

GLOBAL SUPPLY SHOCKS, FOREIGN TRADE AND INCLUSIVE GROWTH IN NIGERIA, 1995-2025

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ABSTRACT

Every global shock brings a peculiar challenge specially to emerging economies with skewed participation in global trade. Thus, this study is on global supply shocks, foreign trade and inclusive growth in Nigeria between 1995-2025. With focus on how global supply shocks filters through foreign trade to determine inclusive growth in Nigeria through; human development index (HDI), international commodity price index (ICPI), Trade openness (TOP), real effective exchange rate (REER) inflation rate (INFR) and institutional quality index (IQI). Non-linear Autoregressive Distributed Lag (NARDL) model technique was employed for estimation and outcomes indicated that; Nigeria's macro welfare connection has not been stable within the period of the study (1995-2025). Furthermore, outcome also indicated the absence of a long run relationship between the variables. This implies that; HDI, ICPI (positive/negative), TOP, REER, INFR, and IQI do not share a stable long-run equilibrium over this period of the study. And that shocks resulting from ICPI transmit into inclusive growth (HDI) in Nigeria, mainly through short run asymmetry, instead of through stable long run equilibrium relationship. Based on these outcomes, the study made the following recommendations; the Nigerian authorities should institutionalise counter cyclical fiscal management of commodity windfalls. Break the cycle of fiscal ratchet behaviour. And the government should also address the issues surrounding the transmission gap.

Key Words: Global Supply Shocks, Foreign Trade, Inclusive Growth and NARDL

JEL Classification Code: F14, F41, O47, C32

1.0 Introduction

The global macroeconomic scenery has witness extraordinary interruptions, caused by series of overlapping supply-side shocks. The flowing disruptions extending from the long-standing supply chain bottlenecks of the pandemic (Covid-19) era to the Russia-Ukraine and geopolitical war, energy market volatility and trade disruption in the Red Sea maritime corridor, which has brought systemic spikes in inflationary pressures and contraction in real output on a global scale (Ha et al., 2024). For an emerging nation, dependent on commodity in sub-Saharan Africa, the scale of the international volatility exposes a profound structural susceptibility, which has undermined long standing social welfare and macroeconomic balance (Wirajing et al., 2023).

In Nigeria, one of Africa's leading economies; the mechanism for transmission of the world-wide supply disruptions is through the channel of international trade. Nigeria showcased growth poverty paradox in spite of its vast natural resources (Elufisan, 2024). In spite of this, Nigeria remains deeply dependent on crude oil exports for over 85% of its foreign exchange and government income, while at the same time relying on imports for indispensable consumer goods, capital equipment, refine petroleum products and industrial raw material (Joseph, 2026). Hence, the Nigerian economy is vulnerable to global commodity price spikes and world-wide vulnerability as a result of its structural asymmetry.

These vulnerabilities, is intensified by current development at the national level. Furthermore, shifts in policy resulting from Nigeria's structure which includes, subsidy removal on Premium Motor Spirit (PMS) and the floating of the Naira as a result of the regulated currency market, this incidentally corresponds with the sharp currency depreciation and foreign exchange liquidity. Subsequently, inflation was at 33% in 2024 determined mostly by increased cost of food and transportation (Doris, 2026). Sluggish real wage increase with high inflation has contributed in weakening households purchasing power which led many into multidimensional poverty, and stagnate the progress towards inclusive growth.

Volatile surge in the International Commodity Price Index (ICPI) complications transmit instantly through trade link (TOP). This is as a result of Nigeria's volume of imports, especially of refine: oil, industrial goods, and processed foods. Global price upsurge increased import cost triggering cost-push inflation (INFR) and depreciation of the exchange rate (REER). As exchange rate depreciates, and national inflation rises, household's disposable income reduces; they dedicate more of their income to immediate consumption requirements, which may include energy and food, thereby reducing investment in health and education the basics for human capital development (HDI) (Kuhe 2026). Institutional quality on the other hand (IQI), determines whether international trade benefits reduce social inequality. When there is prevalence of corruption in an economy, fiscal leakages and weak public investment, the incomes from high export commodity prices don't fund public goods such as: schools, hospitals and social safety nets. More so, capital spending brings negligible welfare enhancement, neutralising the prospective gains of trade on inclusive growth (Orshi, 2024; Kudaisi, 2024).

Neoclassical and classical theories of trade opposed that foreign trade connections promote output growth through comparative advantage, transfer of technology and economies of scale. In developing contexts, empirical evidence indicates mix outcomes. For Obiora (2020) and Joseph (2026) average trade openness exhibits a positive futuristic link with real gross domestic product (GDP) in Nigeria, the benefit is highly domiciled primarily in the oil sector, creating a minimal forward and backward connection with the economy based on labour intensive production. From the welfare metrics scope, Ajayi et al., (2024a) evaluated the mediating place

of infrastructure and trade in Nigeria, and finalising that trade openness does not automatically bring inclusive growth. However, uncontrolled openness in primary-commodity-dependent countries sometimes expose domestic markets to global supply volatility, destabilising domestic price structures (Ogundipe, 2020; Kacou et al, 2022). Additionally, Ha et al, (2024) showed that world-wide supply and energy costs volatility are the main instigators of inflation cycles in developing markets. Economic policy and trade benefits filter through institutions into the real economy. Studies by Kudaishi (2024) highlights that control of corruption, voice and accountability, political stability, government effectiveness are important for human capital accumulation. Similarly, Elufisan (2024) indicated that, institutional ineffectiveness can destabilise important impacts on trade and financial inclusion, resulting in economic growth negatively affecting inclusiveness.

In spite of intermittent resource booms and growth in aggregate GDP, Nigeria suffers from a situation where expansion in the economy takes place alongside increasing poverty, inequality in income and worsening human capital outcome. Transmission of the current worldwide supply disruption, together with consistent foreign exchange volatility and hyperinflation, has reduced standard of living in the country. Furthermore, growth at the macro-economic level is inadequate in promoting micro-level growth inclusiveness. It is in this regards that this study presents an empirical evaluation of the links between global supply shocks, foreign trade and inclusive growth in Nigeria. This is done by bringing together the human development index, international commodity price index, trade openness, real effective exchange rate, inflation rate and institutional quality index. Additionally, through the application of a robust econometric modelling and estimation technique; the Non-linear Autoregressive Distributed Lag (NARDL) model approach, that has the superior advantage to decompose the effect of the independent variables on the dependent variable into their positive and negative state. Therefore, the study examines how global supply shocks filters through foreign trade to determine inclusive growth in Nigeria asymmetrically.

