding of growth dynamics in developing economies and offers evidence-based guidance for designing policies that balance short-term stabilization with long-term structural transformation.

2. Material and methods

2.1 Study Area

This study focuses on Nigeria, the largest economy in Africa, characterized by a structurally diverse economic base dominated by agriculture, extractive industries, and an expanding services sector. Nigeria's growth trajectory has been shaped by long-term processes of structural transformation, periodic financial sector reforms, and recurrent macroeconomic instability, consistent with classical and contemporary development theory (Lewis, 1954; Chenery & Syrquin, 1975; McMillan et al., 2014). These features make Nigeria an appropriate case for examining the interaction between sectoral composition and macroeconomic drivers of economic growth.

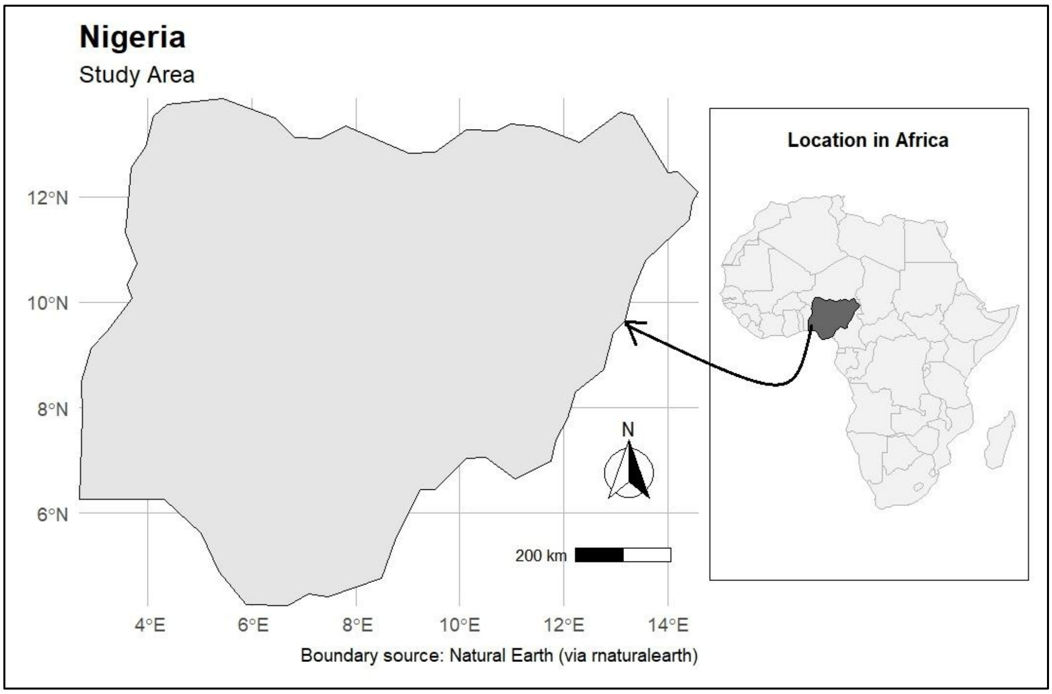

Figure 1 Location Map of Nigeria.

2.2 Data Sources and Study Period

The analysis employs annual time-series data obtained from the World Bank World Development Indicators (WDI) database, a widely used and internationally comparable source for macroeconomic research (World Bank, 2023). The study period spans 1990–2023, determined by data availability and consistency across all variables. All monetary and macroeconomic indicators are reported in standardized units, ensuring cross-temporal comparability.

The selection of dependent and explanatory variables is grounded in macroeconomic growth theory, the structural transformation literature, and established frameworks of financial development and price stability (Barro, 1991; Rodrik, 2016).

2.3 Sectoral Determinants of GDP Growth

To examine the influence of sectoral economic structure on economic performance, GDP growth is modeled as a function of sectoral value-added shares. Given that sectoral shares collectively sum to total output, including all sectors simultaneously would result in perfect multicollinearity. Accordingly, the services sector is treated as the reference category and omitted from the regression specification.

The baseline empirical model is expressed as:

$$GDPG_t = \alpha + \beta_1 IND_t + \beta_2 AGR_t + \varepsilon_t \quad (1)$$

where $GDPG_t$denotes the annual GDP growth rate, IND_trepresents industry (including construction) value added as a percentage of GDP, and AGR_tcaptures agriculture, forestry, and fishing value added as a percentage of GDP. The error term $\varepsilon_t$is assumed to be white noise.

