International Migration and Labor Supply in Africa: A Panel Data Analysis of 37 Countries from 2000 to 2024

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ABSTRACT

This study analyzes the impact of international migration on labor supply across 37 African countries over the 2000–2024 period. Using panel data and an econometric approach that combines a random-effects model with System GMM (Generalized Method of Moments) estimation, the results show that international migration has a positive and significant effect on labor supply. Per capita income also positively influences labor market participation, whereas the effects of urbanization and education appear less robust depending on the specific econometric specifications used. The GMM model results confirm the robustness of the positive impact of migration and economic development on labor supply, while highlighting that urbanization and education require favorable institutional and economic conditions to fully exert their effects. Consequently, the study recommends strengthening policies to engage the diaspora, channeling remittances into productive investments, and improving the alignment between education systems and the needs of African labor markets.

Keywords: International migration; Labor supply; Panel data; System GMM; Economic development; Africa.

INTRODUCTION

International migration represents one of the major transformations of the contemporary global economy, affecting the distribution of the workforce, employment dynamics, and the development trajectories of both origin and host countries. According to Harris and Todaro (1970), wage and employment opportunity differentials are key determinants of migratory flows, while Massey et al. (1993) highlight the role of economic, social, and institutional factors in the dynamics of international migration. Beyond its demographic dimension, migration influences origin economies through several channels, notably remittances, the circulation of skills, and the development of economic networks (de Haas, 2010; Docquier et al., 2012). In Africa, this issue is of particular importance due to rapid labor force growth, limited capacity for productive job creation, and the predominance of the informal sector (McMillan et al., 2014; ILO, 2020). Understanding the effects of international migration on labor supply has thus become a major priority for policymakers and researchers alike.

However, the impact of international migration on labor supply remains ambiguous. On the one hand, remittances can support consumption, investment, and economic activity while easing pressures on domestic labor markets (Ratha, 2013; de Haas, 2010). On the other hand, emigration—particularly that of skilled workers—can lead to a reduction in available human capital and constrain the productive capacity of origin countries (Beine et al., 2008; Docquier et al., 2012). As Docquier and Rapoport (2012) demonstrate, the effects of migration depend largely on the economic and institutional characteristics of the countries involved, which explains the heterogeneity of results observed in empirical studies.

Despite growing interest in this issue, several gaps remain in the literature. First, most studies primarily analyze the effects of migration on remittances, poverty, or economic growth (de Haas, 2010; Ratha, 2013), whereas its impact on labor supply remains relatively understudied. Second, empirical analyses often focus on a limited number of countries, which restricts the applicability of the findings to the African continent as a whole. Third, few studies simultaneously examine the influence of international migration and key structural determinants of labor supply—such as income levels, education, and urbanization—within an econometric framework that explicitly accounts for endogeneity issues.

To address these gaps, this study analyzes the effect of international migration on labor supply growth in African countries. Specifically, it seeks to answer the following question: to what extent does international migration influence labor supply dynamics in Africa? To answer this question, the study utilizes panel data covering several African countries and employs an econometric strategy combining a random-effects model with a system Generalized Method of Moments (System GMM) estimator, in order to control for unobserved heterogeneity and potential endogeneity issues.

This research makes three main contributions to the literature. First, it provides a comparative analysis across several African countries, whereas existing studies are largely limited to single-country contexts. Second, it jointly assesses the impact of international migration and that of key structural determinants of labor supply, notably GDP per capita, education, and urbanization. Third, the use of two complementary econometric approaches allows for testing the robustness of the results and enhancing the credibility of the estimates.

The remainder of the article is organized as follows. Section 2 presents the literature review, Section 3 describes the data and methodology, Section 4 presents and discusses the empirical results, and the final section is devoted to the conclusion and policy implications.

LITERATURE REVIEW

The relationship between international migration and labor supply has attracted growing interest in the economics literature. Existing studies show that migration influences labor markets through several interdependent mechanisms, yet findings remain mixed depending on economic, institutional, and demographic contexts. This literature review first outlines the main theoretical foundations of international migration, then analyzes the key mechanisms through which migration affects labor supply, before discussing empirical findings and major gaps in the literature.