2.0 Literature Review

2.1 Empirical Literature

Literature on Global Supply Shocks

Balke et al., (2025), employed global input-output framework augmented with a Panel Dynamic GMM specification to assess the consequence of participation in the global value chains for 42 developing economies (1998-2023). The study revealed that countries engaging in the global value chains through the export of raw materials are particularly vulnerable to supply chain disruptions. With limited scope for domestic substitution, negative supply shocks reverberate through time affecting local production. In their study on the impact of maritime choke points and shipping prices on coastal ECOWAS countries using Dynamic Factor Models (DFM) from 2005-2023, Gong et al., (2024) demonstrated that transport and logistics shocks are significant inflationary pressures, especially in import-dependent economies. Disruptions in the smooth flow of goods at major ports exacerbate the vulnerabilities of lower-income households as consumers. Using a similar specification, Andriantomanga (2023), analysed the implication of fluctuations in the Global Supply Chain Pressure Index (GSCPI) on the importing economies of Africa. The study covered 34 sub-Saharan African countries, including Nigeria, using panel data between 2000-2022. The authors concluded that the effect of disrupted supply chains manifests rapidly in domestic consumer prices, especially in import-dependent economies. The study further observed that, in import-dependent developing countries, global supply constraints generate asymmetric cost-push inflation, with adverse

downstream effects on manufacturing activity and ultimately, the capacity of the poor to consume.

Alegria et al. (2022), employed a Structural Vector Autoregression (SVAR) methodology augmented with sign restrictions to disentangle supply and demand shocks in the Organization of Petroleum Exporting Countries (OPEC) using data from 1995-2021. The authors concluded that contractionary supply shocks generated fiscal windfalls for oil-producing countries like Nigeria, which are partially offset by higher import prices for capital goods and food. Killian and Lütkepohl (2021), revealed the non-linear response of industrialized economies to global supply shocks by analysing the impact of exogenous physical supply disruptions on factor inputs and production. The authors documented that, compared to demand-driven price shocks, supply-driven shocks have persistent effects on industrialized economies. In their analysis of the impact of supply shocks on primary commodity-importing developing economies using SVAR, Akinlo and Olayiwola (2021), noted the asymmetry in the transmission mechanism of global supply shocks. Using the Non-Linear Autoregressive Distributed Lag (NARDL) approach, the authors analyse the transmission of world oil supply shocks in Nigeria using time-series data from 1990-2019. The study observed that negative and positive supply shocks have different impacts on economic activity. While negative supply shocks immediately lower domestic manufacturing output, positive supply shocks have a delayed response due to domestic structural rigidities. Oseni and Nwosa (2020), employed a Markov-Switching Vector Autoregression model to analyse the impact of global supply disruptions on exchange rates in sub-Saharan Africa. Using quarterly data from 1995-2018, the authors concluded that negative supply shocks precipitate depreciation in the exchange rates of developing countries with limited foreign reserves, triggering a transition to a higher volatility regime, with adverse implications for inflation and welfare.

While the above studies establish the presence of macroeconomic consequences of global supply shocks; particularly in the areas of inflation, exchange rates, and output; they do so in isolation. Each study focused on either the impact of supply disruptions on headline inflation (Andriantomanga, 2023), or the fiscal implications of supply shocks for oil exporting countries (Alegria et al., 2022; Akinlo & Olayiwola, 2021). What is missing in the literature is an analysis of the channel or transmission mechanism through which global supply shocks operate, particularly through trade, to affect the distribution of inclusive growth.

Literature on Foreign Trade

Ajayi et al., (2024b), showed that foreign trade has a positive long-run growth effect on aggregate economic growth; nevertheless, the short-run dynamics revealed that heavy reliance on imports of consumer and intermediate goods tends to weaken domestic production due to high costs. When the authors applied Autoregressive Distributed Lag (ARDL) bound test approach and Error Correction Modelling (ECM), with Nigerian time series data from 1990 to 2022. Esiaka et al., (2024), assessed the asymmetric impact of trade openness on Nigerian industrial sector output using NARDL modelling technique on time series data spanning 1986-2019. The results suggested that free trade (openness) hurts non-oil industrial production as cheap foreign imports outweigh domestic output. The study concluded that Nigeria has an enclave development model in which exports of primary commodities do not contribute to domestic industrialization. Omang et al., (2024), applied the System-GMM approach to examine the association between terms of trade, foreign trade, and government spending in ECOWAS region using aggregated panel data from 2000 to 2022. The results suggested that deteriorating terms of trade combined with heavy import dependency negatively affect official reserves and the government's ability to finance recurrent expenditures.

Uzonwanne (2021), applied the Structural cointegration and VECM technique to examine foreign trade linkages using Nigerian time series data from 1981 to 2019. The paper revealed that while exports drive aggregate economic growth in the short run, exchange rate volatility of critical imported intermediate goods offsets the growth benefit in the long run. Mohammed and Ahmed (2021), employ Johansen cointegration and Fully Modified Ordinary Least Square (FMOLS) techniques to analyse the impact of trade openness, non-oil exports, and economic diversification on the growth of trade openness in Nigeria using time-series data from 1990 to 2020. The study finds that non-oil exports have a positive effect on economic growth but with a low export coefficient, suggesting that diversification away from natural resources is insufficient to cushion the economy against commodity price fluctuations. Anyawu and Enima (2020), apply the Time-Varying Parameter Vector Autoregression (TVP-VAR) approach to examine the relationship between non-oil trade performance and economic growth in Nigeria using data from 1985 to 2018. The results suggested that trade policy reforms have not promoted the transformation of the non-oil economy into an advanced manufacturing economy due to inadequate infrastructure, high port costs, and trade policy inconsistencies. Olofin and Udo (2019), used Panel Dynamic Fixed-Effects and GMM Regressions to estimate the impact of global value chains, trade openness, and import diversification on macroeconomic vulnerability in twenty-eight (28) Sub-Saharan African countries using aggregated panel data from 1995 to 2017. The results suggested that trade openness alone does not benefit sub-Saharan African countries; rather, it increased price volatility in the face of foreign cost shocks unless there is diversification into domestic industrial capacity.

The foreign trade literature focused on the relationship between trade and economic growth, particularly on trade openness, export diversification, and terms of trade (Ajayi et al., 2024b; Mohammed & Ahmed, 2021). However, the growth analysis in these studies is limited to conventional economic growth indicators such as real gross domestic product (GDP) growth rates. These papers overlook the fact that trade openness promotes economic growth not only through direct output effects but also indirect growth effects by influencing the distribution of income as well as social inclusion and protection.

