Education

Labour migration and human capital development in Nigeria: Dynamic Ordinary Least Squares (DOLS) regression

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Received 6 May 2025; Accepted 2 Jul 2025; Published 10 July 2025

DOI: https://doi.org/10.64171/JAES.5.3.26-36

Abstract

The study examined effect of labour Migration on human capital development in Nigeria. Specifically, the study sought to: ascertain the impact of net migration value on human capital development in Nigeria and determine the impact of international migration stock on human capital development in Nigeria. This study made use of ex post-facto research design. The data analytical technique was divided into three phases namely: pre-estimation, estimation and post-estimation. The pre-estimation statistics includes descriptive statistics, Correlation Matrix of the Variables, Augmented Dickey-Fuller Unit Root test statistic, Johansen Co-integration test. The estimation technique includes Dynamic least square (DOLS) while post-estimation techniques involves and Histogram Normality Test. These variables consist of government expenditure on health and education (GEHE), net migration value rate (NMG), international migration stock (IMG), rural-urban migration (RBM), trade openness (TRADE) and exchange rate (EXCH) for the period of 1990 to 2024 as defined in our model specification. The empirical results showed that net migration value value (NMG) has negative and significant impact on human capital development in Nigeria (t-statistics; -5.3335; *p*-value; 0.0007 < Sig-value: 0.005) and international migration stock (IMG) has negative and significant impact on human capital development in Nigeria (t-statistics; -6.5826; *p*-value; 0.0009 < Sig-value: 0.005). This study concludes that labour migration has negative and significant impact on human capital development in Nigeria. The study recommended that Nigerian government should continue to expand its investment in human capital development. Enhanced education, healthcare, and skill-building programs are evidently making the country more appealing to immigrants.

Keywords: Labour migration, Human capital development, Net migration value stock, Rural-urban migration

Introduction

Background of the study

Migration is the movement of people from one location to another, usually involving a change in the place of residence. Numerous elements, including societal reasons, political situations, environmental conditions, economic opportunities, and personal preferences, may be the moving forces behind this factor. The term "migration of labor" refers to people who move primarily for work or to search for better career opportunities from one area or nation to another. Labor migration plays a crucial role in global economies, as it contributes to the supply of workers in sectors experiencing labor shortages and fills skill gaps in various industries (ILO, 2015 cited in Ugwoegbu, Okoro & Obijiaku, 2024) [23].

The desire for better living conditions, greater incomes, and work opportunities often pushes people to migrate across national borders due to economic differences. From developing to developed countries, a large number of people migrate in search of greater opportunities for employment and income. Due to globalization, labor migration has become easier since economies have become more interconnected. Workers are migrating to these countries in search of work as a result of globalization's increased job outsourcing to nations with cheaper labor prices (International Labour Organization, ILO 2020). The term "migration of labor" particularly describes the movement of individuals seeking employment or better job prospects from one area or nation to another. Economic factors frequently drive this kind of migration, as people move in looking for better pay, job opportunities, or working conditions. Labor migration can occur on an internal level, within a nation, or on an international level, including movement across borders.

Human capital development has been viewed from diverse angles as it has been defined to represent and aggregate of an individual's skills, knowledge and competencies. As observed by Imouokhome, (2023) [12], human capital development is defined as cumulative personal assets which comprise of acquired skills, knowledge, entrepreneurship, educational achievements, motivation, among others. Equally, Ewubare and Odu, (2024) [10] contended that human capital development has to do with the enrichment of the skills of individuals, their knowledge and productivity as well as innovative capacities. In another vein, the term migration is the movement of people outside the shores of their countries with mainly the aim of seeking greener pastures. As observed by various scholars, migration has the tendency to improve the economic fortune of countries, especially those whose revenue generating capacity

is low. In a similar reasoning, Duru, (2021) [6] contended that migration could be a stimulant to modernization and productivity, resulting into mutual advantages for both country where people migrants out from and the country where migrants settle. However, despite this argument, some scholars such as Ozulumba, Metu and Nzeribe, (2024) [19] were of the opinion that the persistence of migration may lead to a vicious circle of poverty and thus retards development if such phenomenon is allowed to persist as it will erode the region's human capital assets. In another dimension, Nwokoro, (2024) [17] and Omolola, (2024) [18] were of the contention that migration could aggravate underdevelopment in the country where people migrate from.

Labor migration significantly impacts human capital, both positively and negatively, in both sending and receiving countries. While migration can boost human capital formation through remittances and increased education, it can also lead to a "brain drain" and reduced educational attainment in origin countries. Migrant workers often send remittances (money) back home, which can be used to improve living standards, increase school enrollment, and reduce child labor (Egbule, 2023) [7]. Migrants may acquire new skills and knowledge while working abroad, which they can potentially transfer back to their home country. Access to better healthcare in destination countries can improve the health of migrants and their families, contributing to their overall human capital. Emigration of skilled workers (doctors, engineers, etc.) can negatively impact the human capital stock of the sending country, leading to a "brain drain" (Pramshu, 2023) [20]. In some cases, migration can lead to a decrease in educational attainment, particularly if children are pulled out of school to work or if families prioritize migration over education. The benefits of migration are not always evenly distributed, and some communities may experience increased inequality as a result of migration. The link between labour migration and human capital development has either both positive and negative impact in both sending and receiving countries. This study aimed to identity either positive and negative impact of labour migration on human capital development in Nigeria.

