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MACROECONOMIC DETERMINANTS OF INCOME PER CAPITA IN NIGERIA

By

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Abstract

This paper investigates the macroeconomic determinants of income per capita in Nigeria, dwelling on the short-term and the long-term impacts of exchange rate dynamics, government effectiveness, trade openness, and crude oil price. The time-series data between 1981 and 2024 are analysed on the basis of the autoregressive distributed lag (ARDL) model to determine dynamic adjustments and the relationships in the long-run equilibrium. The short-run result reveals that depreciation of the exchange rate decreases income per capita, while trade openness and fluctuations of oil prices produce adjustment effects. Government effectiveness is associated with short-run transitional costs but positively related with long-run income growth. The error correction mechanism signifies fairly rapid adjustment to equilibrium. The estimate in the long-run shows that crude oil prices dominate the income per capita, trade openness and quality of governance also justify income growth. The results indicate the structural reliance of Nigeria on the oil revenues and the superior role of institutional reforms, diversification of trade, and macroeconomic stability in ensuring sustainable increases in the living standards.

Keywords: *Income per capita, Exchange rate dynamics, Government effectiveness, Trade openness, Crude oil prices*

JEL Classifications: *F41, O11, P36*

1. Introduction

The role of macroeconomic performance in the determination of income per capita and general welfare is important, especially in the developing economies where structural transformation and exposure of the economies to external factors are critical to growth outcomes. The income per capita does not only reflect the degree of economic activity but also the efficiency of the way macroeconomic policies are implemented and can lead to better living conditions. Over time, the developing countries have adopted different policy strategies such as exchange rate management, trade liberalisation, institutional reforms, and resource-based growth models, to improve their economic performance and lessen income inequalities. Nonetheless, the consequences of these policies have been uneven as a result of persistent macroeconomic volatility, structural inflexibility, and vulnerability to external shocks. In resource-dependent economies, fluctuations in commodity prices and governance structures usually interact to influence income dynamics and prosperity in the long-run (Acemoglu, 2025). It has also been empirically illustrated that with effective institutional structures and coordinated policies, macroeconomic stability and international openness could facilitate growth (Seti et al., 2025). Hence, it is one of the primary concerns of policymakers and researchers to understand how multiple macroeconomic forces interplay in determining income per capita.

In Nigeria, macroeconomic environment has been typified by frequent exchange rate adjustments, ustable trade relationships and high reliance on crude oil exports. Although the country has experienced economic booms, the growth rate in income per capita has not been that steady, which portrays cogent structural challenges. Exchange rate changes impact the cost of production in the country and competitiveness in foreign markets, whereas degree of integration into the global markets is determined by the level of trade openness. Meanwhile, governance effectiveness is crucial in maintaining consistency of policies, effective distribution of resources and adopting reforms that can stimulate growth. The dependence of the Nigerian economy on the revenue of crude oil also results in an exposure of the economy to external price shocks that tend to pass through fiscal imbalances and macroeconomic instability, thus impacting the welfare outcomes (Okorie & Lin, 2024). These broad macroeconomic dynamics imply that income per capita patterns cannot be attributed to any single cause but rather a combination of

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multiple and policy-relevant variables that contribute to causing these trends at once.

Despite the increasing amount of empirical evidence, there are still large gaps in the literature about the joint impacts of exchange rate dynamics, government effectiveness, trade openness, and crude oil prices on income per capita. Several studies have focused on the relationship based on one variable, such as exchange rate pass-through or oil price changes, without incorporating the role of institutional quality and trade as a single framework (Mahama et al., 2023; Wasurum, 2025; Magfiroh, 2026). The cross-country focus on trade openness and macroeconomic performance has been studied by others, and such do not clearly address country-specific dynamics that apply to the situation in Nigeria (Oppong-Baah et al., 2022; Seti et al., 2025; Yeboah et al., 2025). Governance evidence also indicates that institutional effectiveness mediates the influence of macroeconomic factors, but in practice, it is rare to find instances where governance indicators are used in conjunction with the traditional macroeconomic determinants (Garba et al., 2025; Dada et al., 2026; Boubechtoula et al., 2025).

