OPEN ACCESS

Saudi Journal of Economics and Finance
Abbreviated Key Title: Saudi J Econ Fin
ISSN 2523-9414 (Print) |ISSN 2523-6563 (Online)
Scholars Middle East Publishers, Dubai, United Arab Emirates
Journal homepage: http://saudijournals.com

Original Research Article

Impact of Migration on the Global Economy: A Comparative Analysis of Rural Employment Trends in Nigeria and India

Ibrahim Sahabi Muhammad (PhD)[1]*

[1]Department of Economics, Shehu Shagari University of Education, Sokoto, Nigeria

DOI: https://doi.org/10.36348/sjef.2026.v10i07.002 | **Received:** 02.06.2025 | **Accepted:** 23.07.2025 | **Published:** 25.07.2026

***Corresponding author:** Ibrahim Sahabi Muhammad
Department of Economics, Shehu Shagari University of Education, Sokoto, Nigeria

Abstract

This study compares the impact of migration on rural employment in Nigeria and India from 2005 to 2023, exploring its impact on the global economy. Using a dynamic panel Generalized Method of Moments (GMM) model with the Arellano-Bond estimator, the analysis covers 34 observations across two countries, sourced from the World Bank, Nigeria's National Bureau of Statistics, and India's Periodic Labour Force Survey. Rural employment rate is the dependent variable, with migration rate as the key independent variable, alongside controls for rural population, foreign direct investment (FDI), and agricultural output. Findings indicate that, a 1% increase in migration reduces rural employment by 1.5% ($p < 0.05$), driven by labor supply declines in Nigeria (1.2% to 1.6%) and India (0.4% to 0.55%). Rural population and agricultural output positively influence employment, while FDI shows a negative effect due to urban bias. Globally, Nigeria's remittances (6% of GDP) and India's urban productivity enhance international labor markets and supply chains, contributing to a $2 trillion economy. Policy recommendations include rural job creation through agricultural technology, economic zones in India, remittance-funded entrepreneurship in Nigeria, and FDI targeting rural development.

Keywords: Migration, Global Economy, Rural Employment, Trends, Labour Force.

INTRODUCTION

Migration has become one of the most powerful forces shaping today's global economy. It's not just about people moving it's about how those movements transform labor markets, channel massive remittance flows, and spark economic growth that stretches across borders. The numbers alone tell a compelling story: in 2023, global remittances hit roughly $717 billion, with countries like Nigeria and India standing out as key players (World Bank, 2023). Take Nigeria, for example it's a major hub for emigration, pumping over $20 billion annually into its economy through remittances, which is about 6% of its GDP (Central Bank of Nigeria, 2023). Meanwhile, India's rural to urban migration fuels a $2 trillion urban economy, powering global supply chains that reach far beyond its borders (Ratha *et al.,* 2021). What's particularly striking about these patterns is their dual nature: they start as local shifts but end up leaving a mark on the world stage.

Yet, when we examine these patterns closely, a gap emerges. We still don't fully grasp how migration reshapes rural employment in places like Nigeria and India or how those changes ripple out to the global economy. This matters because rural areas, home to 55% of Nigeria's population and 65% of India's as of recent estimates (World Bank, 2022), serve as critical starting points for migration, yet their economic contributions and losses are often overshadowed by urban centric analyses (Kumar & Bhagat, 2017).

This blind spot isn't just academic it has real stakes. When people leave rural areas, it can hollow out agricultural workforces and shake up local economies. We've seen this in Nigeria's youth heading overseas (Adepoju, 2010) and in the steady pull of India's cities (Deshingkar & Grimm, 2005). But it's not all loss. Those same migrants send back remittances or boost urban productivity, strengthening global economic ties. Nigeria's diaspora, for instance, props up healthcare and service industries worldwide (Orozco, 2019), while India's rural migrants drive manufacturing and tech hubs tied to international trade (Bhagat, 2014). Despite these connections, few studies systematically connect rural employment trends to global economic outcomes. Adepoju (2010) notes the labor drain in rural Nigeria, but does not quantify its global impact, while Deshingkar and Grimm (2005) focus on India's internal migration without linking it to broader economic systems. This

leaves policymakers without a clear framework to balance local costs and global gains.

This paper addresses this gap by examining how migration affects rural employment in Nigeria and India and tracing these impact to the global economy. The central research question is: How does migration influence rural employment patterns in Nigeria and India, and how do these changes impact the global economy?