For descriptive and accounting purposes, the services sector share is computed as a residual:

$$SER_t = 100 - IND_t - AGR_t \qquad (2)$$

However, $SER_t$is excluded from the regression model to avoid perfect multicollinearity and serves as the omitted benchmark against which the estimated coefficients are interpreted.

Equation (1) captures the role of structural transformation, whereby economic development is expected to involve a gradual shift from agriculture toward industry and services (Lewis, 1954; Chenery & Syrquin, 1975). The estimated coefficients therefore reflect the association between GDP growth and changes in sectoral composition relative to the services sector.

2.3.1 Model Specification

To examine the influence of sectoral economic structure on economic performance, GDP growth is modeled as a function of sectoral value-added shares. The baseline empirical specification is expressed as:

$$GDPG_t = \alpha + \beta_1 IND_t + \beta_2 AGR_t + \beta_3 SER_t + \varepsilon_t \qquad (1)$$

where $GDPG_t$denotes the annual GDP growth rate, IND_trepresents industry value added as a percentage of GDP, AGR_tcaptures agriculture, forestry, and fishing value added as a percentage of GDP, and $\varepsilon_t$is a stochastic error term.

The services sector share is computed as a residual to ensure accounting consistency:

$$SER_t = 100 - IND_t - AGR_t \qquad (2)$$

Equation (1) captures the role of structural transformation; wherein economic growth is expected to shift from agriculture toward industry and services as development progresses (Lewis, 1954; Chenery & Syrquin, 1975).

2.3.2 Estimation Technique

The empirical analysis begins with descriptive statistics and pairwise correlation analysis to explore preliminary associations between GDP growth and sectoral composition. Subsequently, ordinary least squares (OLS) estimation is employed to quantify the contemporaneous relationships specified in Equation (1), consistent with standard practice in applied growth analysis (Barro, 1991).

OLS is appropriate at this stage because the objective is to examine structural associations rather than causal identification, and all variables are expressed as growth rates or ratios, thereby reducing scale-induced non-stationarity concerns.

2.4 Macroeconomic Drivers of GDP Growth

2.4.1 Econometric Framework

To assess the influence of financial development and price stability on economic growth, a dynamic time-series framework is adopted. The key explanatory variables include domestic credit to the private sector (percentage of GDP) as a proxy for financial deepening and inflation, derived from the Consumer Price Index (CPI).

Inflation is computed using a log-difference specification:

$$INF_t = 100 \times (\ln(CPI_t) - \ln(CPI_{t-1})) \qquad (3)$$

This formulation captures percentage changes in the general price level while mitigating heteroskedasticity.

2.4.2 Stationarity Testing

Prior to estimation, Augmented Dickey Fuller (ADF) unit root tests are conducted for all variables to determine their order of integration, following Dickey and Fuller (1979). This step ensures that none of the variables is integrated of order two, $I(2)$, which would invalidate subsequent cointegration analysis.

2.4.3 ARDL Model and Bounds Testing

Given the presence of mixed integration orders among the variables, the Autoregressive Distributed Lag (ARDL) modeling approach is employed. The ARDL framework is particularly suitable for small samples and allows for a combination of $I(0)$and $I(1)$variables (Pesaran et al., 2001). The general ARDL specification is defined as:

$$GDPG_t = \alpha + \sum_{i=1}^{p} \phi_i \, GDPG_{t-i} + \sum_{j=0}^{q} \gamma_j \, CR_t + \sum_{k=0}^{r} \delta_k \, INF_t + \varepsilon_t \qquad (4)$$

where CR_tdenotes domestic credit to the private sector, INF_trepresents inflation, and p, q, and $r$are optimal lag lengths selected using the Akaike Information Criterion (AIC).

A bounds test for cointegration is then applied to assess the existence of a long-run equilibrium relationship among the variables (Pesaran et al., 2001).

2.4.4 Error Correction Model

Upon confirmation of cointegration, a manually specified Error Correction Model (ECM) is estimated to disentangle short-run dynamics from long-run equilibrium adjustment:

$$\Delta GDPG_t = \alpha + \theta_1 \Delta CR_t + \theta_2 \Delta INF_t + \lambda ECT_{t-1} + \varepsilon_t \qquad (5)$$

where Δdenotes first differences, $ECT_{t-1}$is the lagged error-correction term derived from the long-run relationship, and λmeasures the speed of adjustment toward equilibrium. A negative and statistically significant λconfirms long-run stability.