Statement of the problem

Over the last decades, an increasing number of developed countries have put in place different mechanisms to encourage the immigration of only the most talented, skilled individuals from developing countries. It is an indisputable fact that labour migration hurts the emigrant's country. According to Ozulumba, Metu and Nzeribe, (2024) [19], an influx of immigrants can affect welfare in the host country when it leads to congestion in the use of public goods and services, such as roads, parks and schools or greater demand for transfer payments to cover expenses of housing, food, and medical care. The net fiscal balance from immigration depends upon taxes paid versus the extra demands for services and transfers created.

According to Bosede, (2023) [3], 10.7 per cent of the highly skilled population who were trained in Nigeria ended up working abroad in 2006, mostly in Organization for Economic Co-operation and Development (OECD) countries. In the United States and Europe, 83 percent and 46 percent, respectively of the Nigerian immigrant population are highly skilled. On average, 64 per cent of the Nigerian emigrant population has tertiary education. In the medical field, 14 per cent of physicians who were trained in Nigeria worked abroad and, 90 per cent of whom live and work in the United States and the United Kingdom (Aleksandr, Aleshkovski & Anastasiya, 2021) [2]. There have been marked increases in the number of Nigerians. Todaro and Smith (2006) cited in Umeokwobi, Auwal, Oludele and Obeta, (2025) [24], submitted that education plays a powerful role in the growing problem of the international migration of high-level educated workers – the so-called brain drain – from poor to rich countries. This is particularly true in the case of scientists, engineers, academics, and physicians, many thousands of whom have been trained in home country institutions at considerable social cost only to reap the benefits from and contribute to the further economic growth of the already affluent nations. Owing these backdrops, the study aimed to identify impact of labour migration on human capital development in Nigeria.

Objectives of the study

The main objective of the study is to examine effect of labour Migration on human capital development in Nigeria. The specific objectives are to:

- Ascertain the impact of net migration value on human capital development in Nigeria.
- Determine the impact of international migration stock on human capital development in Nigeria.

Research questions

This study seeks to provide answers to the following research questions.

- What is the impact of net migration value on human capital development in Nigeria?
- How does international migration stock impacts on human capital development in Nigeria?

Significance of the study

This study would be beneficial and relevant to development practitioners, Policy makers, families, and non-governmental organizations.

The outcome of this study would be useful to politicians, development practitioners, and international organizations because this study would help them to comprehend the intricate relationships between these components since migration and the unequal distribution of human capital are important worldwide issues that have a big impact on social cohesion, economic growth, and sustainable prosperity.

Policymakers can benefit from the study's identification of the main forces behind these intersections as well as the opportunities and obstacles they present when developing more inclusive and successful policies.

The United Nations Sustainable Development Goals (SDGs), which place a strong emphasis on the development of human capital, inclusive economic growth, and the control of

migration flows, can benefit from the study's findings. The study's conclusions can significantly influence worldwide practice and policy by harmonizing its suggestions with these more comprehensive development frameworks.

Scope of the study

The scope of the study is to examine the impact of labour migration on human capital development in Nigeria. Basically, the study identifies the following proxies for labour namely: international migration stock, net migration value rate, rural-urban migration, trade openess and exchange rate while the following are proxy for human capital development namely: government expenditure on education and health (GEOH).

The geographical scope of the study was Nigeria. The choice for geographical scope was due proximity and availability of data. The study was econometrics time series research.

The study over a period of 1990 to 2023. The choice of the time period was informed by the desire to capture the period of Post Covid 19 era in Nigeria.

Conceptual literature

Migration

The International Organization for migration (IOM) states that migration can be described as: A process of relocating, either over an international boundary or inside a State. It is a population movement that comprises any type of human mobility, regardless of its length, composition, or causes; it includes migration of refugees, displaced people, uprooted people, and economic migrants (IOM, 2024).

Human migration involves the movement of people from one place to another with intentions of settling, permanently or temporarily, at a new location (geographic region). The movement often occurs over long distances and from one country to another, but internal migration (within a single country) is also possible; indeed, this is the dominant form of human migration globally (Adeboga, 2025) [1]. Migration is often associated with better human capital at both individual and household level, and with better access to migration networks. Persons moving from their home due to forced displacement (such as a natural disaster or civil disturbance) may be described as displaced persons or, if remaining in the home country, internally-displaced persons. A person who seeks refuge in another country can, if the reason for leaving the home country is political, religious, or another form of persecution, makes a formal application to that country where refuge is sought and is then usually described as an asylum seeker. If this application is successful this person's legal status becomes that of a refugee (Kavitha & Valliammai, 2020) [14].

Human capital development

The term human capital formation implies the development of abilities and skills among the population of the country. To transform the liability of the huge size of the population into assets adoption of various measures for human capital formation is very much essential. According to Priya and Shaheen (2019) [21] human capital formation indicates, "the process of acquiring and increasing the number of persons who have the skills, education and experience which are critical for the economic and the political development of the country. Human capital formation is thus associated with investment in man and his development as a creative and productive resource."

