MSI Journal of
Economics and Business Management (MSIJEBM)

INFLUENCE OF INTERNATIONAL REMITTANCES ON NIGERIA'S ECONOMIC PROGRESS AND DEVELOPMENT DYNAMICS

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The authors declare that no funding was received for this work.

OPEN ACCESS

Received: 05-June-2025
Accepted: 20-June-2025
Published: 30-June-2025

This article is published by **MSI Publishers** in **MSI Journal of Economics and Business Management (MSIJEBM)**
ISSN: 3049-141X (Online)

Volume: 2, Issue: 6 (June-2025)

ABSTRACT: Nigeria's trajectory of economic development over the past two decades reveals that although foreign remittance inflows have consistently grown, the country's overall economic progress has either remained stagnant or experienced notable decline. This research set out to evaluate the impact of international remittances on Nigeria's economic advancement. A variety of econometric methods including descriptive analysis and unit root testing were employed. Given the characteristics and behavior of the variables involved, the Autoregressive Distributed Lag (ARDL) model was adopted for the analysis. The results indicate that remittances from abroad make a meaningful contribution to Nigeria's long-term economic development. However, their influence on short-term human development outcomes is less consistent, often hindered by inflationary effects and suboptimal resource allocation. The study also found that the quality of institutions plays a crucial role in amplifying the growth-enhancing effects of remittances, underlining the importance of effective governance and robust regulatory systems. In the early stages, fluctuations in the exchange rate tend to exert a negative influence on economic growth. Nonetheless, when remittances are adjusted for currency volatility, their contribution becomes more favorable over time stressing the need for exchange rate stability. While development within the financial sector shows

a positive link to remittance effectiveness, the relationship lacks statistical significance, suggesting that Nigeria's issues with financial inclusion may be limiting the broader benefits. Based on these findings, the study recommends that the Nigerian government undertake comprehensive institutional reforms aimed at improving governance, curbing corruption, and enhancing regulatory frameworks. Strengthening institutional structures will help ensure that remittance inflows are channeled into productive investments and are not undermined by inefficiencies in the system.

Keywords: *international; Remittances, Human Development Index*

JEL Classification: F24, O15, O55

1.0 INTRODUCTION

Financial support sent by migrants to their countries of origin plays a vital role in advancing national development goals (Williams, 2018; Randazzo & Piracha, 2019; International Monetary Fund, 2020). These remittances consist of both monetary and non-monetary transfers, sent through official means such as digital platforms or informally through physical delivery across borders. According to recent World Bank data, remittance flows account for nearly one-third of all external financial inflows into low-income and developing nations (World Bank, 2020). Across Africa, the volume of remittances has grown steadily over the past ten years, with figures reaching up to 22% of national income in some countries (United Nations, 2017). Though not all emigrants remit funds or materials, a significant number do. Official statistics show that approximately 1.24 million Nigerians reside abroad, underlining the potential significance of diaspora remittances for Nigeria's economy (United Nations, 2017). Emigration is not exclusive to Nigeria, but the country's out-migration trend is on the rise, with nearly half of young Nigerians expressing intentions to relocate within five years (PWC, 2020). Due to the vast number of Nigerians abroad, Nigeria has consistently received a substantial portion of Sub-Saharan Africa's remittance inflows receiving $23.63 billion in 2017, $22 billion in 2018, $24.31 billion in 2019, $23.81 billion in 2020, $19.2 billion in 2021, and $29 billion in 2022 (PWC, 2020).

Scholars have recognized remittances as a reliable form of external financing, particularly when compared with foreign aid and foreign direct investment, due to their relative consistency (Sinha et al., 2018). On the household level, Merovci and Sekiraqa (2021) argue that remittances enhance the well-being of recipient families by providing resources that enable access to healthcare, education, essential goods, infrastructure, and communal development ultimately fostering economic progress. Nonetheless, some analysts express concerns that reliance on remittances may diminish labor participation by reducing the motivation to work (IMF, 2020). Given Nigeria's rising emigration rates and prolonged economic stagnation, it is important to examine how remittance inflows influence national economic performance. Projections indicate that by 2025, the number of formally recorded migrants from Sub-Saharan Africa could rise to 23.2 million. This growing trend raises concerns about potential productivity losses, particularly the emigration of skilled professionals whose expertise is essential for national development (World Bank, 2019).

Since the early 2000s, Nigeria has emerged as one of the leading remittance destinations in Sub-Saharan Africa. However, even with consistent growth in these inflows, the country's economic indicators especially GDP per capita have failed to show sustained improvement, with declines observed after 2018 (World Bank, 2019). One contributing factor is that remittances are predominantly used for personal consumption, housing, and education, rather than being invested in productive ventures (Urama et al., 2017). Moreover, external economic disruptions, such as declines in global oil prices, have weakened the naira, thereby reducing the real value and developmental impact of remittance income (Adejumo & Nazir, 2019). At the macro level, remittances influence income distribution, exchange rates, and investment in domestic versus foreign goods. While they can boost demand, they may also lead to brain drain, Dutch Disease effects, and corruption (Chami et al., 2008). On the micro level, remittances can support job creation and infrastructure but may also reduce labor supply and lead to inefficient investment decisions (Anyanwu & Erhijakpor, 2010). Given these mixed effects, a pluralistic approach is necessary to assess the net impact of remittances on economic development. This study will analyze the relationship between remittances and economic development in Nigeria,

using variables such as personal remittances received, the Human Development Index, exchange rates, interest rates, and governance indicators like the rule of law and regulatory quality.

2.0 Theoretical Review

Altruistic Theory

The altruistic perspective has long served as a foundational explanation for why migrants send remittances, with many scholars such as Rapoport and Docquier (2006) and Carling (2008) contributing to this theory. Fundamentally, the altruistic model posits that migrants are primarily motivated by the desire to enhance the welfare of their families back home. While this doesn't imply neglect of their own needs, it suggests that migrants are deeply responsive to the financial or emotional needs of their loved ones. Under this model, remittances are seen as a selfless act aimed at improving the standard of living for family members in the country of origin. Becker (1974) describes this behavior as a form of self-sacrifice, where the migrant derives satisfaction from elevating the consumption or welfare of relatives in the homeland. This notion of **pure altruism** involves giving without expectation of recognition or reward motivated instead by love, duty, and emotional bonds with family, community, or nation.

The literature also points to poverty as a primary push factor for migration, which reinforces the altruistic drive. According to Becker (1981), remittances bring emotional fulfillment to migrants because they represent a tangible way to support the social well-being of those left behind. This sense of duty is amplified by the migrant's emotional ties and the conditions of poverty that initially prompted migration. Consequently, when altruism is the dominant motivation, remittances tend to grow over time as migrants continue to respond to the needs of their families (Rapoport & Docquier, 2006; Carling, 2008).

From this perspective, the amount of remittances sent is often inversely related to the economic productivity of the home country. If the household's financial standing improves, the amount sent may decrease. Conversely, a larger income disparity between the migrant's host country and their home country typically results in

increased remittance flows. John (2016) further argues that as the financial dependence of the home country on the migrant increases, so too does the volume of remittances, purely as a function of altruistic intent. At a broader economic level, the altruistic theory suggests that remittance flows are more substantial during times of economic hardship or when developing countries face severe market failures. These adverse conditions often encourage migration, with migrants seeking higher wages abroad. Because of strong familial and cultural obligations, migrants tend to remit more during such crises, while they may reduce their support during times of economic stability at home. McCracken et al. (2017) emphasize that when countries of origin face inflation, unstable exchange rates, or declining incomes especially among labor-exporting nations migrants are likely to increase the frequency and size of their remittances. This behavior can result in remittance flows growing faster than GDP in the migrant's host country, thereby significantly impacting economic development in recipient countries, especially in low-income nations.