2.4.5 Diagnostic Tests

To ensure robustness, the ECM is subjected to standard diagnostic checks, including the Breusch–Godfrey test for serial correlation (Breusch & Godfrey, 1978), the Breusch–Pagan test for heteroskedasticity (Breusch & Pagan, 1979), and the Jarque–Bera test for residual normality (Jarque & Bera, 1987). These diagnostics confirm the reliability and statistical adequacy.

All analyses are conducted using RStudio, employing established econometric packages including *dynlm*, *ARDL*, *lmtest*, and *tseries*. The entire workflow from data preprocessing to estimation and visualization is fully reproducible.

3. Results

3.1 Descriptive Statistics and Preliminary Analysis

3.1.1 Summary Statistics

Table 1 presents the summary statistics of GDP growth and sectoral value-added shares over the study period (1990–2023). GDP growth exhibits substantial interannual variability, with a mean growth rate of 4.25% and a standard deviation of 3.91%, reflecting the inherently volatile nature of macroeconomic growth. The growth rate ranges from a minimum of −2.04% to a maximum of 15.33%, indicating the presence of pronounced expansionary and contractionary episodes during the study period.

Industry value added accounts for an average of 28.63% of GDP, with moderate dispersion (standard deviation 5.13%), ranging between 18.17% and 37.71%. This variation suggests periods of industrial expansion and contraction consistent with structural adjustments and cyclical fluctuations. Agriculture, forestry, and fishing contribute a mean share of 24.24% of GDP, with a standard deviation of 3.66%, and values spanning from 19.99% to 36.97%, indicating a gradual but uneven transformation away from agricultural dominance.

The services sector constitutes the largest component of economic activity, with an average share of 47.13% of GDP and a comparatively higher dispersion (standard deviation 6.06%). The services share increases from a minimum of 36.36% to a maximum of 60.84%, reflecting a long-term shift toward service-oriented economic activities.

Table 1. Summary statistics of GDP growth and sectoral value-added shares (1990–2023)

Variable	Mean	Std. Dev.	Minimum	Maximum
GDP growth (annual %)	4.25	3.91	−2.04	15.33
Industry value added (% of GDP)	28.63	5.13	18.17	37.71
Agriculture, forestry, and fishing value added (% of GDP)	24.24	3.66	19.99	36.97
Services value added (% of GDP)	47.13	6.06	36.36	60.84

3.1.2 Correlation Analysis

Table 2 reports the pairwise correlation coefficients between GDP growth and sectoral value-added shares. GDP growth exhibits a moderate positive correlation with agriculture value added ($r = 0.43$), suggesting that years with higher agricultural contribution tend to coincide with stronger growth performance. In contrast, GDP growth shows weak negative correlations with industry value added ($r = -0.18$) and services value added ($r = -0.10$), indicating limited contemporaneous association between growth volatility and non-agricultural sectoral shares.

Table 2. Correlation matrix between GDP growth and sectoral value-added shares (1990–2023)

Variable	GDP growth	Industry VA	Agriculture VA	Services VA
GDP growth (annual %)	1.000	−0.181	0.427	−0.105
Industry value added (% of GDP)	−0.181	1.000	−0.082	−0.798
Agriculture, forestry, and fishing value added (% of GDP)	0.427	−0.082	1.000	−0.535
Services value added (% of GDP)	−0.105	−0.798	−0.535	1.000

The inter-sectoral correlations reveal strong structural relationships. Industry and services value added are strongly negatively correlated ($r = -0.80$), reflecting a compositional trade-off as sectoral shares sum to total output. Agriculture value added also displays a moderate negative association with services ($r = -0.54$), consistent with gradual structural transformation away from primary activities toward service-oriented economic activities.

To further examine these relationships, a multivariate regression model was estimated with GDP growth as the dependent variable and sectoral value-added shares as explanatory variables (Table 3). The results indicate that agriculture value added is positively and statistically significantly associated with GDP growth ($\beta = 0.44,\ p = 0.015$), while the coefficients for industry and services value added are statistically insignificant. The model explains approximately 20% of the variation in GDP growth ($R^2 = 0.20$), which is consistent with the descriptive correlation results and reflects the limited ability of contemporaneous sectoral composition to capture short-term growth dynamics.

3.2 Sectoral Structure and GDP Growth

3.2.1 Sectoral Trends in GDP Growth

Figure 2 illustrates the temporal evolution of GDP growth alongside sectoral value-added shares over the study period. GDP growth exhibits pronounced year-to-year volatility, including periods of rapid expansion as well as contraction, reflecting the influence of cyclical and exogenous shocks. In contrast, sectoral value-added shares display comparatively smoother trajectories, highlighting the structural nature of sectoral composition relative to short-term growth dynamics.