The problem statement arises out of the persistent fluctuation in the income of Nigeria even during the periods of economic boom and policy adjustments. According to the empirical data, price shocks of crude oil, exchange rate instability, and the exposure to trade still bring uneven economic effects, which indicate structural vulnerabilities in the economy (Okorie & Lin, 2024; Adesanya, 2025; Mano & Combary, 2025). Institutional quality research also indicates that poor governance and regulatory inefficiency can curb the flow of macroeconomic benefits to higher standards of living (Shikur, 2024; Acemoglu, 2025). Moreover, conflicting evidence regarding the impact of trade openness and external integration creates uncertainty for policymakers trying to design strategies of enhancing growth (Rakshit, 2022; Pham & Nguyen, 2024; Seti et al., 2025). These inconclusive issues necessitate an empirical study that simultaneously consider exchange rate movements, government performance, trade openness and crude oil prices as major macroeconomic determinants of income per capita in Nigeria.

2. Literature Review

2.1 Theoretical Review

This theoretical base of the study lies in the perspectives of institutional and structural development which highlight the importance of governance, coordination of policies and macroeconomic structures in determining the income outcomes. According to institutional theory, good governance structures bring about economic performance because they dictate allocation of resources and policies for productivity and gains of welfare. Acemoglu (2025) points out that the joint effect of the institutional structures, technological decisions, and social organisation defines prosperity based on the impact on economic incentives and the trajectory of innovation. Equally, Rodrik (2022) notes that contemporary development plans should incorporate the industrial policies and employment creation and institutional cooperation to attain sustainable growth. These opinions propose that government effectiveness could be one of the principal mediums through which the macroeconomic variables influence the income per capita, particularly in developing economies where the institutional capacity is a factor that contributes to the success of economic reforms.

The other significant theoretical strand that will be used to support this research is associated with the theories of international trade and openness that consider the effects of integration into the world markets on growth and welfare. The frameworks of trade liberalisation are based on the idea that openness will facilitate efficiency, technology diffusion, and capital accumulation, but the result will be determined by domestic structural factors. The theoretical argument that the openness of trade may boost growth is justified by empirical evidence supplied by Seti et al. (2025) and Oppong-Baah et al. (2022) when the business environment is characterised by stable macroeconomic factors and the quality of institutions. Yet, other viewpoints emphasise the fact that too much openness can put economies at risk of external shocks and structural weaknesses, especially when the local industries are not competitive (Rakshit, 2022; Yeboah et al., 2025). These opposing theoretical perspectives explain why trade openness can be considered an important determinant of income per capita since its impacts can be different in both the short-run and the long-run.

The macroeconomic volatility theories and the resource-dependence theories are also relied on in the study, as they explain the impacts of the commodity price alterations and the exchange rate dynamics on the economies that are resource-abundant. The oil price theories indicate that the cyclical nature of the growth in natural resource-dependent economies is normally due to the external shock of prices and fiscal instabilities. This view is empirically supported by Mahama et al. (2023) and Okorie and Lin (2024), who demonstrate that oil price fluctuations are very influential on the macroeconomic performance and the economy. Also, the exchange rate theories indicate the transmission mechanisms in which currency movements impact inflation, competitiveness, and real income (Anwar et al., 2022; Magfiroh, 2026). These theoretical findings combined give a very detailed theory of the determination of the income per capita in Nigeria by the joint effect of exchange rate dynamics, government effectiveness, trade openness and crude oil prices.

2.2 Empirical Review

There has been a substantial growth in the empirical evidence on the macroeconomic determinants of income per capita, especially in the developing economies where structural vulnerabilities and external shocks define growth results. An example could be given on Magfiroh (2026), who used an Autoregressive Distributed Lag (ARDL) model to interrogate the exchange rate dynamics and inflation in which an enormous pass-through effect is observed between exchange rate depreciation and local price levels. This paper established that depreciation of currency increases the rate of inflationary pressure more than appreciation does, indicating asymmetric

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macroeconomic policies. Although the study dealt with inflation, its results apply to income per capita, as chronic inflation kills purchasing power and real income. On the same note, a structural vector autoregression model of Indonesia was applied by Anwar et al. (2022), which revealed that the exchange rates are very sensitive to the monetary shocks, especially the interest rate and money supply variations. This finding indicates that the impact of instability in exchange rates can be experienced indirectly on the living standards through the macroeconomic transmission channel. Generally, the literature highlights the significance of stability in the exchange rates in sustaining sustainable economic welfare and income growth in emerging economies.