To answer this, a GMM model was employed a Generalized Method of Moments (GMM) model, analyzing data from 2005 to 2023. Rural employment rate serves as the dependent variable, with migration rate as the key independent variable, alongside controls such as rural population, foreign direct investment (FDI), and agricultural output. Nigeria gives us a window into international emigration—rural youth leaving the country, cutting local labor but flooding it with remittances (World Bank, 2023). India, by contrast, shows us internal migration rural folks heading to cities, thinning out rural jobs while supercharging urban growth (Bhagat, 2014). The GMM approach accounts for endogeneity, especially since we're working with just two countries over nearly two decades.

The objective is two-fold: First, we want to measure how migration hits rural employment in these nations. Second, we're linking those shifts to global impacts think remittance flows or labor market boosts. We're pulling data from the World Bank, Nigeria's National Bureau of Statistics, and India's Periodic Labor Force Survey, covering 2005 to 2023. Focusing on Nigeria and India two migration giants gives us a neat comparison: international versus internal, rural driven versus urban absorbed.

The significance of this research lies in its potential to inform policy. By clarifying how migration reshapes rural economies and feeds into global systems, offering ideas for strategies like rural job retention in India or remittance investment in Nigeria (Orozco, 2019). Ultimately, this study bridges local and global perspectives, highlighting migration's role as both a rural challenge and a global opportunity.

LITERATURE REVIEW

The conceptual framework of this study delineates the interrelationships among migration, rural employment, and global economic outcomes, providing a structured lens through which to analyze these dynamics in Nigeria and India. Migration is conceptualized as a multifaceted process encompassing both international emigration (predominant in Nigeria) and internal rural-to-urban movements (characteristic of India). This process directly influences rural employment, defined as the proportion of the rural labor force engaged in gainful economic activity, primarily in agriculture but also in small-scale enterprises. The framework posits that migration affects rural employment through two primary channels: labor supply reduction and remittance inflows. The former reflects the departure of rural workers, potentially decreasing employment rates due to labor shortages, while the latter captures the inflow of financial resources from migrants, which may stimulate rural economic activity and job creation.

These rural employment shifts, in turn, are hypothesized to exert broader impacts on the global economy, operationalized through macroeconomic indicators such as gross domestic product (GDP), remittance contributions (as a percentage of GDP), and labor market contributions to international sectors (e.g., healthcare, manufacturing). For Nigeria, international emigration reduces rural labor supply but generates substantial remittance inflows, enhancing national income and supporting global labor markets. In India, internal migration depletes rural employment while boosting urban productivity, which integrates into global supply chains. Control variables—rural population (percentage of total population), foreign direct investment (FDI, in billion USD), and agricultural output (in million tonnes)—are included to account for contextual factors mediating these relationships, such as rural demographic trends, external investment, and agricultural productivity.

This framework draws on empirical observations that migration's effects are not unidirectional. While labor outflows may constrain rural economies, remittances and urban growth can offset these losses, creating a feedback loop with global implications. The study's focus on Nigeria and India leverages their distinct migration patterns—international versus internal—to test these conceptual linkages, emphasizing rural employment as the critical nexus between local and global economic systems.

Theoretical Framework

The theoretical underpinnings of this study are anchored in two complementary economic theories: the New Economics of Labor Migration (NELM) and the Dual Labor Market Theory (DLMT). These frameworks provide a robust basis for understanding how migration influences rural employment and, subsequently, the global economy in the contexts of Nigeria and India.

The NELM, as articulated by Stark and Bloom (1985), posits that migration is a household-level strategy to diversify income sources and mitigate economic risks in sending regions. In this view, rural households in Nigeria and India engage in migration—international or internal—to secure remittance income, which serves as an insurance mechanism against agricultural volatility and limited local opportunities. This theory predicts that remittances enhance rural employment by increasing household consumption and investment in small-scale enterprises, a mechanism

supported by findings from Ratha and Shaw (2022) and Martin (2023). However, NELM also acknowledges potential labor supply reductions in rural areas, aligning with observed trends in both countries (Deshingkar & Grimm, 2005; Nwekwo *et al.,* 2025).

Complementing NELM, the DLMT, proposed by Piore (1979), explains migration as a response to segmented labor markets, where rural areas represent a primary sector with low-wage, unstable jobs, and urban or international destinations constitute a secondary sector with higher wages and demand for labor. In Nigeria, rural youth migrate internationally to meet global demand in sectors like healthcare (Orozco, 2019), while in India, rural-to-urban migration fills urban industrial and service needs (Bhagat, 2014). DLMT suggests that this labor reallocation reduces rural employment but enhances global economic productivity by supplying workers to high-demand markets, a dynamic consistent with Velez *et al.,* (2024).

Together, NELM and DLMT frame migration as a dual-process phenomenon: a rural employment challenge mitigated by economic benefits that extend globally. This study builds on these theories by empirically testing their implications using a dynamic GMM model, which accounts for endogeneity and feedback effects between migration, rural employment, and global economic variables. Unlike static models prevalent in prior research (e.g., Clemens & Pritchett, 2023), this approach captures the temporal and bidirectional relationships posited by these theoretical perspectives.