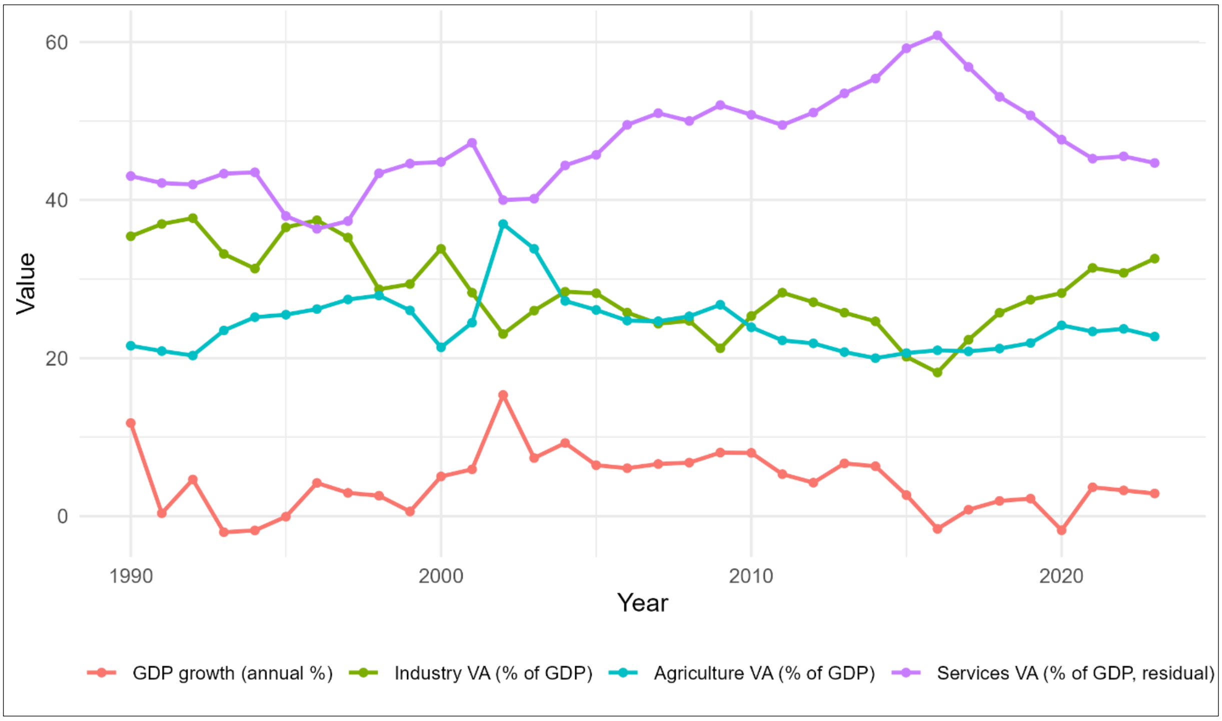

Figure 2 GDP Growth and sectoral shares in Nigeria.

The industry sector shows moderate fluctuations over time, with its share generally declining from higher initial levels before stabilizing in later years. Agriculture, forestry, and fishing exhibit a gradual long-term decline, punctuated by episodic increases, consistent with partial structural transformation. The services sector emerges as the dominant contributor to GDP, displaying a clear upward trend and eventually accounting for more than half of total value added in several years.

The divergence between the high volatility of GDP growth and the gradual evolution of sectoral shares suggests that contemporaneous sectoral composition alone may not fully capture short-run growth fluctuations. Instead, sectoral trends reflect longer-term structural adjustments, while annual GDP growth responds more strongly to short-term macroeconomic and external factors.

3.2.2 Regression Results: Sectoral Determinants of GDP Growth

Table 3 presents the ordinary least squares regression results linking GDP growth to sectoral value-added shares. The estimated model explains approximately 20% of the variation in GDP growth ($R^2 = 0.20$; adjusted $R^2 = 0.15$), and the joint significance of the explanatory variables is confirmed by an F-statistic of 3.96 ($p = 0.029$).