Literature on Inclusive Growth

Umaru and Bilyaminu (2024), evaluated the dimensions of inclusive growth in Nigeria: an empirical assessment. Principal Component Analysis (PCA) was used to build a composite Inclusive Growth Index for Nigeria (1995-2022) combined with structural time-series modelling. Outcome indicted that, structural distortions, high youth unemployment, and persistent inflation have decoupled real GDP growth from social inclusivity in Nigeria over the past two decades. Alekseeva and Iregui (2023), utilized dynamic structural panel estimation across 45 developing economies from 1995 to 2021 to evaluate sector-specific labour absorption and growth inclusivity. Result showed that, growth concentrated in capital-intensive, extractive sectors (such as petroleum) generates minimal employment spillovers, resulting in jobless growth that fails to meet inclusive development benchmarks. Oyinlola and Adedeji (2022), constructed a multidimensional Inclusive Growth Index (incorporating income growth, poverty reduction, equity, and employment) for 32 Sub-Saharan African countries from 1995 to 2020 using System-GMM estimation. And interrogated human capital formation, institutional quality, and inclusive growth dynamics in Sub Saharan Africa. Outcome indicated that, aggregate GDP expansion in Sub Saharan Africa has been non-inclusive. Growth only yields poverty reduction and structural equity when mediated by high institutional quality and targeted human capital development.

Interactive GMM models across 48 African nations spanning 2000 to 2019 was employed by Nchofong and Asongu (2022), to interrogate ICT diffusion, trade openness, and inclusive

growth in Africa. Outcome indicted that, trade openness yields positive inclusive growth outcomes only when combined with digital infrastructure that lowers transaction costs for micro, small, and medium-sized enterprises (MSMEs). Oyakale (2021), combined General Household Survey (GHS) panel data with macro-level price series from 2010 to 2019 using a Micro Econometric Panel Difference-in-Differences approach, to examined macroeconomic volatility, food price shocks, and household inclusivity in rural Nigeria. Result showed that, macroeconomic instability and imported food inflation directly reduce real household income in rural and peri-urban demographics, widening income inequality and eroding gains in inclusive development. Kalu and Ogbuagu (2020), employed ARDL bounds testing and cointegration techniques using Nigerian annual time series data from 1985 to 2018, and examined fiscal policy dynamics, public social spending, and inclusive growth in Nigeria. Result indicated that, public expenditure on health and education promotes long-term inclusive growth, but fiscal revenue volatility driven by external commodity price collapse consistently disrupted social spending programs. Foreign capital inflows, trade openness, and inclusiveness of growth in Sub Saharan Africa was examined by Anetor et al., (2020), with Panel Vector Error Correction Model (PVECM) across 24 Sub Saharan African economies from 1990 to 2017. Outcome showed that, trade openness without domestic credit access and social safety nets worsens income distribution, as competitive advantages accrue primarily to large capital owners rather than smallholder enterprises or informal workers.

The empirical literature on inclusive growth focused on internal structural factors, such as human capital development, institutional quality, public social spending, and labour absorption (Oyinlola & Adedeji, 2022, Umaru & Bilyaminu, 2024). The critical gap is that inclusive growth studies treat social outcomes as insulated from global macroeconomic dynamics, failing to evaluate how external shocks and foreign trade disruptions compromise domestic inclusivity.

2.2 Novelty

Research by Andriantomanga (2023) examined how supply chain disruptions affect inflation and monetary policy, however, the study falls short of examining real trade flows or long-term socio-economic equity. For Ajayi et al. (2024b) and Esiaka et al. (2021) it was trade openness and growth, nevertheless the study relies on aggregate real GDP as indicator, and it masks increasing poverty, unemployment and inequality. On the other hand, Oyinlola and Adedeji (2022) focused on internal domestic policies such as; fiscal social spending and institutions while ignoring external shock transmission pathways. While Kalu and Ogbuagu (2020) examined fiscal policy dynamics, public social spending, and inclusive growth in Nigeria, but ignored the place of foreign trade in improving job creation which enhance inclusive growth. In filling this gap, this study integrates all three components into a single empirical framework: Global supply shocks-foreign trade channels-inclusive growth dynamics. This is done by using time-series data for Nigeria spanning 1995 to 2025, and uses Non-linear Autoregressive Distributed Lag (NARDL) model approach to empirically evaluates how global supply disruptions filter through foreign trade transmission mechanisms to determine multidimensional inclusive growth outcomes.

2.3 Theoretical Review

2.3.1 The New Trade Theory

New Trade Theory (NTT) came about in the late 1970s and 1980s as a reaction to the shortcoming of the classical Ricardian and Heckscher-Ohlin theory. Existing trade theories focus more on international exchange mainly through factors like differences in technological,

factor endowments and comparative advantage. Nevertheless, they have difficulty explaining the reasons countries with similar technologies, preferences and factor endowments trade heavily with one another, or the reason trade is concentrated among firms and countries with substantial economies of scale. Furthermore, Krugman (1979) contributed to the theory through his model of increasing returns, monopolistic competition and international trade. Furthermore, Krugman posited that, trade can arise between countries that are identical in their technologies, factor endowments and consumer preferences because firms benefit from economies of scale and consumers value product variety. NTT is relevant to this study on global supply shocks, foreign trade and inclusive growth in Nigeria. As the theory provides a framework for understanding the productivity and growth effects of foreign trade more than the usual comparative-advantage debate. Nigeria's integration into global trade may expand the scale of firms in manufacturing, agro-processing, logistics, digital services and other tradables. If trade permits Nigerian firms to access larger markets, imported intermediate inputs, new technologies and foreign knowledge, it can reduce production costs and enhance productivity. The theory also throws more light on why the structure of Nigerian trade matters. The Nigerian trade regime is dominated by crude-oil exports and manufactured-goods imports; therefore, this may generate fewer domestic scale economies than a diversified export structure based on processed agricultural goods, petrochemicals, services and manufactured products.

2.3.2 The Stochastic Shock / Real Business Cycle (RBC) Framework

Stochastic Shock or Real Business Cycle (RBC) framework finds its way into the modern macroeconomic literature through Kydland and Prescott (1982). Its intellectual basis can be traced to their earlier works on stochastic disturbances, dynamic adjustment and the interaction between technology and economic fluctuations. Kydland and Prescott integrated these ideas into a dynamic general-equilibrium model in which economic fluctuations arise from real shocks and rational responses by households and firms. In the case of the RBC framework, a negative productivity shock decreases output directly. It might sometimes decrease investment, employment, consumption and government income. However, a positive shock produces the reverse effects. The size and persistence of the response depend on capital accumulation, labour-market adjustment, expectations, openness of the economy, the composition of production and institutional quality. The importance of the RBC framework to this study is that Nigeria is highly susceptible to global shocks. International supply instabilities can affect the Nigerian economy through prices of commodity, import, export revenues, costs of production, households purchasing power and real exchange rates. Any increase in global oil prices may initially improve Nigeria's export revenue, fiscal revenue and foreign-exchange availability. Though, an adverse global supply shock affecting refined petroleum products, machinery, transport, food, machinery, and reduce real output. The aggregate effect rest on whether Nigeria is a net exporter or importer of the affected product, the degree of domestic production capacity and the extent to which global prices are transmitted to domestic economy.