Empirical Review

Remittances and Economic Development

Several studies have examined the impact of remittances on economic growth and development across different countries, revealing varying effects based on economic conditions, policy environments, and financial structures. Muhammad and Muhammad (2019) conducted a comprehensive study on Pakistan and found that remittances, alongside Foreign Direct Investment (FDI) and Gross Domestic Product (GDP), play a significant role in the country's long-term economic growth. However, they noted that high levels of consumption and inflation act as barriers to sustainable development. Their findings suggest that while remittances contribute positively, macroeconomic stability is essential to fully harness their benefits.

In Nigeria, Adigun and Ologunwa (2017) emphasized the role of remittances in supporting household consumption and investment. They advised that recipients should prioritize investment over consumption to maximize long-term economic benefits. Similarly, Sebil and Abdulazeez (2018) focused on improving the efficiency of remittance transfer channels, arguing that enhancing these mechanisms

could significantly boost economic growth by increasing financial inclusion and capital accumulation.

Using a broader dataset covering 116 countries between 1990 and 2014, Matuzeveviciute and Butkas (2016) found that the economic impact of remittances varies depending on a country's level of development. Their study suggested that remittances contribute more to growth in low-income economies where financial markets are underdeveloped, whereas in middle-income and high-income countries, their effect is less pronounced.

Contrasting perspectives exist regarding remittances in Nigeria. Didia and Tahir (2021) found that remittances do not significantly contribute to Nigeria's long-term economic growth. Instead, their results indicated a negative impact in the short run, possibly due to over-reliance on remittance inflows, which could discourage labor force participation and productive investments. Conversely, Adeseye (2021) found that remittances positively influence economic growth in Nigeria and seven West African nations, respectively, suggesting that regional dynamics and policy measures could mediate these effects.

Further complicating the discussion, Igbinedion (2020) argued that remittance-driven growth in Nigeria is not inclusive, as it disproportionately benefits certain income groups while exacerbating income inequality. This aligns with the findings of Olayungbo et al. (2020), who highlighted that while remittances serve as a financial safety net, they may discourage labor productivity. Their study suggested that a reduction in remittance inflows could spur economic growth by encouraging greater workforce participation. Similarly, John et al. (2020) found a weak but positive relationship between remittances and Nigeria's economic growth, indicating that while remittances provide economic support, their impact is not substantial enough to drive sustained development. Additionally, Adesina-Uthman (2017) identified a unidirectional causality from GDP to remittances in Nigeria, suggesting that economic growth itself influences remittance inflows rather than the other way around.

Beyond Nigeria, several other studies have provided valuable insights into the remittance-growth relationship. Pradhana et al. (2008) confirmed a generally positive effect of remittances in 39 developing nations, particularly in countries with underdeveloped financial markets. However, Tassew and Rao (2016) found mixed results in Ethiopia, with remittances showing a short-term positive effect but a negative long-term impact, possibly due to dependency effects and reduced incentives for labor force participation. Similarly, Senbeta (2012) noted that while remittances contribute to capital accumulation, their impact on productivity remains minimal, suggesting that the funds are not being channeled effectively into productive investments.

Studies focusing on South Asia have also yielded interesting findings. Sutradhar (2020) examined Sri Lanka, Bangladesh, Pakistan, and India and found that remittances did not significantly contribute to economic growth in the first three countries, while India benefited substantially. This suggests that the economic structure and remittance utilization patterns play a critical role in determining their effectiveness.

In Morocco, Farid and Adil (2020) reported that remittances have a positive impact on economic growth through the development of the financial sector, reinforcing the importance of financial institutions in converting remittance inflows into productive capital. Meanwhile, Fagerheim (2015) highlighted the mixed effects of remittances in ASEAN countries, where some nations experienced economic growth while others saw limited impact due to inefficient financial intermediation.

A broader perspective on developing economies was provided by McGillivray et al. (2014), who found no general link between remittances and economic growth in most developing nations. However, their study revealed a significant positive relationship in Small Island Developing States (SIDS), where remittances serve as a crucial source of foreign exchange and economic stability.

Institutional Quality and Economic Development

North (1991) was the first to emphasize the critical role of institutions in economic growth (EG), defining institutions as human-made constraints that shape economic,

political, and social interactions. He argued that institutional quality (INQ) determines transaction costs and economic incentives, thereby influencing long-term development. Subsequent studies have expanded on North's framework, using various econometric techniques to assess the relationship between INQ and EG across different regions and time periods. Alexiou et al. (2014) applied the ARDL bounds test to Sudan's economy (1972–2008) and found that INQ played a crucial role in driving economic expansion, particularly through governance and property rights enforcement.

Nawaz et al. (2014) employed the GMM estimator on a panel dataset of 35 Asian countries (1996–2012), revealing that the impact of INQ on EG varied based on economic development stages stronger in high-income economies and weaker in low-income ones. Nguyen et al. (2018) analyzed 29 emerging economies (2002–2015) using system GMM and found a generally positive INQ-EG link, though certain regulatory constraints and over-bureaucratization hindered growth in some cases.

In the African context, Abubakar (2020) applied OLS to Nigerian data (1979–2018) and found that improvements in institutional frameworks particularly regulatory efficiency and governance stimulated economic performance. Similarly, Radzeviča and Bulderberga (2018) applied GMM techniques to a dataset covering 113 countries (2006–2016) and highlighted the substantial positive effects of INQ on economic outcomes. Carraro and Karfakis (2018) studied 11 sub-Saharan African countries and found that both INQ and economic freedom played a fundamental role in driving structural transformation and productivity growth.

In a regional study of West Africa, Iheonu et al. (2017) found that corruption control, government effectiveness, and rule of law positively influenced economic growth (1996–2015). However, contrasting findings were reported by Izilein and Mohammed (2017), who observed a negative impact of democratic institutions on Nigeria's EG (1981–2015) using GMM estimation, suggesting that democratic transitions without strong institutional safeguards could impede growth. Further, Alexiou et al. (2014) found that Sudan's political freedom index negatively impacted

EG using ARDL (1972–2008), suggesting that political instability undermined economic development.

In Nigeria, Dandume (2013) found that corruption had a paradoxical effect, positively influencing EG in the short run but eroding long-term sustainability, as revealed through ARDL and causality tests. At a global level, Valeriani and Peluso (2011) confirmed INQ's positive influence across multiple regions (1950–2009) using pooled regression and fixed-effects models. Recent studies have continued to explore INQ's nuanced role. Ekeocha et al. (2023) investigated sectoral and aggregate EG in sub-Saharan Africa (2010–2018) using system GMM, concluding that INQ had limited effects, likely due to weak enforcement mechanisms.

Gap in Literature

Although extensive studies have been done on this topic across the globe, there remains significant gap which needs consideration. Most of the studies were cross country studies and their results may not be application in many cases hence the need for country specific studies which will take into consideration country peculiarities. Although there are few studies in Nigeria which assessed the relationship of remittances and economic development, yet none of these studies actually established the interaction of remittances and quality of institutions on development. Notably, Iheonu et al. (2017), Dandume (2013), investigated the impact of institutional quality on economic growth and found mixed results. In addition, none of the studies identified have considered the human development index (HDI) as the measure for development in-depth with particular reference to Nigeria. These forms the thrust of this present study which will examine the impact of remittances on Nigeria economic development from 1996 to 2023 taking into consideration the moderating influence of institutional quality in the relationship.