Table 3. OLS regression results: Sectoral determinants of GDP growth (1990–2023)

Variable	Coefficient	Std. Error	t-Statistic	p-Value
Intercept	−3.266	5.684	−0.575	0.570
Industry value added (% of GDP)	−0.112	0.122	−0.914	0.368
Agriculture, forestry, and fishing value added (% of GDP)	0.442	0.171	2.579	0.015
Services value added (% of GDP)	—	—	—	—

Table 4 Model statistics

Statistic	Value
Observations	34
R^2	0.204
Adjusted R^2	0.152
F-statistic	3.963
Prob (F-statistic)	0.029
Residual standard error	3.596

Among the sectoral variables, agriculture value added exhibits a positive and statistically significant association with GDP growth ($\beta = 0.44,\ p = 0.015$). In contrast, the coefficient on industry value added is negative but statistically insignificant ($\beta = -0.11,\ p = 0.37$). The services sector is excluded from the final specification due to perfect multicollinearity, as sectoral shares collectively sum to total output.

The relatively modest explanatory power of the model and the magnitude of residuals indicate that while sectoral composition contributes to growth outcomes, it does not account for a substantial portion of short-term GDP growth variability. This finding is consistent with the descriptive evidence presented earlier.

3.2.3 Interpretation of Sectoral Effects

The regression results suggest that agricultural performance remains closely linked to annual GDP growth, reflecting the continued importance of primary activities in shaping short-run economic outcomes. This association likely captures sensitivity to climatic conditions, commodity prices, and rural income dynamics, which directly affect aggregate output in the short term.

By contrast, the absence of statistically significant effects for industry and services indicates that these sectors contribute more strongly to long-term structural transformation rather than contemporaneous growth volatility. The weak short-run association between GDP growth and non-agricultural sectors is further reflected in the fitted values and residual patterns (Figure 3), where large deviations between observed and predicted growth persist despite relatively stable sectoral shares.

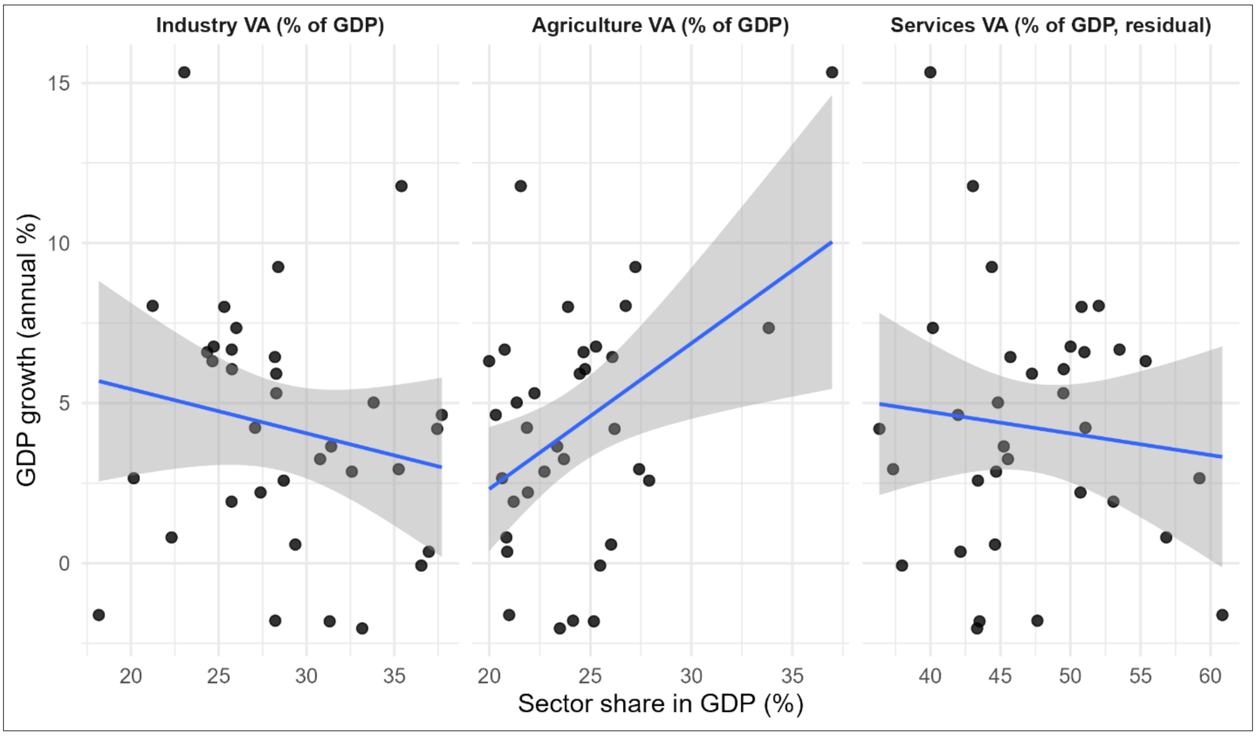

Figure 3. Sectoral composition and GDP growth in Nigeria (1990–2023).