2.4 Theoretical Framework

NTT and RBC framework together explain different but interconnected dimensions of the research problem. NTT is mainly a structural theory of trade and long-run productivity, whereas RBC is mainly a dynamic theory of fluctuations and short- to medium-run responses to real shocks. These theories support one other in that global supply shocks do not affect all economies, firms or sectors alike. Furthermore, their collective effects rest partly on the trade structure and productive organisation designated by NTT. Additionally, the benefits of trade increase depend on the economy's capacity to absorb and adjust to shocks, that is captured by the RBC framework. The NTT component confirms whether Nigeria have what it takes in the

domestic sphere, competition and productive capacity to substitute local inputs for imported ones. Should domestic suppliers expand production as a result of economies of scale, the shock may be absorbed more effectively. On the other hand, should domestic production become weak, the shock may worsen food inflation, reduce real wages and undermine inclusive growth.

3.0 Methodology

3.1 Nature and the Source of Data

Table 1 Definition and measurement of Variables

Variables	Definition & Measurement	Sources
Human Development Index (HDI)	A composite index used to measure the average achievement of a country using three basic aspects of human development: health, knowledge and standard of living, measured using the geometric mean	United Nations Development Programme (UNDP) portal
International Commodity Price Index (ICPI)	Measures monthly changes in international prices of a basket of food commodities (Cereals, Vegetable Oils, Dairy, Meat, Sugar)	IMF Data Portal / IMF eLibrary API
Trade Openness (TOP)	International Trade in Goods and Services as % of GDP	World Development Indicator (WDI)
Real Effective Exchange Rate (REER)	It serves as the primary index of external price competitiveness. It indicates how expenses or cheap Nigeria commodity goods are compared to foreign goods in international market. It is measured in index scale.	Central Bank of Nigeria Statistical Bulletin (CBN)
Inflation Rate (INFR)	Percentage of the variations in the general price level.	Central Bank of Nigeria Statistical Bulletin (CBN)
Institutional Quality Index (IQI)	Institutional Quality Index (IQI) is a composite index, and Principal Component Analysis (PCA) was used with six institutional quality indicators; control of corruption (CC), government effectiveness (GE), political stability (PS), regulatory quality (RQ), rule of law (RL) and voice and accountability (VA).	World Development Indicator (WDI)

Source: Authors computation, 2026

3.2 Model Specification

The model for the study is derived from the theory; the new trade theory and the RBC framework.

Theoretical interpretation

Under New Trade Theory, ICPI and TOP capture external trade conditions, economies of scale, and market-access effects, while REER reflects competitiveness and the transmission of external price movements to domestic trade performance. Under the RBC framework, shocks to ICPI and REER are treated as real external disturbances that propagate through output, prices, and welfare-related outcomes, here proxied by HDI, with inflation and institutional quality serving as adjustment and transmission channels.

$$HDI = f(ICPI, TOP, REER, INFR, IQI)$$

$$HDI = f(ICPI^+, ICPI^-, TOP, REER, INFR, IQI) \text{ -----} 1.0$$

$$InHDI_t = \alpha_0 + \alpha_1 ICPI^+_{t-1} + \alpha_2 ICPI^-_{t-1} + \alpha_3 TOP_t + \alpha_4 InREER_t + \alpha_5 INFR_t + \alpha_6 IQI_t \text{ -----} 2.0$$

$$InHDI_t = \alpha_0 + \alpha_1 ICPI^+_{t-1} + \alpha_2 ICPI^-_{t-1} + \alpha_3 TOP_t + \alpha_4 InREER_t + \alpha_5 INFR_t + \alpha_6 IQI_t + \mu_t \text{ -----} 3.0$$

$$\Delta InHDI_t = \alpha_0 + \rho HDI_{t-1} + \theta^+ ICPI^+_{t-1} + \theta^- ICPI^-_{t-1} + \beta_1 TOP_{t-1} + \beta_2 InREER_{t-1} + \beta_3 INFR_{t-1} + \beta_4 IQI_{t-1} + \sum_{i=1}^p \gamma_i \Delta InHDI_{t-i} + \sum_{i=0}^q 1 (\pi^+ i \Delta ICPI^+_{t-i} + \pi^- i \Delta ICPI^-_{t-i}) + \sum_{i=0}^q 2 \phi_i \Delta TOP_{t-i} + \sum_{i=0}^q 3 \delta_i \Delta InREER_{t-i} + \sum_{i=0}^q 4 \psi_i \Delta INFR_{t-i} + \sum_{i=0}^q 4 \omega_i \Delta IQI_{t-i} + \mu_t \text{ -----} 4.0$$

Where: HDI = Human Development Index, $ICPI^+$ and $ICPI^-$ = International Commodity Price Index, TOP = Trade Openness, REER = Real Effective Exchange Rate, INFR= Inflation Rate and IQI = Institutional Quality Index. α_0 to α_5 indicates unknown vector parameters and μ_t depicts stochastic term. Δ represents first difference operator;

p is the lag order of the dependent variable;

q1, q2, q3, q4 are lag orders of the independent variables;

θ^+ and θ^- capture the long-run effects of positive and negative changes in ICPI;

π^+ and π^- capture the short-run effects of positive and negative changes in ICPI;

ρ is the speed of adjustment parameter; and

μ_t is the error term.