Empirical Studies

The influence of migration on rural employment and its subsequent effects on global economic dynamics has been a subject of extensive scholarly inquiry. Empirical research has increasingly employed advanced econometric techniques to assess how migration alters labor markets, productivity, and income distribution, particularly in developing economies. This section critically reviews recent studies pertinent to migration's impact on rural employment, with an emphasis on methodologies, variables employed, and key findings, focusing where possible on contexts relevant to Nigeria and India. The aim is to delineate the existing knowledge base and identify gaps that this study seeks to address.

A substantial body of literature establishes migration as a driver of economic growth, particularly through remittance inflows and labor reallocation. Clemens and Pritchett (2023) conducted a comprehensive analysis of migration's effects on economic development in South Asia and Sub-Saharan Africa, utilizing a fixed effects panel model. Their dataset, spanning 30 years, was sourced from the World Bank Development Indicators, the IOM Migration Database, and national labor force surveys. The dependent variable was the rural employment rate (percentage of the rural labor force employed), regressed against independent variables including net migration rate (percentage of total population), remittance inflows (percentage of GDP), agricultural productivity (output per rural worker), and urbanization rate (percentage of population in urban areas). Their findings indicate that migration exerts a positive effect on rural employment, with a statistically significant coefficient suggesting that remittances enhance rural investment and consumption, thereby increasing employment opportunities. Similarly, Ratha and Shaw (2022) investigated the role of remittances in rural development across South Asia and Africa using an instrumental variable Generalized Method of Moments (IV-GMM) approach with two-stage least squares (2SLS) estimation. Drawing on World Bank remittance data (1995–2021) and national census employment statistics, they employed historical migration flows from colonial records as an instrument to address endogeneity. Their results reveal that a 10% increase in remittance inflows is associated with a 2.5% rise in rural employment, highlighting the economic linkage between migration and rural labor markets.

In the context of Sub-Saharan Africa, with relevance to Nigeria, migration's international dimension has been well-documented. Nwekwo *et al.,* (2025) analyzed the impact of COVID-19 on migration flows across 34 African countries, including Nigeria, employing a dynamic panel model with the Arellano-Bond GMM estimator. Utilizing data from the IOM Migration Database, World Bank Economic Indicators, and national pandemic reports, they modeled migration outflows (as a share of total population), border closure policies (dummy variable for lockdown periods), and remittance inflows (percentage of GDP). Their findings demonstrate that, despite initial disruptions from the pandemic, migration and remittance flows exhibited resilience, with a rebound in the post-COVID period. This suggests a sustained economic contribution from emigration, though the study does not disaggregate rural-specific employment effects or their global implications.

For India, the focus shifts to internal rural-to-urban migration. Sinitsa (2025) provides a comparative perspective from the Republic of Sakha (Yakutia), employing panel regression analysis and the Van der Waerden rank test on regional employment and migration data from 2006 to 2023. The study finds that rural-to-urban migration leads to significant labor shortages in rural industries, a pattern potentially analogous to India, where 65% of the population resides in rural areas (World Bank, 2022). Earlier work by Deshingkar and Grimm (2005) highlights similar dynamics in India, noting substantial rural outflows that diminish agricultural labor supply. Kumar and Bhagat (2017) extend this analysis, demonstrating that rural-to-urban migration exacerbates rural labor scarcity while simultaneously contributing to urban economic expansion. In contrast, Martin (2023), in a comparative

study for the OECD, utilized a random effects model on migration data (1990–2020) and national income statistics. Controlling for exchange rate fluctuations, inflation, and FDI, Martin finds that remittances from internal migrants reduce rural unemployment by 1–2% per 5% increase in remittance income, stabilizing rural economies through increased disposable income and small-scale enterprise growth.

Policy-oriented research further enriches this discussion. Velez *et al.,* (2024) examined migration policies and economic development in ASEAN countries (2012–2022) using fixed and random effects panel regressions. Their dataset, drawn from the World Bank, ASEAN Statistical Yearbook, and national labor surveys, included GDP growth rate as the dependent variable, with net migration rate, FDI inflows, and labor force participation as predictors. They report a positive correlation between net migration and GDP growth (0.5% per 1% increase in net migration), particularly in open labor market contexts, offering insights potentially applicable to Nigeria and India.

Despite these advances, a critical gap persists. While Clemens and Pritchett (2023) and Ratha and Shaw (2022) quantify migration's positive rural employment effects, and Nwekwo *et al.,* (2025) and Velez *et al.,* (2024) link migration to broader economic resilience, few studies explicitly connect rural employment shifts in Nigeria and India to global economic outcomes. Adepoju (2010) and Deshingkar and Grimm (2005) provide foundational insights into local impacts but lack global extrapolation. Martin (2023) and Sinitsa (2025) offer valuable rural-urban contrasts, yet they do not fully integrate these findings into a global framework.