Egbule and Okobia, (2018) [8] opined that "Investment in human capital" (1961) was an early proponent of the theory. He stated, "Although it is obvious that people acquire useful skills and knowledge, it is not obvious that these skills and knowledge are a form of capital, that this capital is in substantial part a product of deliberate investment" Imouokhome, (2023) [12] in his view, human capital, is determined by education, training, and medical treatment, and is effectively a means of production. Increased human capital explains the differential of income for graduates. Human capital is also important for influencing rates of economic growth.

Linkages between net migration value and human capital development

Net migration value in Nigeria has a complex relationship with human capital development, often leading to both gains and losses. While increased migration can stimulate human capital formation through remittances and exposure to new skills, it can also result in "brain drain," where skilled individuals leave the country, potentially hindering long-term development (Nweke & Enyosiobi, 2023) [16].

Migrants often send money back to their families in Nigeria, which can be used for education, healthcare, and other human capital investments. Returning migrants can bring back new skills and knowledge acquired abroad, contributing to the local workforce. The potential for higher earnings abroad can incentivize individuals to invest in education and skills development (Ugwoegbu, Okoro & Obijiaku, 2024) [23]. Migration can alleviate some pressure on the domestic labor market and social services, potentially leading to better resource allocation. Nigeria experiences significant emigration of skilled professionals, leading to a loss of valuable human capital and potentially hindering economic growth. A significant loss of skilled workers can discourage domestic and foreign investment in certain sectors. Brain drain can lead to social disruptions, particularly in communities that rely heavily on skilled individuals. Remittances may not be evenly distributed, potentially exacerbating existing inequalities (Kanu, 2018) [13].

Linkage between international migration stock and human capital development

According to the neoclassical theory, the need to invest in the key sectors of human capital development (e.g., health and education sectors) to enhance individuals' productivity and potential earnings is becoming increasingly important. Thus, when the domestic labor market cannot fully absorb this enhanced human capital, skilled individuals are likely to seek better opportunities abroad, where their skills are in higher demand and better rewarded. This phenomenon aligns with the study's finding that human capital development positively

impacts net migration value, indicating that a well-educated and healthy workforce is more likely to emigrate if domestic opportunities are limited (Kanu, Omojola & Bazza, 2018) [13]. Umeokwobi, Auwal, Oludele and Obeta, (2025) [24] investigated the relationship between human capital development and migration patterns in Nigeria from 1981 to 2021 using ridge and lasso regression techniques implemented in Python. The results indicate that human capital development positively influences net migration value, suggesting a higher emigration rate relative to immigration. This highlights the paradox of brain drain, where increased investment in education and health enhances skill acquisition but simultaneously encourages outward migration due to limited domestic opportunities.

Theoretical literature

The neoclassical economic growth theory

Neoclassical growth theory is an economic theory that was propounded by Robert Solow and Trevor Swan in 1959. Neoclassical growth theory has the credit of developing and introducing the model of long-run economic growth in 1956. Robert Solow and Trevor Swan in 1956 stipulated how a steady economic growth rate comes as a result of a combination of three driving forces—labor, capital, and technology. The model first considered exogenous p opulation increases to set the growth rate but, in 1957, Solow incorporated technology change into the model.

The theory states that short-term equilibrium results from varying amounts of labor and capital in the production function. The theory also argues that technological change has a major influence on an economy, and economic growth cannot continue without technological advances. Neoclassical growth theory outlines the three factors necessary for a growing economy. These are labor, capital, and technology. However, neoclassical growth theory clarifies that temporary equilibrium is different from long-term equilibrium, which does not require any of these three factors.

This growth theory posits that the accumulation of capital within an economy, and how people use that capital, is important for economic growth. Further, the relationship between the capital and labor of an economy determines its output. Finally, technology is thought to augment labor productivity and increase the output capabilities of labor. Therefore, the production function of neoclassical growth theory is used to measure the growth and equilibrium of an economy. That function is Y = AF (K, L). where Y denotes an economy's gross domestic product (GDP), K represents its share of capital, L describes the amount of unskilled labor in an economy and A represents a determinant level of technology

However, because of the relationship between labor and technology, an economy's production function is often re-written as Y = F (K, AL). Increasing any one of the inputs shows the effect on GDP and, therefore, the equilibrium of an economy. However, if the three factors of neoclassical growth theory are not all equal, the returns of both unskilled labor and capital on an economy diminish. These diminished returns imply that increases in these two inputs have exponentially decreasing returns while technology is boundless in its contribution to growth and the resulting output it can produce.

Empirical literature

Several studies abound on the relationship between labour migration and human capital development

Ozulumba, Metu and Nzeribe, (2024) [19] examined the role of migration in human capital development in ECOWAS sub region over the period from 1996-2022. The specific objective of the study was to predominantly examine the effects of migration on economic growth, production efficiency, and labour productivity, there exists a notable gap in understanding its effects on human capital development. Using the dynamic panel data technique within the framework of the generalized method of moment technique. The study found a significant positive impact of migration, remittances and governance on human capital development. However, the impact of net-migration was negative. It concludes that migration imposes no direct cost on the government and should be encouraged. Based on the findings, the study recommends the formulation of an effective bilateral migration agreement within the ECOWAS region which should aim to facilitate skilled, semi-skilled, and low-skilled migration, accompanied by the implementation of coordinated training programs.