Papers that discuss the macroeconomic interactions provide additional insights regarding the role of governance and institutional factors on economic performance. In their analysis, Garba et al. (2025) estimated the selected West African economies through panel-corrected standard error estimation, and results indicated that exchange rate movement and trade openness had negative effects on the stock market performance, whereas foreign direct investment and GDP per capita have positive effects. This paper has highlighted that the effectiveness of macroeconomic variables is moderated by the quality of governance, thereby showing that the accrual of economic liberalisation may be constrained by weak institutional structures. In line with this institutional view, Shikur (2024) showed that government effectiveness, quality of regulation and rule of law have a significant impact on the development of manufacturing, but the long-term impacts can be inconsistent with the effects observed in the short-run. The results are consistent with the arguments of institutional development developed by Acemoglu (2025), who emphasised the core position of institutions in economic paths and prosperity. Taken together, these works imply that the effectiveness of government is one of the most important channels with the help of which macroeconomic variables are converted into better income per capita.

Trade openness and economic performance are also a relationship that has received significant empirical research with varying results among nations and research approaches. Using ARDL estimation, Rakshit (2022) determined that trade openness had a negative long-run impact on economic growth even though foreign direct investment contributed positively in India. Conversely, the article of Oppong-Baah et al. (2022) has shown that the opening of trade has had a positive impact on economic growth in Ghana and Nigeria as a result of panel estimates, and it is essential that the conditions are country-specific. Seti et al. (2025) also indicated that financial and trade openness promote growth in emerging economies when they are backed by macroeconomic and political stability in emerging economies. Similarly, Yeboah et al. (2025) found that trade openness can boost short-run growth but can have negative effects in the long-run when the domestic industries are not resilient. These opposite findings suggest that the role of trade openness on the income per capita is highly dependent on structural capacity, policy frameworks, and the strength of institutions.

Empirical research has also pointed out the importance of structural change and industrialisation in determining income change. Ogunleye and Ojo (2025) used a panel ARDL approach on the ECOWAS countries and found out that structural change impacted positively on the economic growth in the long term, but there were no significant effects in the short-run. Complementary arguments were made by Rodrik (2022), who suggested modern industrial policies of stimulating sectors based on employment and better working conditions, as they have an indirect effect on the income per capita. Moreover, Mano and Combary (2025) demonstrated that diversification of exports diminishes the economic vulnerability and, therefore, assists in the realisation of consistent growth levels. These data indicate that macroeconomic reforms through structural transformation and interventions of industrial policies could result in greater benefits for strengthening productive capacity. As a result, the long-run increment in income per capita needs policies to promote diversification and decrease dependence on unstable foreign areas.

The crude oil price has continued to play a big role in the economies that rely on oil, like Nigeria. Mahama et al. (2023) discovered that an increase in the price of oil spurs growth in the GDP in the short-run but creates adverse long-run impacts because of structural imbalances. On the same note, both articles by Wasurum (2025) stated that the volatility in oil prices affects the development of the economy in an asymmetric manner, demonstrating the vulnerability of the outcomes of the income to the external shocks. Benlaria and Almawishir (2024) have also demonstrated that oil prices positively influence economic growth in the GCC countries, providing support to the significance of energy markets in macroeconomic performance. Okorie and Lin (2024) have shown in the context of the Nigerian economy that global oil price shocks decrease the economic activity, but the measures of fiscal policy alleviate negative effects. All these studies show that the dynamics in prices of crude oil have a decisive impact on determining income per capita, both by growth and macroeconomic stability.

Quality in institutions and the effectiveness of governance have become part of the empirical measurement of macroeconomic performance. It has been shown by Dada et al. (2026) that macroeconomic volatility is lower in Sub-Saharan Africa when political and economic institutions are more developed, which implies that institutional changes can lead to a more stable economy and improve income growth. Boubechtoula et al. (2025) also demonstrated that institutional quality plays an interaction role in foreign investment to affect economic performance, albeit a weak institution can constrain growth advantages. The study by Caporale et al. (2023) revealed that trade openness and financial development interact variously with governance levels, which is why the institutional context is important. Furthermore, Pham and Nguyen (2024) emphasised that the environment of trade openness is not the only factor affecting the results, which suggests that the governance frameworks influence the macroeconomic outcomes. Collectively, these studies are

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great indicators that government effectiveness and institutional quality are the key determinants of the macroeconomic performance and the standards of living.