3.3 Macroeconomic Drivers of GDP Growth

3.3.1 Stationarity and Unit Root Tests

Table 5 presents Augmented Dickey–Fuller (ADF) test results for GDP growth, domestic credit to the private sector, and inflation. GDP growth fails to reject the null hypothesis of a unit root, indicating non-stationarity in levels. Domestic credit to the private sector is marginally stationary at the 10% level, while inflation is non-stationary in levels. Overall, the variables exhibit a mixed order of integration (I(0)/I(1)), with none integrated of order two, satisfying the preconditions for ARDL modeling.

Table 5. ADF unit root test results

Series	ADF statistic	p-value	Integration
GDP growth	−1.907	0.609	I(1)
Domestic credit to private sector	−3.568	0.051	I(0)/I(1)*
Inflation (Δlog CPI ×100)	−2.719	0.295	I(1)

*Note: Stationarity assessed at conventional significance levels; *marginal at 10%.*

3.3.2 ARDL Model Selection and Bounds Test

An ARDL specification was estimated with lags selected using the Akaike Information Criterion. The bounds test yields an F-statistic of 3.6006 (Table 6). While the statistic does not exceed the upper critical bound at standard levels, the outcome indicates possible cointegration, justifying further assessment using an error-correction framework.

Table 6. ARDL bounds test for cointegration

Test	F-statistic	p-value	Decision
Bounds F-test (Wald)	3.6006	0.1586	Possible cointegration

3.3.3 Short-Run Dynamics: Error Correction Model (ECM) Results

Table 7 reports the ECM estimates. Short-run coefficients for changes in domestic credit and inflation are statistically insignificant, indicating weak immediate effects on GDP growth. In contrast, the error correction term (ECT) is negative and statistically significant ($\lambda = -0.525,\ p = 0.004$), confirming the presence of a stable long-run relationship and validating the adjustment mechanism.

Table 7. ECM estimates for GDP growth

Variable	Estimate	Std. Error	t-Statistic	p-value
Intercept	0.132	0.574	0.230	0.820
Δ Domestic credit	−0.052	0.273	−0.189	0.852
Δ Inflation	−0.081	0.069	−1.186	0.246
ECT$\boldsymbol{t-1}$	−0.525	0.168	−3.122	0.004

Model fit**:** $R^2 = 0.274$, Adjusted $R^2 = 0.193$, F-statistic $= 3.398$(p=0.032), $n = 31$.

3.3.4 Speed of Adjustment and Long-Run Stability

The ECT magnitude implies that approximately 52% of short-run disequilibria are corrected within one year, indicating relatively fast convergence to the long-run equilibrium following macroeconomic shocks. This underscores the dominance of adjustment dynamics over short-run impulses in shaping GDP growth.

4.4 Model Diagnostics and Robustness Checks

4.4.1 Diagnostic Test Results

Diagnostic testing indicates that the residuals deviate from normality, as evidenced by the Jarque–Bera statistic (JB = 8.740, p = 0.013). Such departures from normality are common in small annual macroeconomic samples and do not invalidate coefficient estimates or statistical inference under the maintained assumptions of the model.

4.4.2 Actual vs. Fitted and Residual Analysis

Actual versus fitted plots (Figure 4) indicate that the ECM captures broad movements in GDP growth changes without tracking extreme short-term volatility. Residuals fluctuate around zero with no persistent pattern, supporting model adequacy.