Nwokoro, (2024) [17] aimed to empirically examine the effect of globalization and migration on Nigeria's economic growth. The specific objectives of the study were to determine the influence of foreign direct investment, trade openness, foreign exchange rate, remittances on gross domestic product covered the period 33 years (1990 – 2022). The ARDL (autoregressive distributed lag) model was employed for the study and a long-run relationship was established. Findings revealed that remittance had a significantly positive effect on Nigeria's economic growth in the long run. The finding of the error correction mechanism revealed a speed of adjustment to equilibrium of 31.1%. The study suggested that the government, as a key player, should take immediate action to formulate policies that bolster and optimize the advantages of remittance inflows. This is crucial as remittances have been found to positively and significantly affect economic growth in the short and long run. These measures may encompass reducing transaction expenses, improving financial literacy among recipients, and encouraging investments to amplify the developmental effects of remittances.

Ewubare and Odu, (2024) [10] investigated the effect of migration on economic development in Nigeria. Specifically, the study sought to examine impact of net migration value rate (NMG), international migration stock (IMG) and rural-urban migration (RBM) on economic development from 1981 to 2021. Descriptive statistics, unit root test, bound cointegration test, as well as Autoregressive distributed lag (ARDL) were employed to analyse the data. The study reveals that both in the short run and long run, net migration value (NMG) had a negatively insignificant impact on economic development; in the short run and long run international migrant stock (IMG) had a positive and insignificant impact on economic

development. Also, in the short run, rural-urban migration (RBM) had a positive and insignificant impact on economic development in Nigeria while it had a negative and insignificant impact on economic development over the data period. The study recommends that Nigerian government should handle the migration crisis promptly, contribute to job creation, and improve the environment to discourage people from moving, as well as encourage its skilled workforce overseas to come home to aid in national development.

Ugwoegbu, Okoro and Obijiaku, (2024) [23] explored the immigration and economic growth of Nigeria: A study of Awka youths, Anambra State. The specific objectives were to examine the relationship between political instability and human development in Nigeria. Also, to ascertain the relationship between asylum seeking and good governance in Nigeria. The study used descriptive survey research design. The target population are 100 youths in Awka South Local Government Area of Anambra State, Nigeria, who were given a structured questionnaire to fill. The method of data analysis was Pearson Product Moment Correlation Coefficient. The empirical literature reveled that there is a statistically significant negative relationship between political instability and human development in Nigeria, with r = -0.648, n = 100 and p value of 0.006 (p<0.05). Hypothesis two showed that there is a statistically significant negative relationship between asylum seeking and good governance in Nigeria, with r = -0.812 n = 100 and p value of 0.000 (p<0.05). The study recommended that the Nigerian government needs to prioritize stabilizing the political environment to foster human development and well-being of its citizens.

Bosede, (2023) [3] examined the relationship between migration, remittances and sustainable human capital by using annual time series data from 1990–2021. Based on the fully modified ordinary least squares (FMOLS) regression, the outcome suggests that remittance inflow has a significant influence on human development. Also, migration is positively related to human capital. The combined impact of migration and remittances on human development shows a significant positive relation between the variables. Hence, given the increased globalization and quest to migrate abroad by most Nigerians, the study suggests that the Nigerian government, diaspora commission, and policymakers should develop a proactive strategy to increase the inflows of remittances through proper international travelling documentation, and flexible policy on migration. The country needs to strengthen its institutions to woo its diaspora home to invest in human capital through investment in education and health.

Imouokhome, (2023) [12] examined the impact of migration and remittances on economic growth in Nigeria. The specific objectives of the study were to determine impact of remittance, trade openness, foreign direct investment, government expenditure, capital formation on economic growth. The method of data analysis was Autoregressive distributive Lag model. The short run result was presented was evident that remittance has a positive and statistically impact on economic growth under the period of study. The long run estimates reveal that government spending has a positive and significant impact on economic growth. Moreover, it was deduced from the regression result conducted that trade openness and foreign direct investment has a positive impact on economic growth under the period of study. There was found a direction between the two variables. It is revealed that remittances do not cause changes in economic growth under the period of study. It was therefore recommended that the Nigerian government should budget and expend more resources on productive sector of the economy especially on infrastructure which would attract the right Foreign Direct Investment (FDI) into the country and boost more growth.

2.4 Gap in literature

There exists research gap between this study and past researches. The research gap covers subject gap, gap on geographical location of the study, gap on the variables and contents of the study, gap on literature and gap on methodology.

Subject gap: The subject matter of this work and some reviewed empirical studies has some differences. There are limited studies on impact of labour migration on human capital development in Nigeria over the period of 1990 - 2024. The study is geared to bridge the time gap in literature.

Gap on geographical location of the study: This work covers labour migration in Nigeria. None of the past studies used combination of labour migration and human capital development as mentioned and most of the past studies were done outside Nigeria.

Gap on the variables and contents of the study: The variables used in this study includes proxies for labour migration namely: international migration stock, net migration value rate, trade openness and exchange rate (for independent variable) while the following are proxy for human capital development namely: government expenditure on health and education (GEHE) (for dependent variable).