To narrow down on Nigeria, a number of empirical studies have been done to determine the relationship between oil dependence, exchange rate dynamics, and economic performance. Adesanya (2025) established that the export revenues of crude oil are closely associated with changes in GDP, which indicates the weakness of the economy to any external price shocks. Equally, Okorie and Lin (2024) highlighted that the impact of the oil price shock on economic activity within the country is quite high, which supports the importance of diversification measures. The study by Wasurum (2025) also established that both the exchange rate volatility and the oil price have a combined effect on the indicators of economic development, such as income per capita. The results of the analysis show that the macroeconomic environment in Nigeria is very vulnerable to the economy of the external sector, especially the price fluctuations in the crude oil market and the exchange rate. Hence, it is also crucial that the joint impact of exchange rate variations, openness to trade, governmental effectiveness, and oil prices on income per capita are analysed to explain long-run welfare performance in the country.

3. Methodology

3.1 Model Specification and Estimation Technique

The paper utilises a quantitative time-series study to analyse both short-run and long-run determinants of income per capita in Nigeria by adopting the Autoregressive Distributed Lag (ARDL) model. The dynamic interactions among exchange rate dynamics, governance effectiveness, trade openness and crude oil prices and GDP per capita are captured using annual data. The ARDL method that developed by Pesaran and Shin is appropriate when variables are integrated with mixed orders of I(0) and I(1) and when both short-run adjustments and long-run equilibrium relationships are of interest. The method has been deeply used in macroeconomic research due to its flexibility, small-sample efficiency, and dynamic relationships between variables (Magfiroh, 2026; Rakshit, 2022; Mano & Combary, 2025; Yeboah et al., 2025).

The empirical model follows the functional relationship which is given as:

$$GDPPC_t = f(EXCR_t, GOVE_t, TOP_t, COILP_t) \quad 1$$

The linear ARDL(p, q_1, q_2, q_3, q_4) specification is written as:

$$GDPPC_t = \alpha_0 + \sum_{i=1}^{p} \alpha_{1i} GDPPC_{t-i} + \sum_{i=0}^{q_1} \alpha_{2i} EXCR_{t-i} + \sum_{i=0}^{q_2} \alpha_{3i} GOVE_{t-i} + \sum_{i=0}^{q_3} \alpha_{4i} TOP_{t-i} + \sum_{i=0}^{q_4} \alpha_{5i} COILP_{t-i} + \varepsilon_t \quad 2$$

where $GDPPC_t$ represents GDP per capita, $EXCR_t$ denotes exchange rate dynamics, $GOVE_t$ measures government effectiveness, TOP_t captures trade openness, $COILP_t$ represents crude oil prices, and ε_t is the stochastic error term. The lag orders p, q_1, q_2, q_3, and q_4 are determined using an appropriate information criterion such as the Akaike Information Criterion to ensure parsimonious estimation. This dynamic structure enables the model to capture delayed responses of income per capita to macroeconomic shocks, consistent with earlier ARDL applications in macroeconomic modelling (Rakshit, 2022; Magfiroh, 2026).

To determine the existence of a long-run equilibrium relationship, the ARDL bounds testing approach of Pesaran and Shin is employed using the unrestricted error correction representation:

$$\Delta GDPPC_t = \beta_0 + \sum_{i=1}^{p} \beta_{1i} \Delta GDPPC_{t-i} + \sum_{i=0}^{q_1} \beta_{2i} \Delta EXCR_{t-i} + \sum_{i=0}^{q_2} \beta_{3i} \Delta GOVE_{t-i} + \sum_{i=0}^{q_3} \beta_{4i} \Delta TOP_{t-i} + \sum_{i=0}^{q_4} \beta_{5i} \Delta COILP_{t-i} + \lambda_1 GDPPC_{t-1} + \lambda_2 EXCR_{t-1} + \lambda_3 GOVE_{t-1} + \lambda_4 TOP_{t-1} + \lambda_5 COILP_{t-1} + \mu_t \quad 3$$

where Δ denotes the first difference operator, β_{1i} to β_{5i} represent short-run dynamic coefficients, and λ_1 to λ_5 capture long-run parameters. The joint significance of the lagged level variables is tested using the F-statistic to determine whether cointegration exists among the variables. The bounds testing framework has been widely adopted because it provides reliable inference on long-run relationships in macroeconomic time-series analysis (Rakshit, 2022; Mano & Combary, 2025).