Economic theories of migration explain individuals' motivations for migrating as well as the expected effects of these movements on labor markets. The neoclassical approach developed by Todaro (1969) and Harris and Todaro (1970) views migration as a rational decision based on differences in expected income and employment opportunities between regions or countries. According to this approach, migration flows facilitate a more efficient international allocation of labor by gradually reducing labor market imbalances. This perspective is complemented by Becker's (1964) human capital theory, which posits that migration is an investment aimed at increasing future income by better leveraging individual skills. However, these approaches have been deemed insufficient to explain the full range of migration determinants. The New Economics of Labor Migration (Stark, 1991) views migration as a collective household strategy designed to diversify income sources and mitigate economic risks. Meanwhile, Wallerstein's (1974) world-systems theory explains migration flows in terms of structural inequalities between developed economies and developing countries.

The literature identifies several mechanisms that may explain the impact of international migration on labor supply in countries of origin. One primary mechanism involves the reduction of labor supply surpluses. According to Harris and Todaro (1970), emigration helps alleviate labor market pressures when economies face high unemployment or insufficient job creation. Lucas (2005) and Brücker (2011) also demonstrate that migration can help reduce labor market imbalances, although its effects generally remain limited and depend on the specific characteristics of each economy. Remittances constitute a second, widely documented transmission channel. According to Ratha (2013), they boost household income, support consumption, and foster productive investment. Gubert and Nordman (2011) show that they also facilitate access to financing for economic activities. However, these positive effects are not automatic. Chami et al. (2005) highlight that remittances can create financial dependency, potentially reducing labor market participation as households substitute this income for earned income. International migration also alters the stock of human capital in countries of origin. Bhagwati and Hamada (1974) and Docquier and Rapoport (2012) show that the departure of skilled workers can reduce productive capacity and hinder economic development. Conversely, Beine, Docquier, and Rapoport (2008) highlight the "brain gain" hypothesis, according to which migration prospects encourage investment in education. Furthermore, the return of migrants often fosters the transfer of skills, technologies, and entrepreneurial practices capable of boosting productivity (Dustmann and Kirchkamp, 2002; Black and Castaldo, 2009). The effects of migration are not uniform. De Haas (2010) demonstrates that they depend largely on the

quality of institutions, governance, and public policies. In the African context, the predominance of the informal sector, weak infrastructure, and difficulties in accessing formal employment can limit the expected benefits of migration (ILO, 2020).

Empirical studies yield mixed results. In developed countries, Oláh et al. (2017) show that migration helps alleviate labor shortages in certain sectors, whereas Dalahmeh and Dajnoki (2021) conclude that its effects on employment and wages remain generally limited and depend on workers' qualifications. Similarly, Gündoğmuş and Bayır (2021) show that migration does not have a statistically significant effect on unemployment in European countries, with macroeconomic variables appearing to be more decisive factors. In Africa, findings also remain mixed. Research by Ratha (2013) and by Gubert and Nordman (2011) highlights the positive impact of remittances on investment and income-generating activities. Conversely, Chami et al. (2005) highlight the risks of dependency associated with remittances, while Docquier and Rapoport (2012) point out that the emigration of skilled workers can reduce available human capital. These discrepancies demonstrate that the effects of migration on labor supply vary according to the economic, institutional, and demographic characteristics of the countries studied.

Despite the progress made, several shortcomings remain: First, the majority of studies analyze the effects of migration on remittances, poverty, or economic growth, whereas its direct impact on labor supply remains relatively under-researched. Second, research focused on Africa relies primarily on country-specific studies, which limits the generalizability of the findings to the continent as a whole. Third, few studies simultaneously analyze the role of international migration and that of key structural determinants of labor supply—such as per capita income, education, and urbanization—within an econometric framework capable of addressing endogeneity issues. It is against this backdrop that the present study is situated; it offers a comparative analysis of several African countries using panel models that combine random effects with the system GMM estimator to yield more robust estimates.

METHODOLOGY

Model Specification

To examine the effect of international migration on labor supply growth in Africa, this study adopts a panel data approach. This method, widely used in applied econometrics (Baltagi , 2008; Wooldridge , 2016), allows for the simultaneous control of country-specific characteristics and temporal changes that may influence the labor market. The basic model is formulated as follows:

$$OFF_{it} = \beta_0 + \beta_1 MIG_{it} + \beta_2 PIB_{it} + \beta_3 EDU_{it} + \beta_4 URB_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (2)$$

With β_i, the parameters to be estimated, i refers to the countries, and t designates the period. μ_i and $\lambda_t$respectively capture country fixed effects and time fixed effects , allowing for the consideration of unobserved heterogeneities at the country level and over time (Baltagi , 2008) . ε_{it}random error, assumed to be independent and identically distributed.

Characteristics of the variables

Labor supply is measured as the labor force participation rate, defined as the percentage of the working-age population (15 years and older) that is economically active. The variable is expressed in percentage points to ensure consistency between descriptive statistics and regression estimates. International migration (IM) is measured by the net migration rate, defined as the ratio of the difference between inflows and outflows to the total population.