Gap on literature: For the fact that the dependent and independent variables in this work differs with what were covered in past studies, the literature reviewed were never the same; hence there are differences on the conceptual and theoretical reviews. This study will bridge the gap by providing clear explanation as regards to cause-effect relationship among labour migration and human capital development in Nigeria.

Methodology

This study made use of ex post-facto research design. The data analytical techniques were divided into three phases namely: pre-estimation, estimation and post-estimation. The pre-estimation statistics includes descriptive statistics, Correlation Matrix of the Variables, Augmented Dickey-Fuller Unit Root test statistic, Johansen Co-integration test. The estimation technique includes Dynamic least square (DOLS) and Pairwise Granger Causality while post-estimation techniques involves and Histogram Normality Test. These variables consist of government expenditure on health and education (GEHE), net migration value rate (NMG), international migration stock (IMG), rural-urban migration (RBM), trade openness

(TRADE) and exchange rate (EXCH) for the period of 1990 to 2024 as defined in our model specification. All the variables were sourced from Central Bank of Nigeria's (CBN) statistical bulletin for various years and on-line World Bank Data indicators. The study employed e-view version (9) statistical application software to analysis the data because it is user-friendly software.

Model specification for the study

GEHE = f (NMG, IMG, RBM, TRADE, EXCH) ……..……..……(3.1)

Where GEHE is government expenditure on health and education, NMG is net migration value value, IMG is international migration stock, RBM is rural-urban migration, TRADE is trade openness and EXCH is exchange rate. In a linear function, it is represented as follows:

$GEHE = \beta_0 + \beta_1 NMGt + \beta_2 IMGt + \beta_3 REMt + \beta_4 TRADEt - \beta_5 EXCH + \mu t$…….(3.2)

Where: $\beta 0$ = Constant term, β_1 to β_6 = Regression coefficient, μt = Error Term and t is the period. To reduce the outliers among the variables, all variables will be expressed in logarithmic form.

$LogRGDP = \beta_0 + \beta_1 LogNMGt + \beta_2 LogIMGt\ \beta_3 + LogRBMt + \beta_4 LogTRADEt - \beta_5 LogEXCH + \mu t$…..……..(3.3)

Where, $\beta 0$ = Constant term, β_1 to β_6 = Regression coefficient, Ut = Error Term and t is the period.

Table 1: Descriptive statistics of the variables

	GEHE	NMG	IMG	RBM	TRADE	EXCHR
Mean	1065879.	1920615.	66051.72	141248.1	2226109.	67.95102
Median	1166001.	2456782.	5860.100	137900.0	1188970.	23.86438
Maximum	2133114.	4890270.	206321.2	369369.0	6500024.	157.4987
Minimum	47051.10	196788.4	131.6000	13030.00	7502.500	8.038285
Std. Dev.	752808.8	1325467.	86327.28	104878.9	2513169.	57.10695
Skewness	0.034863	0.252761	0.764380	0.576732	0.647425	0.392198
Kurtosis	1.393622	2.030851	1.696195	2.445256	1.687051	1.377838
Jarque-Bera	3.770246	1.742419	5.887311	2.389074	4.959023	4.734753
Probability	0.151810	0.418445	0.052673	0.302844	0.083784	0.093726
Sum	37305768	67221512	2311810.	4943683.	77913825	2378.286
Sum Sq. Dev.	1.93E+13	5.97E+13	2.53E+11	3.74E+11	2.15E+14	110880.9
Observations	35	35	35	35	35	35

Source: Author's computation from E-view 9

The table shows descriptive statistics of the variables. In the model established in the study, there is one dependent variable and five independent variables. The mean of government expenditure on health and education (GEHE) was 1065879.0, the median was 1166001.1, maximum was 2133114.9, minimum was 47051.10 and sum of the variable was 37305768.45 respectively. The mean of net migration value rate (NMG) was 1920615.0, the median was 2456782.2, maximum was 4890270.0, minimum was 16788.4 and sum of the variable was 67221512 respectively. The mean of international migration stock (IMG) was 66051.72, the median was 137900.0, maximum was 369369.0, minimum was 131.6000 and sum of the variable was 2311810 respectively. The mean of rural-urban migration (RBM) was 141248.1, the median was 137900.0, maximum was 369369.0, minimum was 13030.00 and sum of the variable was 4943683.0 respectively. The mean of trade openness (TRADE) was 2226109.0, the median was 1188970.00, maximum was 6500024.4000, minimum was 7502.500, and sum of the variable was 77913825.8 respectively. The mean of and exchange rate (EXCH) was 67.95102, the median was 23.86438, maximum was 157.4987, minimum was 8.038285, and sum of the variable was 2378.286 respectively.

Table 2: Results of stationarity (unit root) test

Variables	Variables Full Meaning	ADF- Statistics	Critical Value	Lag Value	Remark
GEHE	Government Expenditure on Health and education	-4.868711	5% level = -2.948404	0	1(0)
NMG	Net migration value Rate	-6.005849	5% level = -2.948404	0	1(1)
IMG	International Migration Stock	-8.910698	5% level = -2.948404	0	1(1)
REM	Rural-urban Migration	-3.596637	5% level = -2.948404	0	1(0)
TRADE	Trade openness	-5.120232	5% level = -2.948404	0	1(1)
EXCH	Exchange Rate	-6.210462	5% level = -2.948404	0	1(1)

Source: Author's computation from E-view 9.