Following the confirmation of cointegration, the error correction model (ECM) is estimated to capture the speed of adjustment towards long-run equilibrium:

$$\Delta GDPPC_t = \gamma_0 + \sum_{i=1}^{p} \gamma_{1i} \Delta GDPPC_{t-i} + \sum_{i=0}^{q_1} \gamma_{2i} \Delta EXCR_{t-i} + \sum_{i=0}^{q_2} \gamma_{3i} \Delta GOVE_{t-i} + \sum_{i=0}^{q_3} \gamma_{4i} \Delta TOP_{t-i} + \sum_{i=0}^{q_4} \gamma_{5i} \Delta COILP_{t-i} + \varphi\, ECM_{t-1} + \nu_t \quad 4$$

where ECM_{t-1} is the lagged error correction term derived from the long-run equation and φ represents the speed of adjustment coefficient expected to be negative and statistically significant. Diagnostic and stability tests, including serial correlation, heteroskedasticity, and parameter stability checks, are conducted to ensure the robustness of the estimated ARDL model, consistent with established empirical practices in recent macroeconomic studies (Yeboah et al., 2025; Magfiroh, 2026).

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3.2 Data Measurement and Sources

This paper takes Nigeria as its example of annual time-series data to test the macroeconomic condition of income per capita determinants with the motivation of intractable income issues, fluctuation of currency exchange rates, dependence on oil and the reforming of institutions. The dependent variable is Gross Domestic Product per capita (GDPPC) and is computed in constant prices based on the World Development Indicators in real terms as an indicator of real living standards. The exchange rate (EXCR), which is the value of the naira as compared to the US dollar, is the currency dynamic, and obtained data are provided by the Central Bank of Nigeria Statistical Bulletin and the World Bank. The index of government effectiveness (GOVE) evaluates the quality of institutions by referring to the Worldwide Governance Indicators index. The openness of trade (TOP) is the calculation of total trade divided by GDP, which indicates the integration of Nigeria in the global markets, and the data is provided by the World Development Indicators. The price of crude oil (COILP), which is approximated by the Brent crude oil prices of the U.S. Energy Information Administration and World Bank Commodity Price Data, would be an indicator of the external revenue condition that can affect income per capita.

4 Results and Discussion

4.1 Unit Root Results

The Phillips-Perron test and the Augmented Dickey-Fuller test show that GDP per capita, exchange rate, trade openness, and crude oil prices are neither stationary nor integrated of order one, I(1). Only with limited specifications is government effectiveness weakly stationary. The findings imply that macroeconomic variables in Nigeria have long-run tendencies that are determined by the structural changes and external shocks, and short-run changes are temporary. The agreement between the results of PP and ADF enhances faith in the integration characteristics of the series. On the whole, both long-run equilibrium relationships and short-run dynamics can be modelled using the ARDL framework to justify the findings. On request, the unit root results (Table 1) are provided.

4.2 Bounds Test for Long-Run Relationship

The ARDL bounds test (Table 2) confirms the existence of a long-run equilibrium relationship between GDP per capita and its determinants in Nigeria since the F-statistic of 6.68 is above the upper critical bounds at all the conventional levels of significance. This finding causes the null hypothesis of no levels relationship to be rejected and that GDP per capita, exchange rate, government effectiveness, trade openness and crude oil prices are jointly moving over time. The economic interpretation of it is that temporary deviations of the short-run are corrected by the equilibrium which confirms the ARDL method and emphasises the extent of macroeconomic factors that affect income per capita in the long-run.