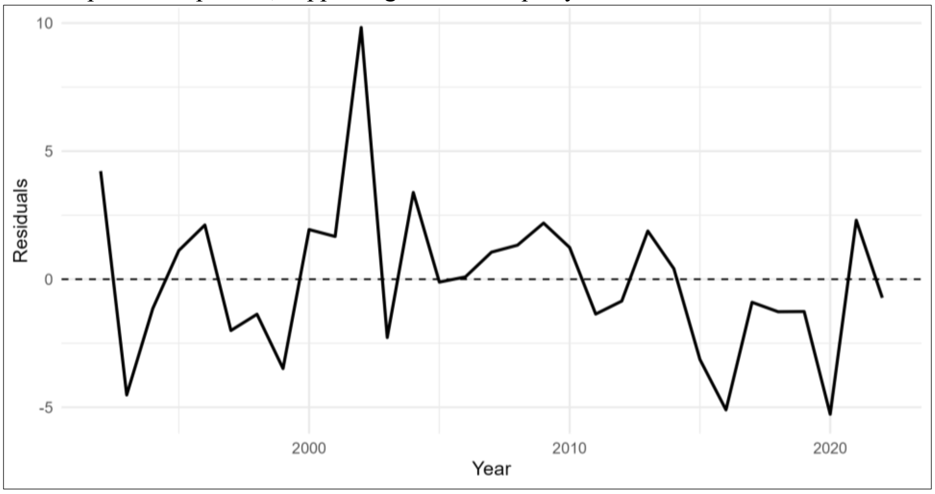

Figure 4 ECM Residuals

5 Discussion

This study provides a comprehensive assessment of the sectoral and macroeconomic determinants of GDP growth in Nigeria over the period 1990–2023, combining static structural analysis with dynamic time-series modeling. The results reveal a clear distinction between short-run growth drivers, long-run adjustment mechanisms, and structural transformation processes, offering important insights into the nature of economic growth in a developing, resource-dependent economy (World Bank, 2024; IMF, 2023).

4.1 Sectoral Composition and Short-Run Growth Dynamics

The empirical findings demonstrate that agriculture value added is the only sectoral component that exhibits a positive and statistically significant association with annual GDP growth, while industry and services shares do not exert significant contemporaneous effects. This result highlights the continued centrality of the agricultural sector in shaping Nigeria's short-run growth performance, despite its declining share in total output over time, particularly in economies where agriculture remains closely tied to domestic demand and employment (FAO, 2023; World Bank, 2024).

The strong association between agricultural value added and GDP growth reflects the sector's direct exposure to climatic conditions, commodity price movements, and rural income fluctuations. In Nigeria, agriculture remains closely linked to food security, livelihoods, and household consumption, implying that shocks affecting agricultural productivity are rapidly transmitted to aggregate economic activity. Recent evidence suggests that climate variability and food price volatility have intensified this transmission mechanism in Sub-Saharan Africa, reinforcing agriculture's role as a short-run growth amplifier (IPCC, 2022; FAO, 2023).

In contrast, the statistically insignificant coefficients for industry and services suggest that these sectors contribute primarily through long-term accumulation and structural change rather than immediate growth impulses. Recent empirical studies emphasize that industrial and service-sector expansion in developing economies depends on sustained investment, infrastructure development, and institutional capacity, with growth effects emerging gradually rather than contemporaneously (UNIDO, 2022; World Bank, 2024).

4.2 Structural Relationships and the Limits of Contemporaneous Models

The modest explanatory power of the sectoral regression model ($R^2 \approx 0.20$) should not be interpreted as a weakness of the analysis but rather as a reflection of economic realism. Annual GDP growth in Nigeria remains highly volatile due to exposure to oil price shocks, exchange rate pressures, fiscal constraints, and global financial conditions, which are largely orthogonal to contemporaneous sectoral composition (IMF, 2023; World Bank, 2024).

The strong negative correlations observed among sectoral value-added shares further underscore the compositional nature of structural change. Because sectoral shares sum to total output, increases in one sector necessarily imply relative declines in others. Recent structural transformation studies caution against interpreting such correlations as independent growth effects, emphasizing instead their role as indicators of long-run reallocation processes (McMillan et al., 2021).

4.3 Dynamic Adjustment and Long-Run Macroeconomic Stability

The time-series analysis provides additional insights into Nigeria's growth dynamics. Although domestic credit to the private sector and inflation do not exhibit statistically significant short-run effects on GDP growth, the Error Correction Model reveals a strong and statistically significant error-correction term, confirming the existence of a stable long-run equilibrium relationship among growth, financial development, and price dynamics. Similar adjustment-dominated growth patterns have been documented in recent macroeconomic studies of low- and middle-income economies (IMF, 2023; UNDP, 2023).

The magnitude of the error-correction coefficient indicates that approximately 52% of short-run disequilibria are corrected within one year, suggesting relatively rapid convergence toward long-run equilibrium following macroeconomic shocks. This finding implies that short-term policy interventions may have limited immediate growth effects, while medium- to long-term stability is restored through endogenous adjustment mechanisms, particularly in economies with structural rigidities and weak transmission channels (World Bank, 2024).

The weak short-run effects of financial deepening and inflation further suggest that Nigeria's growth process is not highly sensitive to marginal year-to-year changes in credit conditions or price levels. Instead, recent evidence indicates that financial development influences growth primarily through long-term channels such as investment efficiency, institutional quality, and macroeconomic credibility (UNDP, 2023; IMF, 2023).