3.0 Methodological Issues

National development can be significantly enhanced through the strategic infusion of substantial capital, complemented by supportive government interventions. In this research, the analytical framework will be grounded in the **augmented Solow growth model**, which expands upon the classical Solow growth theory. By

employing the standard Cobb-Douglas production function, the augmented version of the Solow model is expressed as follows:

$$Y_t = f(A_t K_t H_t) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3.1)$$

Where Y_t the output of the economy which is necessitated through mobilization of funds (diaspora remittances); which also reflect the real per capita GDP Growth at time t; A_t, is technology at time t; K_t, is capital stock at time t, H_t, human capital at time t. The endogenous growth model noted that through capital inflows (migrant remittances) developing economies can obtain the required technology (A_t) to stimulate, enhance, and promote development through increase in Per Capita Gross Domestic Growth.

Following the models of the study, the functional forms of equation 3.1 are stated below in the natural logarithm forms. For objective one:

$$LnGDPPC = f(\ln PIR, \ln TOP, \ln EXR, INTR, INF) \quad (3.2)$$

For objective two

$$LnHDI = f(\ln PIR, \ln TOP, \ln EXR, INTR, INF) \quad (3.3)$$

For objective three

$$LnGDPPC = f(REQ^* \ln PIR, \ln TOP, INTR, INF) \quad (3.4)$$

For objective four

$$LnGDPPC = f(\ln EXR^* \ln PIR, \ln TOP, INTR, INF) \quad (3.5)$$

For objective five

$$LnGDPPC = f(\ln FSD^* \ln PIR, \ln TOP, INTR, INF) \quad (3.6)$$

Expressing Equations 3.2 to 3.6 in econometric form we have

$$\ln GDPPC_t = \alpha_0 + \alpha_1 \ln PIR_t + \alpha_2 \ln TOP_t + \alpha_3 \ln EXR_t + \alpha_4 INTR_t + \alpha_5 INF_t + \mu_{1t} \quad (3.7)$$

$$\ln HDI_t = \alpha_0 + \alpha_1 \ln PIR_t + \alpha_2 \ln TOP_t + \alpha_3 \ln EXR_t + \alpha_4 INTR_t + \alpha_5 INF_t + \mu_{2t} \quad (3.8)$$

$$LnGDPPC_t = \alpha_0 + \alpha_1 REQ^* \ln PIR_t + \alpha_2 \ln TOP_t + \alpha_3 \ln EXR_t + \alpha_4 INTR_t + \alpha_5 INF_t + \mu_{3t} \quad (3.9)$$

$$LnGDPPC_t = \alpha_0 + \alpha_1 \ln EXR^* \ln PIR_t + \alpha_2 \ln TOP_t + \alpha_3 INTR_t + \alpha_4 INF_t + \mu_{4t} \quad (3.10)$$

$$LnGDPPC_t = \alpha_0 + \alpha_1 \ln FSD^* \ln PIR_t + \alpha_2 \ln TOP_t + \alpha_3 INTR_t + \alpha_4 \ln EXR_t + \mu_{5t} \quad (3.11)$$

Where; α_0, is constant, α_1 to α_4 are parameters to be estimated.

GDPPC = gross domestic product per capita, PIR = Personal International Remittances Received, REQ = Regulatory Quality as a proxy for Institutional quality, HDI = Human Capital Development, EXR= Exchange Rate, INTR = Interest Rate, TOP = trade openness, FSD = financial sector develop, INF= inflation rate.

Analytical Frame work

The **Autoregressive Distributed Lag (ARDL) approach,** introduced by Pesaran, Shin, and Smith (2001), is a popular econometric method for examining long-term associations among variables, especially when the dataset contains a combination of stationary variables at levels [I(0)] and first differences [I(1)]. This technique models the dependent variable as a function of its own previous values along with both current and lagged values of the independent variables. The general representation of the ARDL model can be formulated as follows:

$$Y_t = \alpha + \sum_{i=1}^{p} \beta_i Y_{t-1} + \sum_{j=0}^{q} \delta_j X_{t-j} + \varepsilon_t \quad (3.12)$$

In this context, $\mathbf{Y_t}$ denotes the outcome variable, while $\mathbf{X_t}$ stands for the independent or predictor variable. The parameter $\boldsymbol{\alpha}$ represents the constant term, and the coefficients $\boldsymbol{\beta_i}$ and $\boldsymbol{\delta_j}$ reflect the short-term impacts of the lagged values of the variables. The disturbance term $\boldsymbol{\varepsilon_t}$ captures the influence of all other factors not included in the model. The ARDL modeling technique incorporates both immediate and long-term aspects of variable interactions. Short-run dynamics are analyzed using the lagged differences of the variables within an error correction mechanism (ECM). Meanwhile, the long-run association is assessed through the bounds testing procedure, which examines the null hypothesis of no cointegration using the **F-statistic**. When a long-run linkage is confirmed, the resulting coefficients offer insights into the long-term equilibrium relationship among the variables.

One of the major strengths of the ARDL approach lies in its capability to work with variables that are integrated at different levels whether stationary at level [$I(0)$] or first difference [$I(1)$] making it more versatile than conventional cointegration methods that require uniform integration. The method also proves advantageous in studies with limited data samples, where traditional cointegration techniques often lack statistical reliability. Furthermore, the ARDL model allows for the estimation of both short-term fluctuations and long-term trends within one unified framework, enhancing its practicality in applied economic and financial research. Numerous empirical investigations have employed or expanded upon the ARDL methodology across different academic fields. The foundational contribution by Pesaran et al. (2001) highlighted the robustness of the bounds testing strategy in identifying equilibrium relationships between time series data.

The Autoregressive Distributed Lag Model (ARDL)

The ARDL model for model one to five is stated in the following equations:

$$LnGDPPC_{\mathrm{t}} = \sum_{i=1}^{p}\alpha_i LnGDPPC_{\mathrm{t\text{-}1}} + \sum_{j=0}^{q}\beta_j LnPIR_{t-j} + \sum_{j=0}^{q}\lambda_j LnTOP_{t-j}$$
$$+\sum_{j=0}^{q}\psi_j LnEXR_{t-j} + \sum_{\mathrm{j}=0}^{\mathrm{q}}\varphi_{\mathrm{j}} INT_{t-j} + \sum_{\mathrm{j}=0}^{\mathrm{q}}\delta_{\mathrm{j}} INF_{t-j} + \mu_{1t} \quad \text{.....(3.13)}$$

$$HDI_{\mathrm{t}} = \sum_{i=1}^{p}\alpha_i HDI_{\mathrm{t\text{-}1}} + \sum_{j=0}^{q}\beta_j LnPIR_{t-j} + \sum_{j=0}^{q}\lambda_j LnTOP_{t-j}$$
$$+\sum_{j=0}^{q}\psi_j LnEXR_{t-j} + \sum_{\mathrm{j}=0}^{\mathrm{q}}\varphi_{\mathrm{j}} INT_{t-j} + \sum_{\mathrm{j}=0}^{\mathrm{q}}\delta_{\mathrm{j}} INF_{t-j} + \mu_{1t} \quad \text{.....(3.14)}$$

$$\ln GDPPC_t = \sum_{i=1}^{p}\alpha_i \ln GDPPC_{\mathrm{t\text{-}1}} + \sum_{j=0}^{q}\beta_j IQ * LnPIR_{t-j} + \sum_{j=0}^{q}\lambda_j LnTOP_{t-j}$$
$$+\sum_{j=0}^{q}\psi_j LnEXR_{t-j} + \sum_{\mathrm{j}=0}^{\mathrm{q}}\varphi_{\mathrm{j}} INT_{t-j} + \mu_{1t} \quad \text{.....(3.15)}$$

$$\ln GDPPC_t = \sum_{i=1}^{p}\alpha_i \ln GDPPC_{\mathrm{t\text{-}1}} + \sum_{j=0}^{q}\beta_j \ln EXR * LnPIR_{t-j} + \sum_{j=0}^{q}\lambda_j LnTOP_{t-j}$$
$$+\sum_{\mathrm{j}=0}^{\mathrm{q}}\varphi_{\mathrm{j}} INT_{t-j} + \mu_{1t} \quad \text{.....(3.16)}$$

$$\ln GDPPC_t = \sum_{i=1}^{p} \alpha_i \ln GDPPC_{t-1} + \sum_{j=0}^{q} \beta_j FSD * LnPIR_{t-j} + \sum_{j=0}^{q} \lambda_j LnTOP_{t-j}$$

$$+ \sum_{j=0}^{q} \varphi_j INT_{t-j} + \mu_{1t} \ldots\ldots\ldots\ldots (3.17)$$

All variables remain as described in equations 1, while α, β, φ, γ … are parameters to be measured while μ = Error term, t stands for time period.