Table 2: F-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	6.67813	10%	2.2	3.09
k	0	5%	2.56	3.49
	4	2.5%	2.88	3.87
		1%	3.29	4.37

4.3 Short-run Dynamics and Error-Correction Mechanism

The short-run ARDL error correction results (Table 3) indicate that there are significant dynamic adjustments in GDP per capita. The lagged changes in GDP per capita have mixed impacts; the second lag has a positive and significant impact, which shows short-run income persistence. The changes in exchange rates have large impacts in multiple lags, as contemporaneous depreciation decreases GDP per capita, but lagged impacts are positive, indicating delayed adjustment advantages, which might be in export competitiveness. The effectiveness of government depicts negative short-run impacts, especially at the first lag, which suggests that initial institutional changes can cause the short-term instability of income outcomes first before the long-term benefits are observed. The contemporaneous impact of trade openness on income is positive, whereas the lags have negative impacts, which indicate that the adjustment costs of trade exposure are high. There are negative lagged effects of the price of crude oil, which shows that it is susceptible to oil price volatility in the short-run. The error-correcting term is negative and large with high significance, which depicts that it converges to the long-run equilibrium rapidly. Precisely, approximately 44 per cent of short-run disequilibrium is being fixed annually, and this depicts a fairly rapid process of adjustment in Nigeria.

Table 3: Short-Run Result

ARDL Error Correction Regression

Dependent Variable: D(GDPPC)

Selected Model: ARDL(3, 4, 2, 4, 3)

Sample: 1981 2024

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDPPC(-1))	-0.053862	0.112700	-0.477924	0.6382
D(GDPPC(-2))	0.330209	0.091060	3.626297	0.0018
D(EXCR)	-0.706533	0.158070	-4.469749	0.0003
D(EXCR(-1))	1.256654	0.493546	2.546173	0.0197
D(EXCR(-2))	1.207659	0.532683	2.267127	0.0352
D(EXCR(-3))	1.917115	0.642028	2.986029	0.0076
D(GOVE)	-112.7269	79.20656	-1.423202	0.1709

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D(GOVE(-1))	-239.4122	94.44984	-2.534808	0.0202
D(TOP)	2.45E-06	7.47E-07	3.276941	0.0040
D(TOP(-1))	-1.52E-06	6.81E-07	-2.233145	0.0378
D(TOP(-2))	-2.42E-06	6.78E-07	-3.571503	0.0020
D(TOP(-3))	-1.10E-06	8.13E-07	-1.355639	0.1911
D(COILP)	0.327732	0.665493	0.492465	0.6280
D(COILP(-1))	-2.999695	1.008828	-2.973445	0.0078
D(COILP(-2))	-1.531232	0.801317	-1.910894	0.0712
CointEq(-1)*	-0.438498	0.061636	-7.114295	0.0000

4.4 Long-Run Relationship

The long-run coefficients (Table 4) dwell on how GDP per capita in Nigeria can be determined using structural determinants. The long-run impact of exchange rate variations is positive, though not statistically significant, indicating that currency movements do not have an independent long-term income effect. The positive but non-significant influence of government effectiveness points out that the better the institutional quality, the higher the per capita income will be in the long-run due to the improved policies, production and service provision. Trade openness also has a positive long-run effect, which implies that the long-term integration in the world markets aids the growth of income due to the increase in efficiency and the increase in the trade opportunities. The positive influence of crude oil prices is positive and very strong, which highlights the main role of oil revenues in the formation of long-run income levels. The size of this coefficient supports the fact that Nigeria is an economy that is reliant on the oil industry as one of the primary sources of economic wellbeing. On the whole, in the long-run, the findings indicate that even though the performance of income is dominated by oil prices, the quality of governance and openness to trade are significant complementary factors to achieve sustainable growth.

Table 4: ARDL Long-run Form

ARDL Long Run Form

Dependent Variable: D(GDPPC)

Levels Equation

Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXCR	0.427879	0.423968	1.009226	0.3255
GOVE	756.6729	365.5460	2.069980	0.0523
TOP	5.27E-06	2.70E-06	1.953010	0.0657
COILP	11.72137	1.477751	7.931901	0.0000
C	1799.869	353.1965	5.095943	0.0001

4.5 Diagnostic Results

The diagnostic tests establish the strength and reliability of the estimated ARDL model. According to the Breusch-Godfrey LM test, there is no sign of serial correlation since the chi-square and F-statistic both have values that are greater than the standard level of significance. This implies that the model is able to capture the dynamic form of the GDP per capita and the determinants, and it means that historical shocks are not carried over in the error term. On the same note, the Breusch-Pagan-Godfrey test demonstrates that there is no heteroskedasticity, which means it is the same constant throughout time. This has an economic implication in that macroeconomic shocks such as changes in the exchange rates and fluctuations in the price of oil do not alter the accuracy of the estimated coefficients. The fact that residuals are stable helps to increase the accuracy of both the short-run and long-run estimates and proves that the model meets the main classical regression assumptions. In general, the results of the diagnoses are valid to be inferred and increase the trust in the empirical results.