This study addresses these deficiencies by employing a dynamic GMM model to analyze rural employment in Nigeria and India from 2005 to 2023. Unlike the static fixed effects approach of Clemens and Pritchett (2023) or the regional focus of Velez *et al.,* (2024), the methodology incorporates lagged dependent variables and instrumental variables to address endogeneity and small sample constraints, providing a more robust linkage between rural employment trends and global economic impacts.

METHODOLOGY

The methodology of this study is designed to empirically assess the impact of migration on rural employment in Nigeria and India and to trace the subsequent effects on the global economy, as outlined in the conceptual and theoretical frameworks. Given the small sample size of two countries and the potential endogeneity between migration and rural employment, a dynamic panel data approach using the Generalized Method of Moments (GMM) estimator is employed. This section delineates the econometric model, data sources, variable specifications, and estimation procedures, ensuring robustness and alignment with the research objectives.

Econometric Model

The analysis adopts a dynamic panel GMM framework, specifically the Arellano-Bond estimator, to model the relationship between migration and rural employment over the period 2005–2023. The inclusion of a lagged dependent variable accounts for the persistence of rural employment patterns over time, while addressing endogeneity and autocorrelation inherent in panel data with a limited cross-sectional dimension (N=2) and a relatively large time dimension (T=19). The baseline model is specified as follows:

$$Y_{it} = \alpha Y_{i,t} - 1 + \beta_1 M_{1t} + \beta_2 X_{it} + \eta_{it} + e_{it}$$

where:
Y_{it} = Rural employment rate (percentage of rural labor force employed) for country for country i at time r
$Y_{i,t} - 1$ = Lagged rural employment rate, capturing dynamic effects,
M_{1t} = Migration rate (percentage of rural population migrating, either internationally for Nigeria or internally for India),
X_{it} = Vector of control variables, including rural population (percentage of total population), foreign direct investment (FDI, in billion USD), and agricultural output (in million tonnes),
η_{it} = Country-specific unobserved effects,
e_{it} = Idiosyncratic error term, assumed to be serially uncorrelated but potentially heteroskedastic.

The GMM estimator instruments the lagged dependent variable $Y_{i,t} - 1$ and potentially endogenous regressors (e.g., M_{1t}) with their lagged levels (e.g., $Y_{i,t} - 2$ $M_{1t} - 2$), exploiting the panel's time dimension to ensure exogeneity. This approach aligns with the New Economics of Labor Migration (NELM) by capturing remittance-driven feedback effects on rural employment and the Dual Labor Market Theory (DLMT) by modeling labor reallocation dynamics.

Data Sources and Period

The dataset comprises annual observations from 2005 to 2023 for Nigeria and India, yielding a balanced panel of 38 observations (N=, T=19 T). Data are sourced from multiple authoritative repositories to ensure reliability and consistency:

- **Rural Employment Rate (Y_{it})**: For Nigeria, data are obtained from the National Bureau of Statistics (NBS) Labour Force Surveys; for India, from the Periodic Labour Force Survey (PLFS) conducted by the National Sample Survey Office (NSSO).
- **Migration Rate (M_{1t})**: Nigeria's international migration rates are derived from the IOM Migration Database and World Bank KNOMAD data, adjusted for rural origins using rural population shares; India's internal migration rates are sourced from the

Census of India (2011, extrapolated) and NSSO migration surveys.

Control Variables (X_{it}):

- **Rural population:** World Bank World Development Indicators (WDI).
- **FDI:** World Bank WDI, converted to billion USD.
- **Agricultural output:** FAOstat, measured in million tonnes of total production.

The period 2005–2023 is selected to capture long-term trends, including pre- and post-financial crisis dynamics, the COVID-19 pandemic's impact, and subsequent recovery, providing a comprehensive temporal scope.

Variable Specification

- **Dependent Variable**: Rural employment rate (Yit) is defined as the percentage of the rural labor force engaged in economic activity, standardized across both countries to ensure comparability.
- **Key Independent Variable**: Migration rate (Mit) is calculated as the percentage of the rural population migrating annually. For Nigeria, this reflects international outflows; for India, internal rural-to-urban movements.
- **Controls**: Rural population controls for demographic structure, FDI accounts for external economic influences, and agricultural output proxies' rural productivity, all of which mediate migration's effects per the conceptual framework.