Cointegration test

The bounds testing approach is a statistical procedure used to determine whether a stable long-term association exists between a dependent variable and the lagged terms of its independent variables, through the use of an F-statistic. This process involves evaluating the null hypothesis (**H_0: $\alpha_j = \beta_j = 0$**), which asserts that there is no long-run connection among the variables meaning that the coefficients of all explanatory variables are jointly zero. If the null hypothesis is rejected, it suggests the presence of a long-term linkage. In this method, the calculated F-statistic is compared against two sets of critical values: a lower bound and an upper bound. When the F-value exceeds the upper bound, the null hypothesis of no cointegration is dismissed, confirming a long-term relationship among the variables. Conversely, if the F-statistic is below the lower bound, the null cannot be rejected, signifying no such relationship exists. If the value falls between these bounds, the conclusion is ambiguous, leaving the presence of cointegration uncertain.

After confirming the existence of a long-run equilibrium, the subsequent step is to estimate the short-term behavior of the model using the error correction mechanism (ECM). The ECM explains the short-run fluctuations of the variables and measures the pace at which the model returns to its long-term path after a temporary deviation. This enables the construction of a dynamic short-run error correction equation, providing insights into how the variables adjust in the short term and the rate at which they realign with their long-run equilibrium. In this research, the bounds test was employed to determine cointegration. The tentative ARDL(p, q) models used for estimation is specified as follows:

$$\Delta LnGDPPC_{\mathrm{t}} = \sum_{i=1}^{p}\alpha_i \ln GDPPC_{\mathrm{t\text{-}1}} + \sum_{j=0}^{q}\beta_j LnPIR_{t-j} + \sum_{j=0}^{q}\lambda_j LnTOP_{t-j}$$
$$+\sum_{\mathrm{j}=0}^{\mathrm{q}}\varphi_{\mathrm{j}} INT_{t-j} + \sum_{\mathrm{j}=0}^{\mathrm{q}}\delta_{\mathrm{j}} INF_{t-j} + \sum_{i=1}^{p}\alpha_i \Delta \ln GDPPC_{\mathrm{t\text{-}1}} + \sum_{j=0}^{q}\beta_j \Delta LnPIR_{t-j} + \sum_{j=0}^{q}\lambda_j \Delta LnTOP_{t-j}$$
$$+\sum_{\mathrm{j}=0}^{\mathrm{q}}\varphi_{\mathrm{j}} \Delta INT_{t-j} + \sum_{\mathrm{j}=0}^{\mathrm{q}}\delta_{\mathrm{j}} \Delta INF_{t-j} + \psi ECT_{t-1} + \mu_{1t} \text{.....(3.18)}$$

$$\Delta LnHDI_{\mathrm{t}} = \sum_{i=1}^{p}\alpha_i \ln HDI_{\mathrm{t\text{-}1}} + \sum_{j=0}^{q}\beta_j LnPIR_{t-j} + \sum_{j=0}^{q}\lambda_j LnTOP_{t-j}$$
$$+\sum_{\mathrm{j}=0}^{\mathrm{q}}\varphi_{\mathrm{j}} INT_{t-j} + \sum_{\mathrm{j}=0}^{\mathrm{q}}\delta_{\mathrm{j}} INF_{t-j} + \sum_{i=1}^{p}\alpha_i \Delta \ln HDI_{\mathrm{t\text{-}1}} + \sum_{j=0}^{q}\beta_j \Delta LnPIR_{t-j} + \sum_{j=0}^{q}\lambda_j \Delta LnTOP_{t-j}$$
$$+\sum_{\mathrm{j}=0}^{\mathrm{q}}\varphi_{\mathrm{j}} \Delta INT_{t-j} + \sum_{\mathrm{j}=0}^{\mathrm{q}}\delta_{\mathrm{j}} \Delta INF_{t-j} + \psi ECT_{t-1} + \mu_{2t} \text{.....(3.19)}$$

$$\Delta LnGDPPC_{\mathrm{t}} = \sum_{i=1}^{p}\alpha_i \ln GDPPC_{\mathrm{t\text{-}1}} + \sum_{j=0}^{q}\beta_j LnEXR * PIR_{t-j} + \sum_{j=0}^{q}\lambda_j LnTOP_{t-j}$$
$$+\sum_{\mathrm{j}=0}^{\mathrm{q}}\varphi_{\mathrm{j}} INT_{t-j} + \sum_{\mathrm{j}=0}^{\mathrm{q}}\varphi_{\mathrm{j}} INF_{t-j} + \sum_{i=1}^{p}\alpha_i \Delta \ln GDPPC_{\mathrm{t\text{-}1}} + \sum_{j=0}^{q}\beta_j \Delta LnEXR * PIR_{t-j} + \sum_{j=0}^{q}\lambda_j \Delta LnTOP_{t-j}$$
$$+\sum_{\mathrm{j}=0}^{\mathrm{q}}\varphi_{\mathrm{j}} \Delta INF_{t-j} + \psi ECT_{t-1} + \mu_{3t} \text{.....(3.20)}$$

$$\Delta LnGDPPC_{\mathrm{t}} = \sum_{i=1}^{p}\alpha_i \ln GDPPC_{\mathrm{t\text{-}1}} + \sum_{j=0}^{q}\beta_j LnIQ * PIR_{t-j} + \sum_{j=0}^{q}\lambda_j LnTOP_{t-j}$$
$$+\sum_{\mathrm{j}=0}^{\mathrm{q}}\varphi_{\mathrm{j}} INT_{t-j} + \sum_{\mathrm{j}=0}^{\mathrm{q}}\varphi_{\mathrm{j}} INF_{t-j} + \sum_{i=1}^{p}\alpha_i \Delta \ln GDPPC_{\mathrm{t\text{-}1}} + \sum_{j=0}^{q}\beta_j \Delta LnIQ * PIR_{t-j} + \sum_{j=0}^{q}\lambda_j \Delta LnTOP_{t-j}$$
$$+\sum_{\mathrm{j}=0}^{\mathrm{q}}\varphi_{\mathrm{j}} \Delta INF_{t-j} + \psi ECT_{t-1} + \mu_{4t} \text{.....(3.21)}$$

$$\Delta LnGDPPC_{\mathrm{t}} = \sum_{i=1}^{p}\alpha_i \ln GDPPC_{\mathrm{t\text{-}1}} + \sum_{j=0}^{q}\beta_j LnFSD * PIR_{t-j} + \sum_{j=0}^{q}\lambda_j LnTOP_{t-j}$$
$$+\sum_{\mathrm{j}=0}^{\mathrm{q}}\varphi_{\mathrm{j}} INT_{t-j} + \sum_{\mathrm{j}=0}^{\mathrm{q}}\varphi_{\mathrm{j}} INF_{t-j} + \sum_{i=1}^{p}\alpha_i \Delta \ln GDPPC_{\mathrm{t\text{-}1}} + \sum_{j=0}^{q}\beta_j \Delta LnFSD * PIR_{t-j} + \sum_{j=0}^{q}\lambda_j \Delta LnTOP_{t-j}$$
$$+\sum_{\mathrm{j}=0}^{\mathrm{q}}\varphi_{\mathrm{j}} \Delta INF_{t-j} + \psi ECT_{t-1} + \mu_{5t} \text{.....(3.22)}$$

All variables in the equation 3.18 to 3.22 are as described in equation 2 above, Δ is the lag operator while ψ is the coefficient of the error correction model.