This indicator measures the intensity of migration flows and their potential effects on the economies of origin (Docquier et al., 2006; Beine et al., 2008). The control variables are GDP per capita (GDP), education (EDU), and urbanization (URB). GDP per capita measures the level of economic development (Lucas, 1988; Barro, 1991). Urbanization is measured by the proportion of the population living in urban areas (Henderson, 2003; Todaro , 1997).

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Data

This study is based on secondary quantitative panel data covering 37 African countries over the period 2000–2024 (up to 925 country-year observations). Data on international migration come from the United Nations Department of Economic and Social Affairs (UN DESA), GDP per capita data from the World Bank, education indicators from the UNESCO Institute for Statistics , and urbanization data from UN DESA.

Estimation Techniques

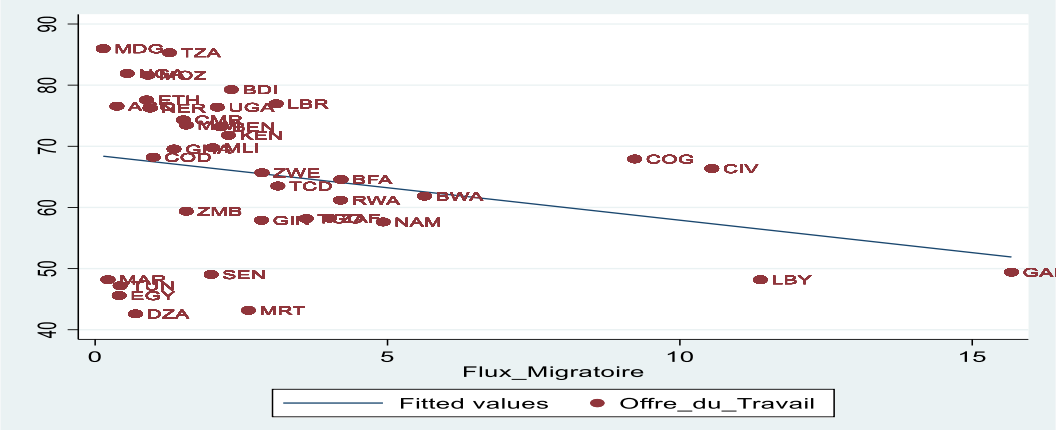
Before estimating the model, several diagnostic tests are performed to ensure the reliability of the results. The Levin-Lin-Chu (2002) and Im- Pesaran -Shin (2003) tests verify the stationarity of the series, while the VIF test detects multicollinearity among the explanatory variables (Gujarati & Porter, 2009). The Breusch -Pagan (1979) and Wooldridge (2002) tests examine heteroscedasticity and autocorrelation of the errors, respectively. Finally, the Hausman test guides the choice between fixed and random effects, while GMM estimation is used to test the robustness of the results to endogeneity issues (Arellano & Bond, 1991; Blundell & Bond, 1998).

STYLIZED FACTS, RESULTS, AND DISCUSSION

Stylized facts and descriptive statistics

Figure 1 highlights a negative correlation between international migration flows and labor supply in African countries. The downward slope of the regression line suggests that an increase in migration flows is generally associated with a decrease in labor supply, which is consistent with the hypothesis that emigration reduces the availability of labor in countries of origin. Observations show that countries such as Gabon and Libya, characterized by high migration flows, have relatively low labor supply. Conversely, Madagascar, Tanzania, and Mozambique, where migration flows are limited, have a larger labor supply. However, countries like Côte d'Ivoire and Congo exhibit a relatively strong labor supply despite moderate migration flows, suggesting that this relationship is also influenced by demographic, economic, and institutional factors. Ultimately, these stylized facts highlight a negative association between international migration and labor supply. They provide an initial empirical indication that justifies a more in-depth econometric analysis.

Figure 1: Correlation between international migration and labor supply



Source: Authors

Table 1 presents the descriptive statistics of the variables used in the empirical analysis. The results reveal substantial variations across the African countries included in the sample.

The dependent variable, labor supply has an average value of 61.25%. The minimum value is 38.70%, while the maximum reaches 86.45%, indicating significant differences in labor market participation across countries. These variations reflect differences in demographic structures, economic development levels, employment opportunities, and the degree of labor market integration among African economies.