4.0 Result and Interpretation

4.1 Preliminary Test

4.1.1 Trend Analysis

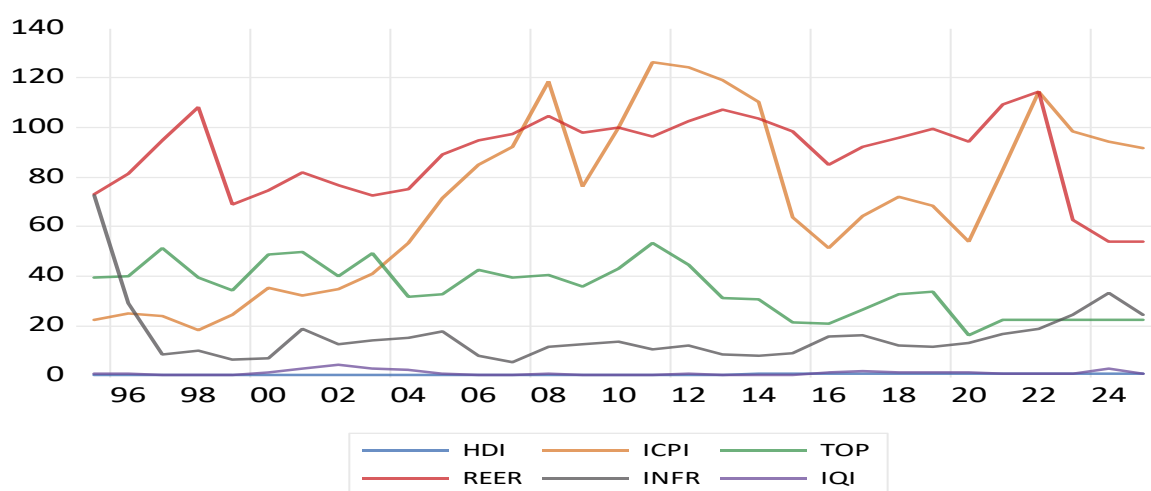


Figure 1. Source: Authors computation with output from E-views 13, 2026

Figure 1 indicates the combined trend of the variables used for the study; the outcome reveals a striking contrast in Nigeria's economic structure. International Commodity Price Index (ICPI) demonstrated to be highly volatile, cyclical sensitive trajectories. Trade Openness (TOP) indicates to be undulating and peaked around 2011 then continued to decrease but in an undulating manner. The Human Development Index (HDI) showed to be stagnant. These variations imply that the benefit of foreign trade does not flawlessly translate into human capital development. This non inclusive growth is fundamentally facilitated by two features; persistent inflation (INFR) instigated by exchange rate (REER) devaluation and consistent low institutional quality (IQI). When worldwide supply volatility hit, the institutions that lacks resilience to mitigate inflation will result in reduction in the power of real incomes, preventing any reasonable improvement in welfare (HDI). Subsequently, foreign trade opens the economy to international shocks without distributing the systemic transformations needed for inclusive growth.

4.1.2 Descriptive Statistics

Table 2. Descriptive Statistics

	HDI	ICPI	TOP	REER	INFR	IQI
Mean	0.479774	70.63226	34.98312	89.03548	16.13226	1.072710
Median	0.484000	71.40000	34.45780	94.60000	12.90000	0.807000
Maximum	0.563000	126.4000	53.27790	114.2000	72.80000	4.278000
Minimum	0.395000	18.20000	16.35210	54.10000	5.400000	0.083000
Std. Dev.	0.057005	34.13386	10.36138	16.10092	12.39498	1.005558
Skewness	-0.167452	0.032811	-0.005589	-0.616708	3.282823	1.551474
Kurtosis	1.658236	1.773367	1.956752	2.495451	15.30438	4.914513
Jarque-Bera	2.470301	1.949041	1.405967	2.293849	251.2362	17.17097
Probability	0.290791	0.377373	0.495106	0.317612	0.000000	0.000187
Sum	14.87300	2189.600	1084.477	2760.100	500.1000	33.25400
Sum Sq. Dev.	0.097485	34953.61	3220.743	7777.191	4609.068	30.33442
Observations	31	31	31	31	31	31

Source: Authors computation with extracts from E-Views

Table 2 indicates the outcome of the descriptive statistics, which implies that, Nigeria's human development performance is relatively stable within the period of the study (1995-2025), however, trade policy conditions, real effective exchange rate, inflation and institutional quality indicates considerably greater variations. Inflation and institutional quality were positively and highly leptokurtic, which implies episodic improvements and significant exposure to policy and structural shocks. This suggests that, international commodity price might depend on Nigeria's capacity to absorb global supply shocks through exchange rate stability, inflation and effective institutions.

4.1.3 Unit Root Test

Table 3. Zivot-Andrews Unit Root Test Result

Variables	T-Stat	Break Date	Critical Value (5%)	Prob. Value	Order
HDI	-7.220059	2017	-4.443649	0.0100	I(1)
ICPI	-5.964061	2015	-4.443649	0.0100	I(1)
TOP	-5.458143	2011	-4.443649	0.0100	I(1)
REER	-7.715463	2022	-4.443649	0.0100	I(1)
INFR	-8.375810	2007	-4.443649	0.0100	I(0)
IQI	-5.926720	2002	-4.443649	0.0100	I(1)

Source: Authors computation with extracts from E-Views

Outcome of Zivot-Andrews unit root test that allows of an endogenous one-time structural break is presented in Table 3. The test statistics for HDI, ICPI, TOP, REER, INFR, and IQI are -7.220059, -5.964061, -5.458143, -7.715463, -8.375810, and -5.926720, respectively, and are all more negative than the 5% critical value of -4.443649. Consequently, the null hypothesis of a unit root is rejected for all variables. This indicates that the series are stationary in levels and first difference around structural breaks occurring in 2017, 2015, 2011, 2022, 2007, and 2002 in that order. Therefore, these findings mean that the variables respond to regime-specific shocks but revert to their respective broken deterministic paths. Nevertheless, the reported integration-order classifications do not require correction, since the test statistics support I(0) and I(1) with structural breaks.

4.1.4 NARDL Bounds Test

Table 4. NARDL Bounds Test Result

Null hypothesis: No levels relationship

Model Specification	F-Statistics	K	I(0)	I(1)	Cointegration
NARDL	2.364296	5	2.910	4.193	No Cointegration

Source: Authors computation with extracts from E-Views13, 2026

Table 4 displays the NARDL bounds test result for nature of the relationship, the F-statistics result at 2.364296, which is below the lower and upper bounds at 5% level. The result clearly implies acceptance of the null hypothesis of no relationship, which implies absence of long run relationship between the variables. Indicating that between 1995 to 2025 global Supply Shocks, Foreign Trade and Inclusive Growth in Nigeria have no long run relationship. This indicates the study will focus mainly on short run and transitory asymmetric specification, in line with recurrent structural breaks and regime shifts preventing the emergence of a stable long run equilibrium across the period of the study.

4.1.5 NARDL Wald Test

Table 5. NARDL Wald Test Result

Test Statistics	Values	Df	Prob Value
F-statistics	2672284.4	(2, 12)	1.2811
Chi-square	5344568.8	2	0

Source: Authors computation with extracts from E-Views13, 2026

The Wald test result in Table 5 strongly rejects the null hypothesis that the two restrictions are jointly satisfied, as indicated by an F-statistic of 2,672,284.4 with F(2,12) degrees of freedom and a Chi-square statistic of 5,344,568.8 with 2 degrees of freedom. The associated p-value is 0.0000; hence, the null hypothesis is rejected at the 1% significance level. This implies that the tested coefficients or parameter restrictions are statistically significant jointly. Based on the Wald test, there is strong evidence of asymmetry in the variables; ICPI, TOP and HDI.