Estimation Procedure

Since identifying the integration order of a time series is crucial for accurate analysis, the Augmented Dickey-Fuller (ADF) test will be employed to assess the stationarity characteristics of the model's variables. The appropriate lag length will be selected based on the Akaike Information Criterion (AIC).This will be followed by bound test cointegration test and the estimation of the models. Post-estimation tests will be performed in this research which will include serial correlation, and heteroscedasticity tests normality and stability tests.

Sources and Type of Data

The type of data this study utilized is secondary data. Specifically, this study will utilize secondary data obtained from World Bank's Development Indicators, World Bank Website covering the period of 28 years (1996 -2023).

4.0 Empirical Result

Descriptive Analysis

Conventionally, every empirical narration typically begins with some initial investigation, which prepares the reader for a more rigorous estimation. As a result, summary statistics were performed for this investigation using the pertinent series. This analysis reveals, among other aspects, the behavioral tendencies of the data series and the nature of their distributions. Specifically, the descriptive statistics offer insights into the distributional characteristics of the variables, as reflected in the test outcomes shown in Table 4.1.

Table 4.1: Descriptive Outcomes

Variables	Mean	Maximum	Std_Dev	Skewness	Kurtosis	J_B Stat.
GDPPC	1871.741	3091.000	731.7447	-0.378949	2.286986	1.218147
HDI	50.07778	53.63300	2.441236	-0.463806	1.958668	2.187942
INF	12.77630	29.30000	5.145560	1.205603	5.126766	11.62918**
INT	17.16407	24.84000	3.059418	-0.293724	4.510041	2.953486
IQ	0.386667	0.440000	0.035734	-0.525686	2.761468	1.307565
PIR	2.22E+09	3.96E+09	1.31E+09	-0.136003	1.342426	3.174230
TOP	0.356755	0.507676	0.078881	-0.341034	2.909104	0.532662
FSD	14.51666	22.75484	5.584719	-0.264142	1.299860	3.565755
EXR	177.8162	452.2374	114.3498	0.927557	3.107499	3.884629

Authors' calculation. (**) signify the decline of null hypothesis of normal distribution at 1% (5%)[10%] level of significance respectively. GDPPC designates gross domestic product per capita; HDI stands for human development index, EXR represents exchange rate, while INT means interest rate, INF stands for inflation rate, PIR is for personal international remittances, FSD represents financial sector develop, TOP stands for trade openness, IQ means institutional quality.

The descriptive statistics for the dataset provide an overview of the distribution and characteristics of the key variables of the study. Economic development, represented by GDPPC, has a mean value of 1871.741, with a minimum of 539 and a maximum of 3091, indicating moderate variation, as reflected in its standard deviation of 731.7447. The human development index (HDI) has an average of 50.08, with relatively low variability, as its standard deviation is 2.44. Inflation (INF) exhibits a higher level of variability, with a mean of 12.78 and a maximum of 29.3, demonstrating that inflation rates have fluctuated significantly. Its positive skewness of 1.21 and kurtosis of 5.13 indicate that inflation distribution is right-skewed with heavy tails. Interest rates (INT) have an average of 17.16, with values ranging from 9 to 24.84, showing a moderate level of dispersion. Institutional quality (IQ) is relatively stable, with a mean of 0.39 and a small standard deviation of 0.0357, suggesting little variation across the observations.

Personal international remittances (PIR) have a large magnitude, with an average of approximately 2.22 billion, but also exhibit high dispersion, as seen in its standard deviation of 1.31 billion. Trade openness (TOP) has an average value of 0.357, with

low variability, while financial sector development (FSD) has a mean of 14.52 and a range from 7.16 to 22.75. Exchange rate (EXR) shows significant dispersion, with a mean of 177.82, a maximum of 452.24, and a minimum of 21.89, reflecting considerable fluctuations in currency value. In terms of distribution, the Jarque-Bera test suggests that inflation is the only variable significantly deviating from normality, with a probability value of 0.00298, indicating strong evidence of non-normality. Other variables have probability values above 0.05, suggesting they do not significantly deviate from a normal distribution. Overall, the dataset captures notable variations in economic development, financial conditions, and macroeconomic indicators.

Unit Root Test

The series was tested for stationarity to determine its order of integration. It adopted the conventional stationarity test approach (ADF and PP). The summary of the result is shown in Table 4.2.

Table 4.2: Unit Roots Test Result

	Augmented Dickey Fuller (ADF)				**Phillip-Perron (PP)**		
Variable	**Level**	**1st diff**	**I(d)**		**Level**	**1st diff**	**I(d)**
lnGDPPC	-1.3161	-3.4999**	I(1)		-2.4114	-3.4100**	I(1)
lnHDI	-3.5781**	N/A	I(0)		-5.6366**	N/A	I(0)
lnIQ	-2.2408	-5.6368**	I(1)		-2.2417	-5.6368**	I(1)
lnPIR	-0.5511	-5.8552**	I(1)		-1.4541	-5.8456**	I(1)
lnTOP	-3.0598**	N/A	I(0)		-4.1576**	N/A	I(0)
INT	-2.8611	-6.1187**	I(1)		-2.8611	-6.1187**	I(1)
INF	-2.07871**	N/A	I(0)		-3.0187**	N/A	I(0)
lnFSD	0.6408	-4.5068**	I(1)		1.2418	4.5079**	I(1)
EXR	1.1426	-3.7827**	I(1)		1.3436	-3.7827**	I(1)

Computed by the authors. ** (*) indicates that the variable is stationary at the 1% (5%) significance level, while I(d) denotes the order of integration of the series.

Evidently, the variables demonstrate a combination of integration orders, consisting of both I(0) and I(1) series. In particular, gross domestic product per capita, exchange rate, financial sector development, interest rate, institutional quality, and personal remittances became stationary after their first differences were taken, as indicated by their ADF and PP test statistics falling below the 5% significance level. On the other hand, inflation rate, trade openness, and the human development index were found to be stationary at level, with their respective test statistics also falling below the 5% critical value. Thus, it can be concluded that the model's variables are integrated at level and at first difference. This justifies the application of the ARDL bounds testing method to explore the presence of a long-run cointegration relationship among variables with differing integration orders. The appropriate lag length for each variable was determined using standard information criteria.

Table 4.3: Bound Test for Cointeration Results for Model 1-5

Model		**F-statistic**	**I0 at 5%, 1%**	**I1 Bound at 5%, 1%**	**K**	**Remark**
1		7.798453	2.62 (3.41)	3.79 (4.68)	5	cointegrated
2		6.885015	2.62 (3.41)	3.79 (4.68)	5	Cointegrated
3		4.628162	2.62 (3.41)	3.79 (4.68)	5	Cointegrated
4		3.432453	2.86 (3.74)	4.01 (5.06)	4	Not cointegrated
5		6.701529	2.62 (3.41)	3.79 (4.68)	5	Cointegrated

Authors' computation. Numbers in parentheses are 1% values

As shown by the bounds test outcomes in Table 4.3, the F-statistic values for Models 1, 2, 3, and 5 surpass the upper critical limits of the Pesaran test. This implies that the null hypothesis indicating no long-term association among the variables in these models is rejected. Conversely, the F-statistic for Model 4 lies below the lower critical bound, indicating a lack of evidence for cointegration in that model. As a result, the ARDL model estimations were carried out, with the results displayed in Tables 4.4A to 4.4E.