In the table 2, the variables that were tested with unit root are shown, the values for Augmented Dickey Fuller (ADF) statistics were presented, the lag level of each variable was identified. The Mackinnon critical values at 5% level of significant were pointed out. The order of integration of each variable was enumerated, and finally the stationarity position of each variable was also stated. The unit root test was based on the level of Augmented Dickey Fuller (ADF) statistics was stationary or not stationary on 5 percent significance level. When Augmented Dickey Fuller statistic is greater than Mackinnon 5 percent critical value in absolute term, it is concluded that the variable is stationary.

Correlation matrix of the variables

Table 3: Result of correlation matrix

	GEHE	NMG	IMG	RBM	TRADE	EXCHR
RGDP	1	0.6826	0.8121	0.7699	0.4152	0.3483
NMG	0.6826	1	0.3704	0.7894	0.0395	0.6202
IMG	0.8121	0.3704	1	0.5050	0.5780	0.0206
RBM	0.7699	0.7894	0.5050	1	0.1726	0.5093
TRADE	0.4152	0.0395	0.5780	0.1726	1	-0.3449
EXCHR	0.3483	0.6202	0.0206	0.5093	-0.3449	1

Source: Author's computation from E-view 9

This correlation matrix presents a table showing correlation coefficients between sets of variables. Each random variable (X_i) in the table is correlated with each of the other values in the table (X_j). This result of correlation matrix helps to identify which pairs of variables have the highest correlation. This test is to detect whether exact or perfect relationship exist among explanatory variables (multicollinearity). This test presented clear understanding on the assumption of ordinary least square that there is no perfect or exact linear relationship among explanatory variables. The result of correlation matrix showed that every explanatory variable in the study is linearly independent of each other.

Johansen Co-integration test

Ho = There is no co-integration (no long run relationship among Variable)

Table 4: Co-integration test results

Date: 06/25/25 Time: 10:32				
Sample (adjusted): 1992 2024				
Included observations: 33 after adjustments				
Trend assumption: Linear deterministic trend				
Series: RGDP NMG IMG REM TRADE EXCHR				
Lags interval (in first differences): 1 to 1				
Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		**Trace**	**0.05**	
No. of CE(s)	**Eigenvalue**	**Statistic**	**Critical value**	**Prob.****
None *	0.856674	129.8596	95.75366	0.0000
At most 1	0.582210	65.75276	60.81889	0.0000
At most 2	0.517371	36.95112	27.85613	0.0000
At most 3	0.179569	12.91041	29.79707	0.8956
At most 4	0.120727	6.378878	15.49471	0.6507
At most 5	0.062595	2.133104	3.841466	0.1441
Trace test indicates 3 cointegrating eqn(s) at the 0.05 level				
Denotes rejection of the hypothesis at the 0.05 level				
MacKinnon-Haug-Michelis (1999) *p*-values				

Source: Author's computation from E-view 9

The co-integration results in table 4 for the model (RGDP, NMG, IMG, RBM, TRADE and EXCH) reveals that both trace test and the Max-eigenvalue test indicate 3 co-integrating equation(s) at the 5 percent level of significance. We therefore reject the null hypothesis of there is no co-integration amongst the variables and accept the alternative hypothesis that states there is co-integration amongst the variables.

Estimation of regression model

Empirical results of the dynamic least square dols model

Table 5

Dependent Variable: GEHE				
Method: Dynamic Least Squares (DOLS)				
Date: 06/25/25 Time: 10:40				
Sample (adjusted): 1992 2023				
Included observations: 32 after adjustments				
Cointegrating equation deterministics: C				
Fixed leads and lags specification (lead=1, lag=1)				
Long-run variance estimate (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)				
Variable	**Coefficient**	**Std. error**	**t-statistic**	**Prob.**
NMG	-0.481146	0.090212	-5.333508	0.0007
IMG	-0.119165	0.018103	-6.582613	0.0009
RBM	0.607804	0.078582	7.734610	0.0000
TRADE	2.708191	0.526516	5.143608	0.0003
EXCHR	-6484.480	807.0023	-8.035268	0.0000
C	122254.0	40882.44	2.990378	0.0123
R-squared	0.989297	Mean dependent var		1150967.
Adjusted R-squared	0.969836	S.D. dependent var		729855.1
S.E. of regression	126758.8	Sum squared resid		1.77E+11
Long-run variance	7.65E+09			