5.0 Non-linear ARDL Result and Interpretation

Table 6 NARDL Result

Variable	Coefficient	Stand-Error	T-stat	Prob Value
LHDI(-1)*	-0.632757	0.205730	-3.075655	0.0096
LICPI_POS(-1)	0.000990	0.000397	2.489977	0.0284
LICPI_NEG(-1)	0.000289	0.000330	0.877718	0.3973
TOP(-1)	-0.002189	0.001289	-1.698373	0.1151
LREER(-1)	-0.037842	0.048630	-0.778156	0.4515
INFR(-1)	-0.002604	0.001659	-1.569432	0.1425
IQI**	0.007176	0.006352	1.129743	0.2806
C	-0.281984	0.310701	-0.907571	0.3819
D(LICPI_POS)	-0.000514	0.000527	-0.975615	0.3485
D(LICPI_POS(-1))	0.001489	0.000700	2.125516	0.0549
D(LICPI_NEG)	0.000585	0.000467	1.252715	0.2341
D(LICPI_NEG(-1))	-0.000583	0.000402	-1.450625	0.1725
D(TOP)	-0.000741	0.000700	-1.059609	0.3101
D(TOP(-1))	-0.000835	0.000778	-1.072631	0.3045
D(LREER)	0.068212	0.034230	1.992745	0.0695
D(INFR)	-0.001434	0.001318	-1.087691	0.2980
R-squared	0.749063		Prob(F-statistic)	0.067667
A-R-squared	0.435393		D-Watson stat	2.378373
F-statistic	2.388059			

Source: Authors computation with extracts from E-Views 13, 2026

Outcome of the NARDL ECM estimation in Table 6 indicates that, LHDI(-1) in the first lag has an estimated coefficient of -0.6328 and p-value of 0.0096, which is significant at 1%. The

outcome also indicates that the variables move towards a long run cointegration, however this might imply weak long run relationship or more of the variables have weak long run relationship. While 63% is the speed of adjustment after disturbance in LHDI within a year. On the other hand, D(ICPI_POS(-1)) in the first, lag has an estimated coefficient of 0.001489 with a marginal significant p-value of 0.0549 at 10%. Other variables; D(LICPI_NEG), D(TOP), D(INFR) were insignificant statistically. Therefore, the short run movement in HDI are directed mainly by positive shocks to LICPI and LREER (depreciation/appreciation) are both weak at 10%. Over all, the model R^2 at 0.749 and adjusted R^2 at 0.435 which is a wide margin which might imply that the model has many regressors relative to the content of the information of the sample. The joint significance of the model F-stat (2.388) and Prob value (0.0677). The D. Watson stat at 2.378 is a strong indication of absence of serial correlation, therefore, the model is robust and suitable for economic forecast.

Discussion of Result

For Nigeria, the significant negative ECT implies shocks to institutional, trade, exchange rate, inflation and price conditions drag human development away from its long run, and 63% correction rate yearly. This is in line with economies where policy and market reactions act relatively fast, in the case of Nigeria: fiscal reallocation of oil revenue, subsidy removal, CBN interventions, can restore the shocks, even if development outcomes remain structurally delicate. The asymmetric connection in international commodity price outcome implies that, positive changes are important both in the long and short run. However, it is not so with the negative changes, this is intuitive for an economy that depends on oil like Nigeria, where boom translate into human development benefit; through fiscal windfall funds for health, education and spending for infrastructure or through acts that enhance investors and donors' confidence. Although, downturn hardly produce asymmetric HDI decline; this demonstrates Nigeria's documented pattern of fiscal ratchet behaviour, as the government increase spending during booms and rarely cuts down during busts, rather the government borrow and this affects the reserves. Outcome also indicated that the indicators of human development are sticky downward, this is in tandem with the resource curse and Dutch Disease literature.

The marginal significance in exchange rate might imply real appreciation of naira is connected to surge in HDI in the short run, this is plausible when there is lower cost for importation for medicines, capital goods, and foods which directly feed into health and education outcomes. However, it is not significant in the long run; although, it seems more of a transitory than durable link. Trade openness, inflation and institutional quality were statistically dormant, none is significant, economically this is not an indication of irrelevance to the Nigeria's economy. Statistical significance lacked for trade openness, inflation, and institutional quality does not imply that these factors are not economically relevant to Nigerian human development. Instead, it may likely reflect; structural instability in these relationships across differing policy regimes, inadequacy of standard average measures to capture the theoretical relevant channel, the low time-series variance, of slow-moving institutional indices, and the likelihood that these variables operate through interaction with oil-price/revenue dynamics rather than as independent drivers of HD.

5.1 Post Estimation Test

5.1.1 Serial Correlation Test

Table 7 Serial Correlation Test Result

Null hypothesis: No serial correlation

F-statistics	0.830863	Prob. F(2,20)	0.4502
Ob R-squared	2.301375	Prob. Chi-Square(2)	0.3164

Source: Authors computation with extracts from E-Views 13, 2026

Outcome of the serial correlation test in Table 7 indicates that the p-values are above the usual 5% threshold. They are not significant and implies acceptance of the null of no serial correlation. Therefore, the model is free from autocorrelation.

5.1.2 Heteroskedasticity Test

Table 8. Heteroskedasticity Test Result

Null hypothesis: Homoskedasticity

F-statistic	1.566477	Prob. F(7, 22)	0.1976
Obs*R-squared	9.978973	Prob. Chi-Square (7)	0.1898
Scaled explained SS	7.705027	Prob. Chi-Square (7)	0.3593

Source: Authors computation with extracts from E-Views 13, 2026

The outcome of the heteroskedasticity test result in Table 8 shows the p-values are above 0.10. therefore, the null hypothesis is accepted of homoskedasticity; that is the variance appears constant all through the residuals. The model is free from heteroskedasticity.