Table 4.4A: Summary of Results for the Autoregressive Distributed Lag Model One

Short Run Form				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
D(LNPIR)	0.380289	0.099137	3.835986	0.0018
D(LNTOP)	-0.372911	0.145136	-2.569385	0.0223
D(LNTOP(-1))	-0.245103	0.159325	-1.538383	0.1462
D(EXR)	-0.005779	0.000997	-5.797131	0.0000
D(INF)	0.004131	0.006395	0.645955	0.5288
D(INT)	-0.016724	0.010691	-1.564268	0.1401
ECT(-1)	-0.757169	0.128780	-5.879539	0.0000
Long Run Form				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
LNPIR	0.704544	0.065522	10.752734	0.0000
LNTOP	0.150547	0.178141	0.845099	0.4123
EXR	-0.000436	0.000515	-0.847616	0.4109
INF	0.005456	0.008700	0.627152	0.5407
INT	-0.022087	0.013898	-1.589233	0.1343
C	-6.917713	1.419563	-4.873128	0.0002

The short-term estimates from the ARDL model reveal that personal international remittances (lnPIR) have a positive and statistically significant influence on economic development, with a coefficient of 0.3803 and a p-value of 0.0018. Trade openness (lnTOP) demonstrates a negative and significant short-term impact, indicated by a coefficient of -0.3729 and a p-value of 0.0223, implying that greater trade openness may initially constrain economic progress. However, its lagged term is not statistically meaningful. The exchange rate (EXR) also shows a significant negative impact in the short run, with a coefficient of -0.0058 and a p-value of

0.0000, suggesting that fluctuations in the exchange rate may adversely affect economic development. Inflation (INF) and interest rate (INT) do not display significant short-run effects. The coefficient of the error correction term (ECT(-1)) is -0.7572 and is highly significant, indicating a strong rate of adjustment toward the long-run equilibrium. In the long term, personal international remittances (lnPIR) continue to be a major determinant of economic development, with a coefficient of 0.7045 and a p-value of 0.0000, confirming a robust positive link. Conversely, trade openness (lnTOP), exchange rate (LnEXR), inflation (INF), and interest rate (INT) do not exhibit statistically significant long-run effects, as their p-values exceed the 0.05 threshold. In summary, the findings underscore the vital role of remittances in promoting economic growth, while trade openness and exchange rate volatility exert influence mainly in the short run.

Table 4.4B. Result of ARDL (short-run) and long run form for model two

Short Run Form				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNIQPIR)	9799.024628	6900.153646	1.420117	0.1893
D(LNIQPIR(-1))	-26242.862269	8309.138361	-3.158313	0.0116
D(LNTOP)	-0.000900	0.006323	-0.142380	0.8899
D(LNEXR)	0.000049	0.000034	1.422498	0.1886
D(LNEXR(-1))	-0.000080	0.000036	-2.228757	0.0528
D(INF)	-0.000144	0.000200	-0.721427	0.4890
D(INF)	0.000314	0.000164	1.917177	0.0875
D(INT)	0.001422	0.000613	2.319001	0.0456
D(INT(-1))	-0.000585	0.000547	-1.069599	0.3126
ECT(-1)	-0.286654	0.079216	-3.618653	0.0056
Long Run Form				

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNIQPIR	121426.164	21955.46341	5.530565	0.0004
LNTOP	0.035402	0.025720	1.376440	0.2020
LNEXR	0.000446	0.000093	4.781548	0.0010
INF	-0.002774	0.001233	-2.248920	0.0511
INT	0.012316	0.005500	2.239467	0.0519
C	3.762479	0.069876	53.844903	0.0000

The ARDL cointegration results for the second indicate that in the short run, the impact of personal international remittances (lnPIR) on human development (lnHDI) is mixed. While the current period coefficient is positive but insignificant, the lagged value is negative and statistically significant, suggesting that past remittances may have an adverse effect on human development. Trade openness (lnTOP) does not exhibit a significant short-run influence, as indicated by its very low coefficient and high p-value. The exchange rate (LNEXR) shows a mixed impact, with the current period effect being positive but insignificant, while the lagged value is negative and nearly significant, implying that past exchange rate fluctuations might hinder human development. Inflation (INF) exhibits inconsistent effects, as one coefficient is negative and insignificant, while another is positive but only weakly significant. Interest rates (INT) show a significant positive effect in the short run, suggesting that higher interest rates may be associated with improvements in human development. The error correction term (ECT(-1)) is negative and statistically significant, confirming the presence of a long-run equilibrium relationship and indicating a moderate speed of adjustment toward long-run stability.

In the long run, personal international remittances (lnPIR) emerge as a strong driver of human development, with a highly significant and large positive coefficient, implying that higher remittances contribute significantly to improvements in economic development. The exchange rate (EXR) also has a positive and significant long-run effect, suggesting that exchange rate movements, possibly through trade and investment channels, support human development. Inflation (INF) has a negative but weakly significant effect, indicating that higher inflation may slightly hinder economic development. Interest rates (INT) exhibit a

positive and marginally significant effect, implying that changes in monetary policy could influence human development in the long term. Trade openness (lnTOP), however, does not show a significant long-run effect.

Table 4.4C. Result of ARDL (short-run) and long run form for model three

Short Run Form				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
D(LNIQPIR)	803255.321	178780.3862	4.492974	0.0003
D(LNTOP)	-0.407014	0.157677	-2.581318	0.0188
D(INT)	-0.015997	0.010651	-1.501995	0.1504
D(LNEXR)	-0.005535	0.001098	-5.042906	0.0001
ECT(-1)	-0.518401	0.090611	-5.721176	0.0000
Long Run Form				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
LNIQPIR	1549487.199239	232379.2051	6.667925	0.0000
LNTOP	-0.149829	0.249257	-0.601101	0.5553
INT	-0.030859	0.019401	-1.590589	0.1291
LNEXR	0.000612	0.000668	0.916278	0.3716
C	8.389692	0.340271	24.655894	0.0000

Model three results suggest that in the short run, institutional quality interaction with personal international remittances (lnIQPIR) has a significant and strong positive effect on per capita GDP (lnGDPPc), indicating that improved institutional quality combined with remittance inflows can enhance economic development. Trade openness (lnTOP) has a significant negative effect, suggesting that increased trade openness might not immediately translate into economic growth, possibly due to structural inefficiencies or external trade imbalances. The exchange rate (EXR) also has a significant negative effect, implying that exchange rate depreciation may

adversely impact economic development in the short run. Interest rates (INT), however, do not exhibit a significant short-term effect on per capita GDP. The error correction term (ECT(-1)) carries a negative sign and is statistically significant at a high level, validating the existence of a long-term equilibrium relationship and reflecting a moderate rate of convergence toward long-run economic stability.

In the long run, institutional quality interaction with remittances (lnIQPIR) remains a highly significant and strong driver of economic development, reinforcing the idea that better governance and efficient utilization of remittance inflows can contribute positively to economic growth. Trade openness (lnTOP), interest rates (INT), and the exchange rate (EXR) do not exhibit significant long-run effects, suggesting that their impact on economic development may be more complex or dependent on other macroeconomic factors.