Table 5: Diagnostic Tests

Breusch-Godfrey Serial Correlation LM Test:

Null hypothesis: No serial correlation at up to 2 lags

F-statistic	0.205128	Prob. F(2,17)	0.8165
Obs*R-squared	0.942561	Prob. Chi-Square(2)	0.6242

Heteroskedasticity Test: Breusch-Pagan-Godfrey

Null hypothesis: Homoskedasticity

F-statistic	0.347793	Prob. F(20,19)	0.9883
Obs*R-squared	10.71952	Prob. Chi-Square(20)	0.9532
Scaled explained SS	3.738153	Prob. Chi-Square(20)	1.0000

4.6 Residuals Normality and Model Stability

The Jarque-Bera test shows that the residual values are normally distributed since the value is insignificant ($J = 2.258, \rho = 0.3233$). This implies that the shocks on GDP per capita are random and not biased, and it validates the fact that the ARDL model is effective in capturing the process of generating income. Normality of residual behaviour helps increase the accuracy of statistical analysis and contributes to the stability of the parameter. The CUSUM test also indicates that the estimated coefficients do not change much during the sample period, and the statistic is within the 5 per cent critical values. This means economically that the correlation between GDP per capita and the determinants of the same, which have

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been exchange rate, government effectiveness, trade openness, and crude oil prices, has been structural within the context of policy change and foreign shocks. In the same manner, the CUSUM of squares test tests the stability of the variance of the residuals, which implies that there is no structural break or distortion due to volatility. On the whole, these findings indicate that the ARDL model is powerful, dynamically sound and applicable to the interpretation of policies in Nigeria.

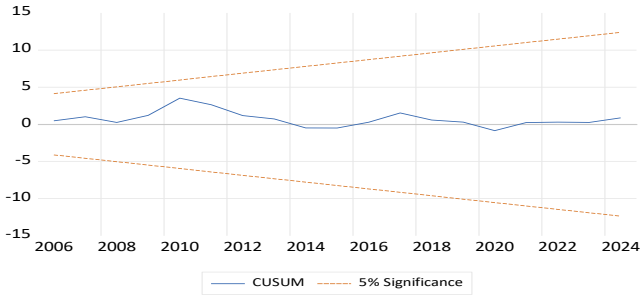

Figure 1: CUSUM Test

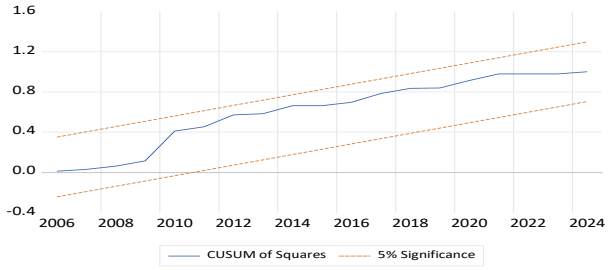

Figure 2: CUSUM of Squares Test

4.7 Discussion of Findings

The following section presents the empirical results with reference to the study aims and hypotheses as well as the available literature and their implications for the economic aspect of income per capita in the case of Nigeria. The short-run ARDL outcomes indicate the responses of the GDP per capita to macroeconomic shocks which are being adjusted. The effect of exchange rate depreciation is negative contemporaneously, which a priori would be expected and is consistent with other studies like Anwar et al. (2022), Garba et al. (2025), and Magfiroh (2026) that indicate a negative effect on real income due to inflationary pressure and increased import prices. Nevertheless, that we have positive lagged effects indicates slow gains in competitiveness and slow adaptation in the economy. The short-run impact of government effectiveness is negative, which could be viewed as transitional costs of institutional reforms and policy restructuring, which Rodrik (2022), Shikur (2024), andOgunleye and Ojo (2025) identify. Such results show that in the short-term welfare effect, short-term outcomes can be suffocated during the process of structural adjustments, and then eventually long-term outcomes can be achieved.