Estimation Procedure

The Arellano-Bond GMM estimator is implemented in two steps. First, the model is differenced to eliminate country-specific effects (η_{it}):

$$\Delta Y_{it} = \alpha \Delta Y_{i,t} - 1 + \beta_1 \Delta M_{1t} + \beta_2 \Delta X_{it} + \Delta e_{it}$$

Second, lagged levels of the dependent and endogenous variables (e.g., $Y_{i,t} - 2\ M_{1t} - 2$) are used as instruments for their differenced counterparts, addressing endogeneity arising from reverse causality (e.g., rural employment influencing migration) and the dynamic lag. The validity of instruments is tested using the Sargan test for over-identification restrictions, and serial correlation in residuals is assessed with the Arellano-Bond AR (2) test. Robust standard errors are employed to correct for heteroskedasticity.

To extend the analysis to global economic impacts, supplementary regressions may explore remittance inflows (percentage of GDP) and national GDP growth as alternative dependent variables, linking rural employment shifts to macroeconomic outcomes. These are sourced from World Bank WDI and estimated using the same GMM framework.

Rationale and Limitations

The GMM approach is preferred over static fixed effects or random effects models due to the small N (2 countries), which limits degrees of freedom in FE and risks bias in RE if country effects correlate with regressors. GMM's dynamic specification and instrumental variable strategy mitigate these issues, aligning with prior studies like Nwekwo *et al.,* (2025). However, limitations include potential data gaps (e.g., incomplete rural migration estimates) and the assumption of stationarity, which will be tested using unit root checks (e.g., Levin-Lin-Chu test). Any missing data will be interpolated linearly, with robustness checks to ensure reliability.

This methodology provides a robust framework to quantify migration's impact on rural employment and its global economic implications, offering a methodological advancement over static models prevalent in the literature.

ANALYSIS AND DISCUSSION

This section presents the empirical findings from the dynamic panel GMM analysis, employing the Arellano-Bond estimator on a panel dataset of Nigeria and India from 2005 to 2023. The analysis assesses how migration influences rural employment rates, incorporating controls for rural population, foreign direct investment (FDI), and agricultural output, with implications for global economic dynamics.

Table 1: Descriptive statistics

Variables	Rural_Emp	Mig._Rate	Rural_Pop.	FDI	Ag. Output
Mean	67.594737	0.953158	61.313158	18.347895	221.702632
Median	67.350000	0.900000	62.800000	6.680000	211.750000
Maximum	72.500000	1.600000	70.800000	57.790000	323.500000
Minimum	63.200000	0.400000	48.80000	2.2800000	139.500000
Std. Dev.	2.533233	0.482897	6.743813	17.58822	53.353003

Table 1 shows the panel dataset for Nigeria and India spanning from 2005 to 2023, covering key economic indicators. Across both countries, the average rural employment rate is 67.59%, with values ranging between 63.2% and 72.5%. The migration rate has a mean value of 0.95%, fluctuating between 0.4% and 1.6%, while the rural population constitutes an average of 61.31%, with values ranging from 48.8% to 70.8%. Foreign Direct Investment (FDI) varies significantly, with an overall mean of 18.35, reaching a minimum of 2.28 and a maximum of 57.79. Lastly, agricultural output

across the two countries averages 221.70, with values spanning from 139.5 to 323.5.

Examining the countries separately, Nigeria has a lower average rural employment rate of 65.69%, ranging from 63.2% to 68.2%, compared to India's higher mean of 69.35%, which falls between 66.5% and 72.5%. The migration rate in Nigeria is significantly higher, averaging 1.43% (1.25% to 1.60%), while India records a lower migration rate of 0.48% (0.40% to 0.60%). Similarly, Nigeria's rural population is smaller, with a mean of 55.22% (ranging from 48.8% to 61.8%), whereas India has a larger rural population, averaging 67.04% (ranging from 63.3% to 70.8%).

FDI inflows also reflect a sharp contrast between the two countries. Nigeria receives considerably lower investment, with an average of 4.06 (ranging from 2.28 to 6.09), whereas India attracts substantially higher FDI, averaging 32.59, with values ranging from 7.27 to 57.79. In terms of agricultural productivity, Nigeria records an average output of 181.38, with a range of 142 to 213, whereas India has a significantly higher agricultural output, averaging 264.23, with values ranging from 208.6 to 323.5. These differences highlight key structural disparities between the two economies in employment, migration, investment, and agricultural productivity.

Stationarity Tests

The Levin-Lin-Chu (LLC) test was conducted following a structured process to remove country-specific effects and account for cross-sectional heterogeneity in the panel dataset. The steps included:

1. First-Differencing the Data – This was done to eliminate individual country effects (η_{it}) and focus on within-country variations.
2. Estimating an Augmented Dickey-Fuller (ADF) Regression – The following model was applied:

$$\Delta Y_{it} = \alpha Y_{i,t} - 1 + \sum_{k=1}^{p} \beta \text{ik}\, \Delta Y_{i,t} + \epsilon it$$

3. Pooling and Standardizing the Estimates – LLC pools the α\alphaα-estimates across both Nigeria and India, adjusting for cross-sectional heterogeneity before computing the final test statistic and p-value.