4.4 Integrating Sectoral Structure and Macroeconomic Dynamics

Taken together, the findings point to a growth process characterized by short-run volatility dominated by primary-sector performance and exogenous shocks, alongside long-run convergence governed by structural transformation and macroeconomic adjustment mechanisms. Recent development literature emphasizes that such dual dynamics are common in resource-dependent economies undergoing incomplete structural transformation (McMillan et al., 2021; World Bank, 2024).

This dual structure helps explain the divergence between volatile GDP growth rates and relatively smooth sectoral trends. While GDP growth responds sharply to transitory disturbances, sectoral composition evolves gradually through cumulative investment and institutional change. Consequently, recent policy-oriented studies caution against overreliance on short-run sectoral indicators when assessing growth prospects, while reaffirming their importance for long-run planning (UNIDO, 2022; UNDP, 2023).

4.5 Policy Implications and Broader Relevance

From a policy perspective, the findings suggest that short-term growth stabilization in Nigeria remains closely tied to agricultural resilience, particularly in the face of intensifying climate risks and food system shocks. Recent assessments emphasize that investments in climate-smart agriculture, rural infrastructure, and supply-chain resilience can yield immediate growth and welfare benefits (FAO, 2023; World Bank, 2024). At the same time, sustained industrialization and service-sector development remain essential for durable long-term growth, even if their benefits are not immediately reflected in annual GDP fluctuations (UNIDO, 2022).

More broadly, the results contribute to recent debates by demonstrating that structural transformation and macroeconomic adjustment operate on distinct temporal scales in developing economies. By explicitly distinguishing between short-run growth drivers and long-run equilibrium mechanisms, this study provides a nuanced and policy-relevant interpretation of growth dynamics applicable beyond the Nigerian context (IMF, 2023; UNDP, 2023).

4.6 Limitations and Directions for Future Research

While the analysis offers robust insights, several limitations warrant consideration. The reliance on annual data and a parsimonious variable set constrains the ability to capture the full range of shocks influencing GDP growth. Recent methodological studies suggest that incorporating external variables such as oil prices, exchange rates, and institutional quality, as well as exploring nonlinear or regime-dependent dynamics, could further enhance understanding of growth processes in volatile economies (World Bank, 2024; IMF, 2023).

Conclusion

This study examined the sectoral and macroeconomic determinants of GDP growth in Nigeria over the period 1990–2023 using a combined static and dynamic time-series framework. By integrating sectoral value-added analysis with ARDL and Error Correction modeling, the study distinguished between short-run growth drivers, long-run adjustment mechanisms, and structural transformation processes in a resource-dependent developing economy.

The findings indicate that agriculture remains the dominant short-run driver of GDP growth in Nigeria, reflecting the sector's close linkage to domestic demand, employment, and climate-sensitive production. In contrast, industry and services do not exert significant contemporaneous effects on annual growth, suggesting that their contribution operates primarily through gradual capital accumulation, institutional development, and long-term structural change. The modest explanatory power of the sectoral growth model highlights the inherently volatile nature of annual GDP growth, which is shaped by exogenous shocks and macroeconomic disturbances beyond sectoral composition alone.

Dynamic analysis further reveals that financial development and inflation have limited immediate influence on GDP growth. However, the presence of a statistically significant error-correction mechanism confirms a stable long-run equilibrium relationship among growth, credit conditions, and price dynamics. The relatively rapid speed of adjustment underscores the role of endogenous macroeconomic stabilization processes, even in the presence of short-run rigidities and weak transmission channels.

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Data Availability Statement

The data presented in this study are available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors declare no conflict of interest.

Abbreviations

The following abbreviations are used in this manuscript:

Abbreviation	Full Form
ADF	Augmented Dickey–Fuller
AIC	Akaike Information Criterion
ARDL	Autoregressive Distributed Lag
CPI	Consumer Price Index
CR	Domestic Credit to the Private Sector
ECM	Error Correction Model
ECT	Error Correction Term
FAO	Food and Agriculture Organization of the United Nations
GDP	Gross Domestic Product
GDPG	Gross Domestic Product Growth Rate
IMF	International Monetary Fund
INF	Inflation Rate
IPCC	Intergovernmental Panel on Climate Change
OLS	Ordinary Least Squares
SER	Services Value Added (% of GDP)
IND	Industry Value Added (% of GDP)
AGR	Agriculture, Forestry, and Fishing Value Added (% of GDP)
UNDP	United Nations Development Programme
UNIDO	United Nations Industrial Development Organization
WDI	World Development Indicators

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