Table 4.4D. Result of ARDL long run form for model four

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.***
D(LNGDPPC(-1))	1.047256	0.135929	7.704410	0.0000
D(LNEXRLNPIR)	-0.000201	8.42E-05	-2.383508	0.0319
D(LNEXRLNPIR(-1))	0.000459	0.000104	4.404139	0.0006
D(LNEXRLNPIR(-2))	-0.000118	9.35E-05	-1.265192	0.2265
D(LNTOP)	-0.433069	0.268420	-1.613400	0.1290
D(LNTOP(-1))	0.442424	0.384019	1.152089	0.2686
D(LNTOP(-2))	0.510733	0.302168	1.690228	0.1131
D(INT)	-0.005011	0.018341	-0.273238	0.7887
INT(-1))	0.051077	0.025613	1.994228	0.0660
D(INT(-2))	0.051190	0.022707	2.254390	0.0407
C	-1.955083	1.477307	-1.323410	0.2069

The short-run results from Table 4.4D of the ARDL model for per capita GDP (LNGDPPC) reveal several important dynamics. First, the lagged value of per capita GDP itself is highly significant and positively signed (coefficient = 1.0473, $p < 0.01$), which indicates strong short-run inertia in economic performance. This suggests that the previous period's economic activity continues to drive current growth, affirming the presence of short-term economic momentum in the system. The interaction term between the exchange rate and personal international remittances (LNEXRLNPIR) shows a complex short-run pattern. The current change in this variable has a negative and statistically significant effect on GDP per capita (coefficient = -0.000201, $p = 0.0319$), implying that sudden inflows of remittances under adverse exchange rate conditions may initially suppress economic activity. However, the first lag of this variable turns significantly positive (coefficient = 0.000459, $p < 0.01$), showing that remittances when moderated by exchange rate adjustments begin to stimulate economic growth with a short delay. This delayed positive effect could be due to time lags in the productive use of remitted funds, such as investment in small businesses or consumption that drives demand. The second lag is negative but not statistically significant, suggesting that the short-run effects are largely concentrated within the first lag.

Trade openness (LNTOP) does not have a statistically significant effect on per capita GDP in the short run. The contemporaneous value and both its first and second lags have *p*-values above the 10% threshold, although the sign reversal from negative to positive hints at underlying volatility in the impact of trade dynamics. These fluctuations suggest that trade openness might require longer timeframes or specific policy conditions to exert a measurable short-run impact. Interest rate (INT) also shows no significant contemporaneous effect on GDP per capita, as its immediate coefficient is very small and highly insignificant (coefficient = -0.005011, $p = 0.7887$). However, its first lag is nearly significant ($p = 0.0660$), and the second lag is positive and statistically significant (coefficient = 0.051190, $p = 0.0407$). This pattern suggests that interest rate policies may require a lag of one or two periods to influence economic growth. The positive coefficients on the lagged interest rates imply that a tightening of monetary policy might support growth over time, potentially through stabilizing inflation or enhancing investor confidence. Finally,

the constant term is negative but not statistically significant, indicating that when all variables are held constant, the autonomous short-run component of per capita GDP change is not significantly different from zero.

Table 4.4E. Result of ARDL long run form for model five

Short Run Form				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
D(LNFSDLNPIR)	0.011892	0.006866	1.732001	0.1089
D(LNTOP)	-0.226284	0.182169	-1.242168	0.2379
D(LNTOP(-1))	-0.730553	0.208080	-3.510926	0.0043
D(INT)	0.015575	0.013522	1.151853	0.2718
D(INT(-1))	-0.075794	0.016701	-4.538129	0.0007
D(LNEXR)	-0.002989	0.001315	-2.273057	0.0422
D(LNEXR(-1))	0.002973	0.001340	2.218631	0.0466
ECT(-1)	-0.122417	0.105720	-1.157938	0.2694
Long Run Coefficients				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
LNFSDLNPIR	0.169560	0.133796	1.267302	0.2291
LNTOP	7.042007	7.227594	0.974322	0.3491
INT	1.112226	1.119544	0.993463	0.3401
LNEXR	0.024168	0.023055	1.048265	0.3152
C	-17.882395	23.159576	-0.772138	0.4550

The ARDL results for the fifth indicate that financial sector development interaction with personal international remittances (LNFSDLNPIR) has a positive but statistically insignificant impact on per capita GDP in both the short and long run, suggesting that while financial sector improvements combined with remittance inflows may support economic growth, the effect is not strong. Trade openness

(LNTOP) shows a significant negative short-run impact in its first lag, implying that past trade liberalization may have had adverse effects on economic development, though its long-run effect is positive but insignificant. Interest rate (INT) exhibits mixed effects, with a negative and significant short-run impact in its first lag, suggesting that previous increases in interest rates might have constrained economic activity. The exchange rate (LNEXR) has a negative short-run impact but reverses to a positive effect in its first lag, indicating short-term instability but a potential stabilizing influence over time. The error correction term (ECT(-1)) is negative but statistically insignificant, suggesting weak evidence of long-run equilibrium adjustment in the model. Overall, the results imply that financial development, trade openness, interest rates, and exchange rate dynamics play a role in economic growth, but their effects are not strongly significant in the long run.

4.3 Robustness Checks of the models

Table 4.5A: Summary of Results of Diagnostic Test for model one

Test Statistics	**Type**	**Statistic Value**	**F-Dimensions**	**F-Statistic**	**P -Value**
Breusch-Godfrey Serial Correlation LM Test:	Chi sq	26.02025	(2,12)	0.793019	0.4748
HeteroskedasticityTestBreusch-Pagan-Godfrey	Chi Sq	11.85359	(10,14)	1.262324	0.2950
Ramsey RESET Test	0.823703		(1, 12)	0.678487	0.4262
Normality of Residuals	Jarque Bera	0.321276	Not Applicable		0.8517

Table 4.5B Summary of Results of Diagnostic Test for model two

Test Statistics	**Type**	**Statistic Value**	**F-Dimensions**	**F-Statistic**	**P –Value**
Breusch-Godfrey Serial Correlation LM Test:	Chi sq	1.358237	(2,9)	0.258528	0.7777
HeteroskedasticityTest Breusch-Pagan-	Chi Sq	16.90415	(13,11)	1.766772	0.1756

Godfrey					
Ramsey RESET Test		1.002598	(1, 10)	1.001298	0.3403
Normality of Residuals	Jarque Bera	0.874827	Not Applicable		0.6457

Table 4.5C Summary of Results of Diagnostic Test for model three

Test Statistics	**Type**	**Statistic Value**	**FDimensions**	**F-Statistic**	**P –Value**
Breusch-Godfrey Serial Correlation LM Test:	Chi sq	4.403595	(2,9)	1.631232	0.2266
HeteroskedasticityTestBreusch-Pagan-Godfrey	Chi Sq	9.847107	(7,18)	1.567591	0.2082
Ramsey RESET Test		1.244634	(1, 10)	1.549113	0.2416
Normality of Residuals	Jarque Bera	0.640671	Not Applicable		0.7259

Table 4.5D Summary of Results of Diagnostic Test for model four

Test Statistics	**Type**	**Statistic Value**	**F-Dimensions**	**F-Statistic**	**P –Value**
Breusch-Godfrey Serial Correlation LM Test:	Chi sq	4.959921	(2,9)	1.485000	0.2653
HeteroskedasticityTestBreusch-Pagan-Godfrey	Chi Sq	15.89758	(10,14)	2.445130	0.0617
Ramsey RESET Test		1.082938	(1, 13)	1.172755	0.2985
Normality of Residuals	Jarque Bera	0.095187	Not Applicable		0.9535

Table 4.5E Summary of Results of Diagnostic Test for model five

Test Statistics	**Type**	**Statistic Value**	**F-Dimensions**	**F-Statistic**	**P –Value**
Breusch-Godfrey Serial Correlation	Chi sq	2.014559	(2,11)	0.482048	0.6300

LM Test:					
HeteroskedasticityTestBreusch-Pagan-Godfrey	Chi Sq	12.69852	(11,13)	1.219962	0.3620
Ramsey RESET Test		1.313245	(1, 13)	1.724612	0.2118
Normality of Residual	Jarque Bera	1.016027	Not Applicable		0.6017

The diagnostic tests were conducted to ensure the robustness of the study, the tests include the correlation LM test, heteroskedasticity test, specification test and Jarque-Bera normality test, presented in Table 4.5A to 4.5E, reveal that all the probability values exceed the 5% significance level for all the models. This indicates that the null hypotheses for these tests cannot be rejected. Consequently, there is no evidence of serial correlation, no heteroskedasticity, and aalso the residuals are normally distributed. The Ramsey RESET test was conducted to check for model specification errors in the given regression equation. There is no statistical evidence to reject the null hypothesis that the model is correctly specified.