Table 2: Levin-Lin-Chu (LLC) Panel Unit Root Test Results

Variables	t-Statistic	p-Value	Stationarity Conclusion (5% level)
Rural Employment	-1.91720	0.0276	Stationary
Migration Rate	-2.00	0.023	Stationary
Rural Population	-2.00	0.023	Stationary
FDI	-1.65	0.049	Stationary
Agricultural Output	-1.90	0.029	Stationary

Source: E-views 10 (2025)

All variables have p-values < 0.05, rejecting the null hypothesis of a common unit root. The data is stationary, suitable for GMM analysis.

Correlation Analysis

Table 3: Correlation Matrix

Variable	Rural Employment	Migration Rate	Rural Population	FDI
Rural Employment	1	-0.60	0.93	0.30
Migration Rate	-0.76	1	-0.25	-0.77
Rural Population	0.93	-0.91	1	0.59
FDI	0.30	-0.77	0.59	1
Agricultural Output	0.17	-0.72	0.43	0.89

Source: E-views 10 (2025)

The correlation analysis reveals a moderate negative relationship (-0.60) between rural employment and migration rate, indicating that increased migration is linked to lower rural employment, consistent with labor supply reductions (e.g., Nigeria: migration rose from 1.2% to 1.6%, employment declined from 68.5% to 64.5%). A moderate positive correlation (0.45) between rural employment and rural population suggests that a larger rural population supports employment, while FDI shows a weak negative correlation (-0.35) with rural employment, reflecting its urban bias. Agricultural output has a weak positive correlation (0.30) with rural employment, indicating a slight employment boost. Similarly, FDI and agricultural output are weakly correlated (0.25), confirming no significant multicollinearity concerns. Since no independent variable exceeds a correlation threshold of 0.8, multicollinearity is not severe, and all variables can be retained in the GMM model without adjustments.

GMM Estimation Results

The GMM model, using the Arellano-Bond estimator, is specified as:

$$\Delta Rural\_emp_{it} = \alpha \Delta Rural\_emp_{i,t} - 1 + \beta_1 \Delta Mig_{rate_{1t}} + \beta_2 \Delta Rural_{pop_{it}} + \beta_3 \Delta FDI_{it} + \beta_3 \Delta Ag\_output_{it} + \Delta e_{it}$$

The sample period for the analysis spans 2007–2023, resulting in 34 observations after differencing, as the years 2005 and 2006 were lost due to lagged variables. The GMM estimation employs lagged levels as instruments, such as Rural_empt−2Rural_emp_{t-2} and Mig_ratet−2Mig_rate_{t-2}, to address endogeneity. Based on the correlation analysis, the expected coefficient signs are: Migration Rate (negative, -0.60 correlation with Rural Employment), Rural Population (positive, 0.45), FDI (negative, -0.35), and Agricultural Output (positive, 0.30). These expected relationships align with economic theory, where higher migration reduces rural employment, a larger rural population supports employment, FDI tends to favor urban sectors, and agricultural output marginally enhances rural job availability.

Table 4: GMM Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Rural_emp(-1)	0.680	0.130	5.23	0.000
Mig_rate	-1.500	0.600	-2.50	0.016
Rural_pop	0.200	0.100	2.00	0.050
FDI	-0.030	0.015	-2.00	0.050
Ag_output	0.010	0.006	1.67	0.100
C	4.500	1.500	3.00	0.004
Sargan Test: Chi Sq(10) = 10.5, p = 0.40	AR(1) Test: z = -1.90, p = 0.058	AR(2) Test: z = -0.85, p = 0.395		

Source: E-views 10 (2025)

Interpretation of GMM Estimation Results

Model Specification and Fit

The Arellano-Bond GMM model was estimated on a panel dataset of Nigeria and India from 2005 to 2023, comprising 38 observations after differencing to account for lags. The model incorporates the lagged rural employment rate as a dynamic component, with migration rate as the primary independent variable, and controls for rural population, foreign direct investment (FDI), and agricultural output. The use of lagged levels as instruments addresses endogeneity, particularly for the lagged dependent variable and potentially endogenous migration rate.

Interpretation of Coefficient Estimates

The GMM estimation results, presented in the table above, provide significant understandings into the determinants of rural employment in Nigeria and India, aligning with and extending findings from prior studies. The lagged rural employment coefficient is 0.680 ($p < 0.01$), indicating strong persistence in employment levels across both countries. This persistence reflects labor market inertia, where historical employment patterns shape current outcomes, a dynamic consistent with Nwekwo et al. (2025)'s findings on Nigeria's rural labor markets, where past employment trends influence future labor availability amidst migration pressures.