5.1.3 Stability Test

Cumulative Sum (CUSUM) Test for Stability

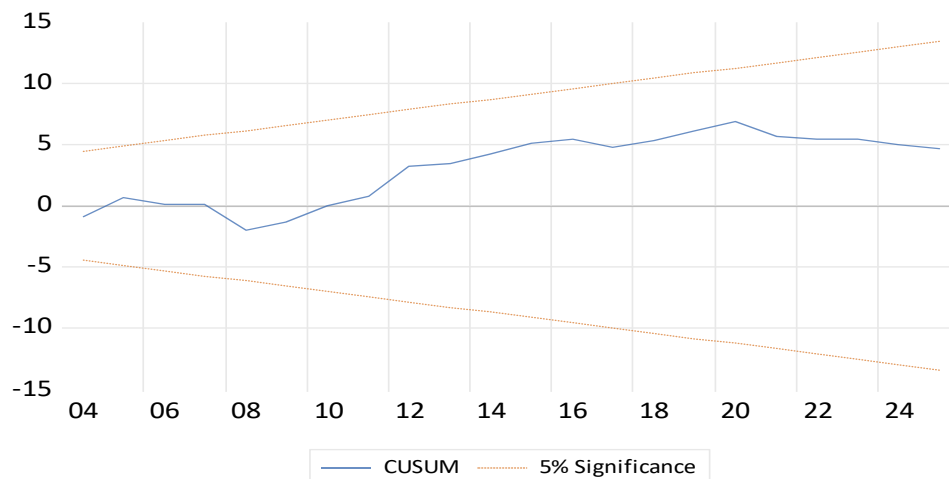


Figure 2

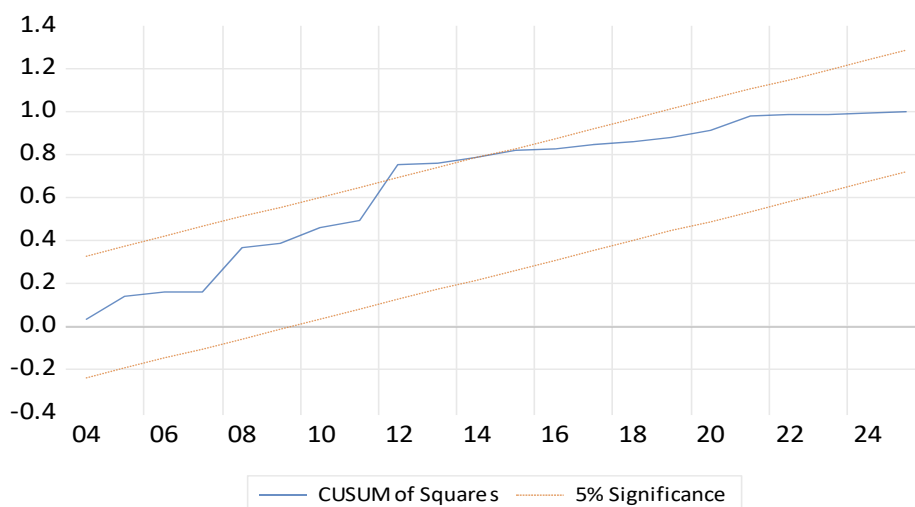


Figure 3

In both figures 2 and 3, the blue lines are in between the two red lines which is an indication that the model use for the study is dynamically stable, or so because the blue lines remain within the 5% critical bounds as shown by the red dashed lines. However, the mild shock observed in CUSUM of squares figure 3 implies a structural break at some point and quick recovery. Other than that, the model is dynamically stable.

6.1 Conclusion and Policy Implications

This study examined global supply shocks, foreign trade and inclusive growth in Nigeria 1995-2025. The study employed the Non-linear Autoregressive Distributed Lag (NARDL) model approach. The advantage of the technique is in its ability to decompose the effect of the independent variables on the depend variable into their positive and negative state. Findings indicated that, the Zivot-Andrews unit root test showed that shocks clustered around; 2002, 2007, 2011, 2015, 2017 and 2022. Therefore, the study found that Nigeria's macro welfare connection has not been stable withing the period of the study (1995-2025). Furthermore, outcome also indicated the absence of a long run relationship; HDI, ICPI (positive/negative), TOP, REER, INFR, and IQI do not share a stable long-run equilibrium over this period. And that shocks resulting from ICPI transmit into inclusive growth (HDI) Nigeria mainly through short run asymmetry, instead of through stable long run equilibrium relationship.

The absence of cointegration is in itself a significant result, not merely an econometric technical point; it indicates that Nigeria has not developed a lasting structural mechanism by which trade openness, exchange rate management, inflation control, and institutional quality can together and in a predictable way transform global price conditions into sustained improvements in welfare. On the contrary, the relationship is more accurately characterised as episodic and driven by shocks; the HDI reacts to price windfalls in the short term, but the system does not adjust to settle on a stable long-run path that is linked to these trade and macro-institutional factors. This is in line with the structural breaks that have been identified repeatedly in the unit-root tests and supports the wider growth without inclusion narrative which is the basis of this study; Nigeria's involvement in global trade subjects it to shocks without having institutional framework that could turn those shocks; whether positive or negative into consistent and lasting advances in human development.

Based on the outcome of this study the following recommendations were made; The Nigerian authorities should institutionalise counter cyclical fiscal management of commodity windfalls. Break the cycle of fiscal ratchet and to address the transmission gap.

Limitation of the Study and Suggestion for future Studies

Generally, this study is limited because of its single country time series, the outcomes are Nigeria specific and cannot be extended to other oil or import dependent economies without further comparative study. Additionally, human development index (HDI) is a useful but slow-moving average measure, it might not take into consideration distributional aspect of inclusiveness such as poverty dept and inequality, more so the global supply shocks may affect aggregate HDI only in the short run than revealed. Further studies can consider modelling fiscal behaviour taking the ratchet effect into consideration as moderating variable between commodity price index (ICPI) and HDI, as the discussion gives much asymmetry to fiscal policy reactions that are directly in the model used for this study.

References

- Ajayi, F. O., Ogede, J. S., Siyanbola, A. A., Atoyebi, O. E., & Yinusa, O. G. (2024a). Intermediating roles of institutional infrastructure in the trade openness-inclusive growth nexus: New empirical evidence from Nigeria. *Jurnal Ekonomi dan Bisnis Airlangga*, 34(1), 20–45. <https://doi.org/10.20473/jeba.v34i12024.20-45>
- Ajayi, S. O., Ogunleye, E. O., & Bello, A. K. (2024b). Trade policy, sectoral output realignment, and economic growth dynamics in Nigeria. *Journal of International Trade & Economic Development*, 33(2), 201–224. <https://doi.org/10.1080/09638199.2023.2215410>
- Akinlo, A. E., & Olayiwola, J. A. (2021). Asymmetric effects of global oil supply disruptions on macroeconomic performance in Nigeria. *Journal of African Business*, 22(3), 388–407. <https://doi.org/10.1080/15228916.2020.1778492>
- Alegria, R., Martinez, M., & Sanchez, F. (2022). Geopolitical risk, global energy shocks, and macroeconomic volatility in developing oil-exporting nations. *Energy Economics*, 109, Article 105941, 1–16. <https://doi.org/10.1016/j.eneco.2022.105941>
- Alekseeva, O., & Iregui, A. M. (2023). Structural transformation, labor absorptive capacity, and inclusive growth in developing economies. *World Development*, 161, Article 106110, 1–19. <https://doi.org/10.1016/j.worlddev.2022.106110>
- Andriantomanga, Z. (2023). Global supply chain disruptions: Challenges for inflation and monetary policy in Sub-Saharan Africa. *IMF Working Papers*, 2023(39), 1–35. <https://doi.org/10.5089/9798400233487.001>
- Anetor, F. O., Ejibowah, J. O., & Echebisin, C. O. (2020). Foreign capital inflows, trade openness, and inclusiveness of growth in Sub-Saharan Africa. *Economic Systems*, 44(4), Article 100822, 1–16. <https://doi.org/10.1016/j.ecosys.2020.100822>
- Anyanwu, S. O., & Emina, K. O. (2020). Does international trade promote non-oil sector expansion? Structural evidence from Nigeria. *Journal of Policy Modeling*, 42(6), 1340–1362. <https://doi.org/10.1016/j.jpolmod.2020.04.005>
- Balke, N. S., Jin, H., & Yilmaz, K. (2025). Global value chain fragmentation, input cost shocks, and developing economy resiliency. *World Development*, 185, Article 106780, 1–18. <https://doi.org/10.1016/j.worlddev.2024.106780>
- Doris, N. (2026). Impact of macroeconomic variables on international trade in Nigeria: 1990–2024. *UAR Journal of Management Sciences*, 2(1), 101–118.
- Elufisan, O. O. (2024). Financial inclusion and inclusive growth in Nigeria: The role of institutional quality. *Veredas do Direito*, 21(3), 1–28.
- Esiaka, C. C., Okafor, I. G., & Uzonwanne, M. C. (2021). Asymmetric foreign trade openness and industrial growth in Nigeria: Evidence from a non-linear ARDL approach. *Journal of Economic and Administrative Sciences*, 37(4), 512–531. <https://doi.org/10.1108/JEAS-04-2020-0048>
- Gong, X., Zhang, L., & Liu, Y. (2024). Disruptions in maritime logistics and domestic food price dynamics in West Africa. *Journal of International Economics*, 147, Article 103850, 1–21. <https://doi.org/10.1016/j.jinteco.2023.103850>