Source: Author's computation from E-view 9

The Dynamic ordinary least square method (DOLS) was carried out to examine parameters estimates. In testing this hypothesis, net migration value rate (NMG), international migration stock (IMG), rural urban migration (RBM), trade openness (TRADE) and exchange rate (EXCH) were regressed against government expenditure on health and education (GEHE). The result of the regression analysis represents the model for investigating impact of migration and remittance on economic growth in Nigeria. The empirical result shows that the coefficient of net migration value rate (NMG) has negative and significant impact on government expenditure on health and education (GEHE) (t-statistics; -5.3335; *p*-value; 0.0007 < Sig-value: 0.005). The empirical result shows that the coefficient of international migration stock (IMG) has negative and significant impact on government expenditure on health and education (GEHE) (t-statistics; -6.5826; *p*-value; 0.0009 < Sig-value: 0.005). The empirical result shows that the coefficient of rural urban migration (RBM) has positive and significant impact on government expenditure on health and education (GEHE) (t-statistics; 7.7346; *p*-value; 0.0000 < Sig-value: 0.005). The empirical result shows that the coefficient of trade openness (TRADE) has positive and significant impact on government expenditure on health and education (GEHE) (t-statistics; 5.1443; *p*-value; 0.0003 < Sig-value: 0.005) The empirical result shows that the coefficient of exchange rate (EXCH) has negative and significant impact on government expenditure on health and education (GEHE) (t-statistics; -8.0352; *p*-value; 0.0000 > Sig-value: 0.005).

Granger causality test result

Table 6: Result of causality test

Pairwise Granger Causality Tests			
Date: 06/25/25 Time: 13:17			
Sample: 1990 2024			
Lags: 2			
Null Hypothesis	**Obs**	**F-Statistic**	**Prob.**
NMG does not Granger Cause GEHE	33	0.59004	0.5611
GEHE does not Granger Cause NMG		0.12310	0.8847
IMG does not Granger Cause GEHE	33	0.30897	0.7367
GEHE does not Granger Cause IMG		1.61265	0.2173
RBM does not Granger Cause GEHE	33	4.62766	0.0002
GEHE does not Granger Cause RBM		6.21261	0.0008
TRADE does not Granger Cause GEHE	33	2.39954	0.1092
GEHE does not Granger Cause TRADE		1.46976	0.2472
EXCHR does not Granger Cause GEHE	33	1.67070	0.2063
GEHE does not Granger Cause EXCHR		0.96175	0.3945

Source: Author's Computation using E-View 9

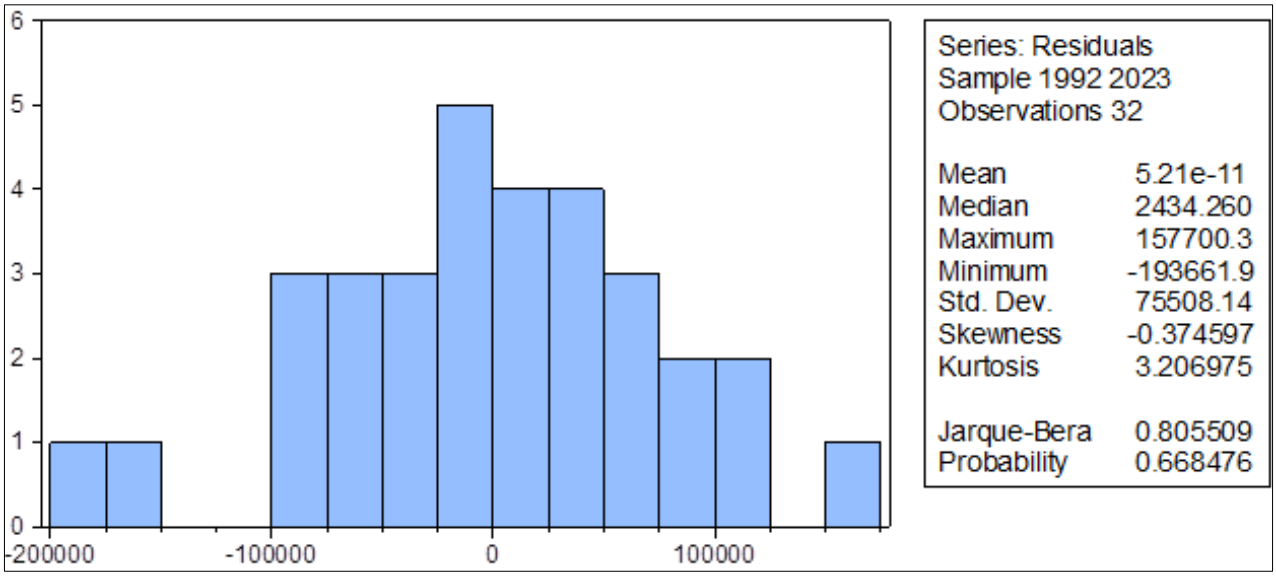
In summary, the result showed that there is bilateral causality relationship between labour migration and human capital development in Nigeria (F-statistics; 6.2126; *p*-value; 0.5611 > Sig-value: 0.0008).

Results of economic expected parameters signs

- Rural urban migration (RBM), trade openness (TRADE) conforms to economic apriori expectation of positive sign.
- Exchange rate (EXCH) conforms to economic apriori expectation of negative sign.
- Net migration value rate (NMG) and international migration stock (IMG) failed to conform to economic apriori expectation of positive sign.

4.6 Econometric/second order test

4.6.3 Histogram normality test



Sources: E-view 9.0 version

The null hypothesis is that there is no skewness and Kurtosis in the model. We reject the null hypothesis because the Jarqua-Bera statistics (0.8055) is less than probability value (0.0.6684). We reject null hypothesis and accept the alternative that there is skewness and Kurtosis in the model. The skewness is normal because the value was -0.3745. The model of the study produced positive skewed distribution meaning that it has a long tail in the positive direction. The kurtosis was 3.2069 meaning that the degree of peaked Ness was high that normal value of three (3). This implies that the standardized residuals from the estimated model in the regression framework is not normally distributed, which is consistent with the OLS assumption.