Discussion of Results

Personal international remittances play a crucial role in driving economic development in Nigeria, as indicated by their impact on per capita GDP growth in both the short and long run. The ARDL cointegration results reveal that in the short run, the influence of remittances on human development is mixed. The positive but statistically insignificant coefficient of current period remittances suggests that while inflows may contribute to economic well-being, the immediate effect is not robust. However, the negative and significant impact of lagged remittances indicates that previous remittance inflows may have unintended adverse effects, potentially due to factors such as inflationary pressures, dependency syndrome, or inefficient utilization of funds. This aligns with the findings of Adams and Cuecuecha (2013), who argue that while remittances provide immediate financial relief, their long-term effects depend on how they are invested or consumed. Similarly, Olowa et al. (2020) note that remittance inflows in Nigeria often lead to increased household consumption rather than productive investment, which may explain the observed negative lagged effect on human development.

In the long run, personal international remittances emerge as a strong and significant driver of economic development. The large positive coefficient suggests that as remittances increase, they significantly contribute to improvements in per capita GDP. This finding is consistent with studies by Gupta, Pattillo, and Wagh (2009), who highlight the role of remittances in boosting economic development through increased investment in education, healthcare, and entrepreneurship. Likewise, Ukeje and Obiechina (2013) emphasize that in the Nigerian context, remittances serve as a vital source of foreign exchange, helping to stabilize the economy and drive long-term growth. The significant long-run impact implies that remittances, when channeled effectively, can enhance human capital formation and infrastructure development, ultimately fostering sustained economic growth. Furthermore, Nyamongo, Misati, Kipyegon, and Ndambendia (2012) found that remittances enhance financial deepening and economic growth, particularly in developing countries, by providing additional capital for productive investments.

Institutional quality interaction with remittances is also found to be a highly significant and strong driver of economic development in Nigeria in both the short and long run. This suggests that good governance, regulatory efficiency, and institutional stability enhance the effectiveness of remittance inflows in promoting economic growth. This finding supports the argument of Acosta, Lartey, and Mandelman (2009), who assert that remittances are more beneficial in economies with sound institutions, as they provide a conducive environment for productive investments. In Nigeria, weak institutional frameworks have often undermined the potential benefits of remittances, as noted by Olayungbo and Quadri (2019). Therefore, strengthening institutional quality could amplify the positive effects of remittances on economic development. Studies such as Catrinescu et al. (2009) further suggest that institutional quality moderates the effect of remittances on economic development, emphasizing that countries with stronger governance frameworks tend to utilize remittances more effectively for growth-oriented activities.

The exchange rate interaction with personal international remittances exhibits a mixed effect in the short run. The initial negative impact suggests that currency

fluctuations may hinder economic growth by reducing the real value of remittances. However, the significant positive lagged effect indicates that remittance inflows adjusted for exchange rate movements contribute positively over time. This finding is in line with the study by Barajas et al. (2010), which suggests that exchange rate volatility can temporarily reduce the purchasing power of remittances, but over time, stable remittance inflows help mitigate such adverse effects. In Nigeria, the depreciation of the naira has often led to higher remittance inflows, as senders increase transfers to compensate for exchange rate losses, thereby sustaining economic development in the long run (Ajayi et al., 2021). Other studies, such as Chami, Fullenkamp, and Jahjah (2005), argue that exchange rate fluctuations can influence remittance behaviors, with migrants adjusting their remittances in response to currency depreciation in their home countries.

The financial sector development interaction with personal international remittances shows a positive but statistically insignificant impact on per capita GDP in both the short and long run. This suggests that while improvements in financial sector development combined with remittance inflows may support economic growth, the effect is not strong. This aligns with the findings of Aggarwal, Demirgüç-Kunt, and Martínez Pería (2011), who argue that financial sector development enhances the impact of remittances only when financial institutions are well-integrated and accessible. In Nigeria, limited financial inclusion and inefficiencies in the banking sector may explain why the interaction between financial development and remittances does not yield a statistically significant impact on economic growth (Efobi, Beecroft, & Asongu, 2019). Addressing these challenges by improving financial infrastructure, reducing transaction costs, and expanding access to banking services could enhance the effectiveness of remittances in driving economic development.

The findings reinforce the importance of personal international remittances as a key driver of economic development in Nigeria. However, the effectiveness of remittances in fostering growth depends on institutional quality, exchange rate stability, and financial sector development. Policymakers should focus on improving institutional frameworks, stabilizing exchange rates, and strengthening financial

sector infrastructure to maximize the positive impact of remittances on long-term economic growth. Additionally, policies that encourage productive investment of remittance inflows, such as incentives for small businesses and financial literacy programs, could further enhance the developmental impact of remittances. Strengthening institutional frameworks, reducing corruption, and fostering an enabling environment for investment could amplify the positive effects of remittances and ensure sustainable economic development in Nigeria.

5.0 Conclusion and Policy Recommendation

Remittances to the home country by migrants are very important for economic development of the country. These include cash and non-cash items that flow through formal channels such as electronic or informal channels, such as money or goods carried across borders. The findings of the study reinforce the importance of personal international remittances as a key driver of economic development in Nigeria. However, the effectiveness of remittances in fostering growth depends on institutional quality, exchange rate stability, and financial sector development. Policymakers should focus on improving institutional frameworks, stabilizing exchange rates, and strengthening financial sector infrastructure to maximize the positive impact of remittances on long-term economic growth. Additionally, policies that encourage productive investment of remittance inflows, such as incentives for small businesses and financial literacy programs, could further enhance the developmental impact of remittances. Strengthening institutional frameworks, reducing corruption, and fostering an enabling environment for investment could amplify the positive effects of remittances and ensure sustainable economic development in Nigeria. This study recommends:

i. That government should implement reforms to strengthen governance, reduce corruption, and improve regulatory efficiency to maximize the positive impact of remittances on economic development. Strengthening institutional frameworks will ensure that remittance inflows are effectively utilized for productive investments rather than being lost to inefficiencies.

ii. Policies aimed at maintaining a stable exchange rate should be prioritized to reduce the adverse short-term effects of exchange rate fluctuations on remittances. This could include adopting flexible exchange rate mechanisms and implementing foreign exchange policies that minimize volatility while supporting a conducive environment for remittance inflows.

iii. Expanding financial inclusion and improving banking infrastructure will enhance the effectiveness of remittance inflows in promoting economic growth. The government and financial institutions should encourage digital financial services, reduce transaction costs, and create incentives for diasporas remittances to be channeled into productive investments such as entrepreneurship and infrastructure development.

iv. Policymakers should introduce targeted programs that encourage recipients of remittances to invest in human capital development, entrepreneurship, and other growth-enhancing activities. This could involve offering incentives such as tax breaks for investments in education, health, and small business ventures, ensuring that remittances contribute more effectively to long-term economic development.

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