- Ha, J., Kose, M. A., Ohnsorge, F., & Yilmazkuday, H. (2024). What explains global inflation. *SSRN Electronic Journal*, Article 4668343. <https://doi.org/10.2139/ssrn.4668343>
- Joseph, A. O. (2026). International trade and Nigeria's economic growth. *Scientific Society of Advanced Research and Social Sciences*, 10(1), 12–31.
- Kacou, K. Y. T., Kassouri, Y., Evrard, T. H., & Altuntaş, M. (2022). Trade openness, export structure, and labor productivity in developing countries: Evidence from panel VAR approach. *Structural Change and Economic Dynamics*, 60, 194–205. <https://doi.org/10.1016/j.strueco.2021.11.015>
- Kalu, U. E., & Ogbuagu, A. R. (2020). Fiscal policy dynamics, public social spending, and inclusive growth in Nigeria. *Journal of Economic Policy Reform*, 23(3), 321–341. <https://doi.org/10.1080/17487870.2019.1668822>
- Killian, L., & Lütkepohl, H. (2021). Structural vector autoregressions and the identification of global exogenous commodities supply shocks. *Journal of Applied Econometrics*, 36(4), 415–439. <https://doi.org/10.1002/jae.2821>
- Krugman, P. (1979). Increasing returns, monopolistic competition, and international trade. *Journal of International Economics*, 9(4), 469–479. [https://doi.org/10.1016/0022-1996\(79\)90017-5](https://doi.org/10.1016/0022-1996(79)90017-5)
- Kudaisi, B. V. (2024). Institutional quality and human capital development in Nigeria: Is there any link? *Timisoara Journal of Economics and Business*, 17(1), 1–20. <https://doi.org/10.2478/tjeb-2024-0001>
- Kuhe, D. A. (2026). Socio-demographic determinants of human development in Nigeria: A panel data analysis. *FUDMA Journal of Sciences*, 10(1), 45–58.
- Kydland, F. E., & Prescott, E. C. (1982). Time to build and aggregate fluctuations. *Econometrica*, 50(6), 1345–1370. <https://doi.org/10.2307/1913386>
- Mohammed, Y. A., & Ahmed, S. B. (2021). Trade openness, non-oil exports, and economic diversification in resource-rich developing economies. *Resources Policy*, 74, Article 102380, 1–14. <https://doi.org/10.1016/j.resourpol.2021.102380>
- Nchofoung, T. N., & Asongu, S. A. (2022). ICT diffusion, trade openness, and inclusive growth in Africa. *Information Technology for Development*, 28(2), 410–434. <https://doi.org/10.1080/02681102.2021.1966102>
- Obiora, R. U. (2020). Trade openness and sustainable economic growth in Nigeria. *International Journal of Research and Publication*, 4(2), 15–30.
- Ogundipe, A. (2020). Commodity price volatility and economic growth in Africa: The mitigating role of trade policy. *Problems and Perspectives in Management*, 18(3), 350–361. [https://doi.org/10.21511/ppm.18\(3\).2020.29](https://doi.org/10.21511/ppm.18(3).2020.29)
- Olofin, O. P., & Udoh, E. J. (2019). Global trade value chains, import volatility, and macroeconomic vulnerability in Sub-Saharan Africa. *Economic Modelling*, 81, 412–426. <https://doi.org/10.1016/j.econmod.2019.01.008>
- Omang, B. J., Aye, G. C., & Tashikalma, A. K. (2024). Terms of trade volatility, import dependency, and macroeconomic stability in West Africa. *Journal of African Economies*, 33(3), 310–332. <https://doi.org/10.1093/jae/ejad018>

- Orshi, T. R. (2024). Impact of public expenditure on human development in Nigeria (2003–2024). *Journal of Public Administration and Finance*, 3(1), 1–15.
- Orukwu, O. T. (2025). Driving economic growth through macroeconomic indicators: Evidence from Nigeria. *Adamawa State University Journal of Agricultural Economics and Food Marketing*, 13(1), 78–94.
- Oseni, I. O., & Nwosa, P. I. (2020). External supply shocks, exchange rate dynamics, and price volatility in Sub-Saharan Africa. *African Development Review*, 32(2), 175–189. <https://doi.org/10.1111/1467-8268.12426>
- Oyekale, A. S. (2021). Macroeconomic volatility, food price shocks, and household inclusivity in rural Nigeria. *Food Policy*, 102, Article 102088, 1–15. <https://doi.org/10.1016/j.foodpol.2021.102088>
- Oyinlola, M. A., & Adedeji, A. A. (2022). Human capital formation, institutional quality, and inclusive growth dynamics in Sub-Saharan Africa. *Social Indicators Research*, 160(2), 645–671. <https://doi.org/10.1007/s11205-021-02812-7>
- Umaru, A., & Bilyaminu, T. (2024). Evaluating the dimensions of inclusive growth in Nigeria: An empirical assessment. *African Development Review*, 36(1), 88–104. <https://doi.org/10.1111/1467-8268.12735>
- Uzonwanne, M. C. (2021). Foreign trade, exchange rate pass-through, and output growth in primary product exporting countries. *Applied Economics*, 53(18), 2101–2118. <https://doi.org/10.1080/00036846.2020.1855319>
- Wirajing, M. A. K., Nchofoung, T. N., & Etape, F. M. (2023). Revisiting the human capital–economic growth nexus in Africa. *SN Business & Economics*, 3(6), Article 112. <https://doi.org/10.1007/s43546-023-00494-5>