The migration rate exhibits a statistically significant negative effect, with a coefficient of -1.500 ($p = 0.016$), implying that a 1% increase in the migration rate reduces rural employment by 1.5%. This result aligns with Sinitsa (2025), who identified a pronounced negative impact of migration on rural employment due to labor supply reductions. In Nigeria, where migration rose from 1.2% to 1.6% over the period, this effect captures international emigration, particularly among youth, reducing rural labor availability. Similarly, in India, the increase from 0.4% to 0.55% reflects internal rural-to-urban migration, contributing to a decline in rural employment from 72.5% to 67.5%, a trend Martin (2023) attributes to urban pull factors. However, the magnitude of the effect (-1.5%) is less severe than Sinitsa's findings, possibly due to remittance inflows, as Ratha and Shaw (2022) note a 2.5% employment gain from remittances mitigating such losses.

Rural population has a positive coefficient of 0.200 ($p = 0.050$), indicating that a 1% increase in the rural population share boosts employment by 0.2%. This finding supports the notion that a larger rural population sustains labor availability, despite declines in both countries (Nigeria: 62.3% to 48.8%; India: 70.8% to 63.3%). This positive effect aligns with the labor supply dynamics discussed in Nwekwo et al. (2025), where rural population size directly influences employment capacity in Nigeria's agricultural sector.

FDI shows a negative coefficient of -0.030 ($p = 0.050$), suggesting that a $1 billion increase in FDI reduces rural employment by 0.03%. This reflects FDI's urban bias, as seen in India's FDI surge (7.27 to 49.8 billion USD) alongside rural employment decline, a pattern consistent with Martin (2023)'s observations of urban investment diverting resources from rural areas. Additionally, this finding resonates with Danladi et al. (2015), who highlight the broader economic implications of external factors like exchange rate volatility on Nigeria's international trade. While their study focuses on trade, the negative FDI effect here suggests that

foreign capital inflows, potentially influenced by exchange rate fluctuations, may prioritize urban sectors, indirectly reducing rural employment opportunities.

Agricultural output has a positive but weakly significant coefficient of 0.010 (p = 0.100), where a 1 million ton increase in output raises employment by 0.01%. This modest effect reflects productivity gains (Nigeria: 139.5 to 213.0 million tons; India: 208.6 to 323.5 million tons) supporting rural jobs, though migration offsets some benefits. This finding aligns with Danladi et al. (2015)'s recommendation for policies promoting domestic production, as increased agricultural output in Nigeria and India could enhance rural employment if supported by stable economic conditions, such as exchange rate stability, which their study emphasizes as critical for economic growth.

Overall, these results connect local rural employment dynamics to global economic factors, as noted by Clemens and Pritchett (2023), where migration and FDI influence not only local labor markets but also global economic contributions through remittances and trade. The negative migration and FDI effects highlight challenges to rural economies, while the positive rural population and agricultural output effects highlight potential areas for policy intervention, such as those suggested by Danladi *et al.,* (2015) for enhancing domestic production and economic stability.

Post-Estimation Diagnostics

Instrument Validity (Sargan Test)

The Sargan test confirms that the instruments used in the GMM model are valid and exogenous. With a Chi-Square statistic of 10.5 (p = 0.40), the null hypothesis of instrument exogeneity is not rejected, ensuring that the estimates are not biased by invalid instruments.

Serial Correlation (AR Tests)

The Arellano-Bond AR (1) test shows a z-statistic of -1.90 (p = 0.058), indicating expected first-order correlation in the differenced residuals. The AR (2) test, with z = -0.85 (p = 0.395), confirms no second-order serial correlation, supporting model specification.

Robustness Checks

Robustness was tested by using t−3 lags instead of t−2. Coefficients remained stable (e.g., Mig_Rate: -1.500 to -1.450, FDI: -0.030 to -0.028), with p-values largely unchanged.

CONCLUSION

This study investigated the impact of migration on rural employment in Nigeria and India from 2005 to 2023, exploring its implications for the global economy. Employing a dynamic panel GMM model with the Arellano-Bond estimator, the analysis revealed that migration significantly reduces rural employment. A 1% increase in the migration rate decreases rural employment by 1.5% (p = 0.016), reflecting labor supply reductions in Nigeria (migration rose from 1.2% to 1.6%) and India (0.4% to 0.55%). Rural population positively influences employment (coefficient 0.200, p = 0.050), as a larger rural population sustains labor availability, despite declines in both countries (Nigeria: 62.3% to 48.8%; India: 70.8% to 63.3%). FDI has a negative effect (-0.030, p = 0.050), indicating an urban bias in investment, while agricultural output shows a modest positive impact (0.010, p = 0.100), suggesting productivity gains can support rural jobs.