Test of hypotheses

The results for the various hypotheses testing are presented in the section.

Test of hypothesis one

H_{01} net migration value has no significant impact on human capital development in Nigeria

In testing this hypothesis, net migration value rate (NMG) is regressed against government expenditure on health and education (GEHE). The empirical result shows that the coefficient of net migration value rate (NMG) has negative and significant impact on government expenditure on health and education (GEHE) (t-statistics; -5.3335; *p*-value; 0.0007 < Sig-value: 0.005).

Test of hypothesis two

H_{O2} International migration stock has no significant impact on human capital development in Nigeria

In testing this hypothesis, international migration stock (IMG) is regressed against government expenditure on health and education (GEHE). The empirical result shows that the coefficient of international migration stock (IMG) has negative and significant impact on government expenditure on health and education (GEHE) (t-statistics; -6.5826; *p*-value; 0.0009 < Sig-value: 0.005).

Discussion of the results

Impact of net migration value on human capital development in Nigeria

It was observed from the hypothesis tested that net migration value value (NMG) has negative and significant impact on human capital development in Nigeria (t-statistics; -5.3335; *p*-value; 0.0007 < Sig-value: 0.005). A change in net migration value value results 48 percent negative and indirect impact on human capital development. The finding of this study was in line with study of Ozulumba, Metu and Nzeribe, (2024) [19] that examined the role of migration in human capital development in ECOWAS sub region over the period from 1996-2022. The specific objective of the study was to predominantly examine the effects of migration on economic growth, production efficiency, and labour productivity, there exists a notable gap in understanding its effects on human capital development. Using the dynamic panel data technique within the framework

of the generalized method of moment technique. The study found a significant positive impact of migration, remittances and governance on human capital development. However, the impact of net-migration was negative. It concludes that migration imposes no direct cost on the government and should be encouraged.

Impact of international migration stock on human capital development in Nigeria

It was observed from the hypothesis tested that international migration stock (IMG) has negative and significant impact on human capital development in Nigeria (t-statistics; -6.5826; *p*-value; 0.0009 < Sig-value: 0.005). A change in international migration stock (IMG) results 11 percent negative and indirect impact on human capital development in Nigeria. The finding of this study was in line with study of Nwokoro, (2024) [17] that aimed to empirically examine the effect of globalization and migration on Nigeria's economic growth. The specific objectives of the study were to determine the influence of foreign direct investment, trade openness, foreign exchange rate, remittances on gross domestic product covered the period 33 years (1990 – 2022). The ARDL (autoregressive distributed lag) model was employed for the study and a long-run relationship was established. Findings revealed that remittance had a significantly positive effect on Nigeria's economic growth in the long run. The finding of the error correction mechanism revealed a speed of adjustment to equilibrium of 31.1%.

Summary of the findings

The following are the major findings of the study**:**

- The empirical result shows that net migration value value (NMG) has negative and significant impact on human capital development in Nigeria (t-statistics; -5.3335; *p*-value; 0.0007 < Sig-value: 0.005). A change in net migration value value result 48 percent negative and indirect impact on human capital development in Nigeria.
- The empirical result shows that international migration stock (IMG) has negative and significant impact on human capital development in Nigeria (t-statistics; -6.5826; *p*-value; 0.0009 < Sig-value: 0.005). A change in international migration stock (IMG) result 11 percent negative and indirect impact on human capital development in Nigeria.

Conclusion

This study concludes that labour migration has negative and significant impact on human capital development in Nigeria. The Nigeria domestic labor market cannot fully absorb human capital and skilled individuals seek better opportunities abroad, where their skills are in higher demand and better rewarded. This phenomenon aligns with the study's finding that net migration value indirectly impacts human capital development, indicating that a well-educated and healthy workforce is more likely to emigrate because domestic opportunities are limited. Migration can have a range of social, cultural, political and economic effects. It involves the transfer and flight of technical know-how and skills and financial assets from one location to another. Migration also has consequences for the individual, the area of origin and the area of destination. Nigeria cannot achieve long-term economic development by exporting its human resources. The professionals that are emigrating out of Nigeria include those with technical expertise, entrepreneurial and managerial skills and in the new world order; economic growth and development are driven by people with knowledge. It is the most talented citizens that should lead the people to create wealth and eradicate poverty.

Recommendations of the study

Based on the findings of this study, the following recommendations were made.

1. Nigerian government should continue to expand its investment in human capital development. Enhanced education, healthcare, and skill-building programs are evidently making the country more appealing to immigrants. This influx of immigrants can be leveraged to further boost the economy, provided that adequate opportunities and support systems are in place for these newcomers.
2. Nigeria government should adopt strategies to stemming international migration by addressing push factors of unemployment, low salaries, limited chances of self-advancement, poor conditions of service, poverty and pull factors such as job opportunities, safety and security, wealth prospects, food security and conflicts, better conditions of service and higher standards of living since they are the root causes of international migration.

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