The immediate impacts of trade openness are positive, with negative lagged effects indicating the adjustment costs that are associated with higher exposure to international competition and foreign shocks. This trend agrees with Oppong-Baah et al. (2022), Rakshit (2022), and Mano and Combary (2025), who stress that in case of low economic diversification, openness can make a person more vulnerable. Likewise, the short-run lagged effects of crude oil prices are negative, which corresponds to the instability of incomes due to changes in oil prices, which is in line with Mahama et al. (2023) and Benlaria and Almawishir (2024). The negative value of the error-correction term is statistically significant and states that about 44 per cent of short-term disequilibrium is fixed in a year. This comparatively fast rate of adaptation indicates that the income system of Nigeria is quick in adjusting to shocks but in a rather fluctuating macroeconomic environment, which is marked by oscillating oil revenue as well as pressures on the exchange rates.

Exchange rate effects are statistically insignificant in the long-run, contrary to a priori beliefs of such a strong relationship. It means that exchange rate dynamics can impact income per capita indirectly with the sources of trade, governance, and oil price factors instead of acting as an independent long-term factor, which agrees with Boubechtoulla et al. (2025) and Dada et al. (2026). The long-run effect of government effectiveness is positive and significant, which supports institutional theories developed by Acemoglu (2025) that emphasise the impact of the quality of governance in maintaining the rate of income growth by way of better policy enforcement and effective resource allocation. Trade openness has also shown a positive effect in the long-run, which is consistent with Caporale et al. (2023), Okorie and Lin (2024), and Yeboah et al. (2025), suggesting that long-term integration into global markets will experience a positive effect on income growth despite short-term adjustment costs.

Nigeria becomes a victim of the dominance of the long-run effect of crude oil prices on GDP per capita, not only as a priori predicted but also as supporting the structural reliance on oil revenues. This observation confirms Adesanya (2025) and Wasurum (2025) but with issues regarding long-term sustainability because it is prone to external price shocks. Altogether, the findings indicate that the income per capita of Nigeria is determined by the interplay between external shocks, especially the price of oil and the level of trade openness, and the internal institutional power. The exchange rate dynamics play a major role as a means of transmission between external shocks and domestic income achievements. The results highlight the need to reinforce governance, enhance trade, and diversify to minimise dependence on crude oil in order to attain sustainable and consistent increases in income per capita.

5. Conclusion and Recommendations

5.1 Conclusion

This paper has explored macroeconomic determinants of income per capita in Nigeria using the ARDL framework between 1981 and 2024. The empirical findings affirm the presence of a long-run equilibrium relationship that exists between GDP per capita, exchange rate dynamics, government effectiveness, trade openness and crude oil prices. Short-term effects of exchange rate depreciation include the decreased income per capita, whereas trade openness and oil

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price variability produce short-term adjustment-induced effects which indicate that Nigeria is susceptible to external shocks. The effects of government effectiveness exhibit transitional impacts in the short-run, but institutional quality in the long-run becomes growth-promoting. The mechanism of error correction implies a rather rapid rate of adaptation to equilibrium. The price of crude oil turns out to be the largest factor in driving income per capita in the long-run, whereas trade openness and governmental improvements to governance have a positive impact on the long-lasting income growth. All in all, these results indicate that the performance of income in Nigeria can be influenced by both external market factors and domestic institutional potentials, and the exchange rate changes serve as the transmission channel and not as the determinant in the long term.

5.2 Recommendations

There are a number of proposed policy recommendations based on the empirical findings. To start with, exchange rate management is supposed to lay emphasis on minimising excessive volatility instead of aiming at firm currency rates since instability is detrimental to short-term income performance. Second, enhancing the effectiveness of the government by means of better delivery of public services, coordination of the policies and transparency of the institutions is a key that contributes to long-run income growth. Third, trade policy ought to focus on diversification and competitiveness in an attempt to reduce the adjustment costs of external openness. To ensure that Nigeria better benefits through global trade integration, importing oil and manufacturing value-added products should be encouraged. Fourth, since the price of crude oil is dominant, the policymakers ought to hasten the process of economic diversification and lessen fiscal reliance on oil incomes. External shocks can be partially countered by the creation of stabilisation funds, and the oil earnings should be invested in infrastructure, human capital, and innovation. Lastly, the macroeconomic policy needs to be coordinated between the fiscal, monetary, and trade authorities to make sure that external shocks do not weaken the growth of income per capita.

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