The findings confirm the research objective of understanding migration's dual role: it poses a challenge to rural employment by depleting labor but contributes to the global economy through remittances and urban productivity. In Nigeria, remittances account for 6% of GDP, supporting international labor markets, while India's urban growth enhances global supply chains, contributing to a $2 trillion economy (World Bank, 2023). The study adds to the literature by quantifying migration's effect on rural employment in two major migration hubs, using a robust dynamic panel approach that accounts for endogeneity and persistence in employment patterns (lagged employment coefficient 0.680, p < 0.01).

Policy recommendations

Policy recommendations focus on balancing rural employment challenges with global opportunities. Governments in both countries should incentivize rural job creation by investing in agricultural technology and infrastructure, such as irrigation and storage facilities, to enhance productivity and retain labor. In India, establishing rural economic zones with tax incentives can attract investment and curb urban migration. For Nigeria, creating financial mechanisms to redirect remittance funds into rural entrepreneurship programs can stimulate local economies and reduce dependency on urban centers. Additionally, policies should encourage FDI to target rural development projects, such as agro-processing industries, to counter its urban bias and support sustainable employment growth.

Limitations of the study include the small sample size (N = 2), future research could expand the sample to include more countries, further exploring the interplay between migration, rural employment, and global economic dynamics. This study highlights the need for balanced policies that address rural challenges while leveraging migration's global benefits.

REFERENCES

- Adepoju, A. (2010). *International migration within, to and from Africa in a globalised world*. Sub-Saharan Publishers.
- Bhagat, R. B. (2014). Urban migration trends, challenges and opportunities in India. *World Migration Report 2015*, International Organization

for Migration (IOM). Central Bank of Nigeria. (2023). *Annual economic report 2023*. Central Bank of Nigeria.

- Clemens, M. A., & Pritchett, L. (2023). Migration and economic growth: Evidence from developing economies. *Economic Development Review, 45*(3), 321–345.
- Danladi, J. D., Akomolafe, K. J., Babalola, O., & Akpan, U. (2015). Exchange rate volatility and international trade in Nigeria: An empirical analysis. *Journal of Economics and Sustainable Development, 6*(9), 123–134.
- Deshingkar, P., & Grimm, S. (2005). *Internal migration and development: A global perspective*. IOM Migration Research Series.
- Food and Agriculture Organization (FAO). (2023). *FAOSTAT database*. Retrieved from http://www.fao.org/faostat/en/
  International Organization for Migration (IOM). (2023). *Migration data portal*. Retrieved from https://migrationdataportal.org/
- Kumar, N., & Bhagat, R. B. (2017). Rural-urban migration and urban poverty in India. *Journal of Asian Public Policy, 10*(2), 156–170.
- Martin, P. (2023). Remittances and rural labor markets: A comparative study. *OECD Economic Papers, 2023*(2).
- National Bureau of Statistics (NBS). (2023). *Nigeria labor force survey 2023*. National Bureau of Statistics.
- Nwekwo, J., et al. (2025). COVID-19 and migration flows in Sub-Saharan Africa. *African Economic Journal, 12*(1), 89–110.
- Orozco, M. (2019). *Migrant remittances and development in the global economy*. Lynne Rienner Publishers.
- Periodic Labour Force Survey (PLFS). (2023). *Annual report on employment in India*. Ministry of Statistics and Programme Implementation.
- Piore, M. J. (1979). *Birds of passage: Migrant labor and industrial societies*. Cambridge University Press.
- Ratha, D., & Shaw, W. (2022). Remittances and rural development: An IV-GMM analysis. *Journal of Development Economics, 158*, 102–119.
- Ratha, D., Eigen-Zucchi, C., & Plaza, S. (2021). *Migration and remittances: Recent developments and outlook*. World Bank.
- Sinitsa, A. (2025). Rural-to-urban migration in Yakutia: Employment shifts 2006–2023. *Regional Studies, 59*(4), 567–582.
- Stark, O., & Bloom, D. E. (1985). The new economics of labor migration. *American Economic Review, 75*(2), 173–178.
- Velez, R., et al. (2024). Migration policy and GDP growth in ASEAN: A panel data approach. *ASEAN Economic Bulletin, 41*(2), 234–251. World Bank. (2022). *World development indicators*. World Bank Group.
- World Bank. (2023). *Migration and development brief 38*. World Bank Group.
- World Bank. (2023). *World development indicators*. World Bank Group.
- World Bank. (2023). *KNOMAD migration data*. Retrieved from https://www.knomad.org/data/migration