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The international migration rate has an average value of 3.10%. The minimum and maximum values are 0.13% and 15.88%, respectively, suggesting considerable heterogeneity in migration intensity across countries. Some African countries experience relatively limited international migration flows, whereas others are characterized by substantial population movements abroad due to economic, social, or political factors.

The GDP per capita variable, expressed in logarithmic form, has a mean value of 11.81 and a standard deviation of 1.99. The minimum value of 6.34 and the maximum value of 15.56 indicate important differences in economic development levels among the countries considered. This variation highlights the diversity of income levels and productive capacities within African economies.

The education variable has an average value of 18.63%. The minimum value (0.50%) and maximum value (73.29%) show substantial differences in educational attainment across countries, reflecting unequal access to education and differences in human capital accumulation.

Finally, urbanization presents an average level of 42.62%, with a standard deviation of 18.69 percentage points. The values range from 8.25% to 91.03%, indicating strong differences in urban development patterns across African countries. These disparities may influence labor supply dynamics through their effects on employment opportunities, economic diversification, and access to labor markets.

Table 1: Descriptive Statistics

Variables	Observations	Mean	Standard Deviation	Minimum	Maximum
Labor supply (%)	888	61.25	10.84	38.70	86.45
International migration (%)	925	3.10	3.45	0.13	15.88
GDP per capita (log)	925	11.81	1.99	6.34	15.56
Education (%)	875	18.63	14.80	0.50	73.29
Urbanization (%)	925	42.62	18.69	8.25	91.03

Source: Authors

Results of tests prior to estimation

Table 2 presents the results of the Im- Pesaran -Shin (IPS) and Levin-Lin-Chu (LLC) stationarity tests applied to the model variables at their respective levels. The results indicate that the entire set of variables is stationary at levels. Indeed, the IPS and LLC test statistics are significant for all variables, with p-values less than 5%, and in most cases, less than 1%. This property is observed for labor supply, international migration, GDP per capita, education level, and urbanization rate.

These results lead to the rejection of the null hypothesis of the presence of a unit root and confirm that the variables are integrated of order zero, I(0). Consequently, they can be used directly in econometric estimations, without prior differentiation, which strengthens the reliability of the empirical analyses that follow.

Table 2: Results of IPS and LLC stationarity tests at level

Variables	Im Test - Pesaran -Shin (IPS).		Levin-Lin-Chu (LLC) test	
	t-bar stat	P-value	adjusted t-stat	P-value
Job offer	-3.2911***	0.0000	-4.0130***	0.0000

International migration	-1.8975***	0.0014	-1.9171**	0.0276
GDP per capita	-4.7446 ***	0.0000	-7.3872***	0.0000
Education	-2.8602 ***	0.0000	-2.6831***	0.0036
Urbanization	-3.4862 ***	0.0000	-4.8450***	0.0000

Source : Authors ; Significant at: *** 1%, ** 5%, * 10%.

Table 3 presents the results of the variance inflation factor (VIF) test, used to assess the presence of multicollinearity among the explanatory variables. The VIF values obtained range from 1.01 to 1.17, with a mean of 1.09, significantly lower than the critical thresholds generally used in the literature (5 or 10). These results indicate an absence of significant multicollinearity among the explanatory variables. Each variable thus contributes unique information to the model, which ensures stable estimates and strengthens the robustness and reliability of the econometric results.

Table 3: Multicollinearity Test Results

Variables	LIVELY	1/ VIF
International migration	1.01	0.988641
GDP per capita	1.01	0.986597
Education	1.17	0.857816
Urbanization	1.17	0.851131
Average VIF	1.09	

Source Authors

Table 4 presents the results of the Breusch-Pagan heteroscedasticity test . The test statistic is 0.09, with a p-value of 0.7676, well above the usual significance thresholds. Therefore, the null hypothesis of homoscedasticity cannot be rejected.

Thes

e results indicate that the variance of the errors is constant across observations, suggesting the absence of heteroscedasticity in the model. This property strengthens the validity of the statistical inferences and the reliability of the econometric estimates obtained.

Table 4: Heteroscedasticity test results

H0: homoscedasticity (constant variance).	
chi2(1)	0.09
Prob > chi2	0.7676

Source : Authors ; Significant at: *** 1%, ** 5%, * 10%.

Table 5 presents the results of the Wooldridge autocorrelation test . The F(1,34) statistic = 37.900 is significant at the 1% level (p-value = 0.000), leading to the rejection of the null hypothesis of no first- order autocorrelation

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. These results highlight within-group autocorrelation of the errors, indicating that the residuals are correlated over time. This situation can affect the validity of standard errors and significance tests. Therefore, it is necessary to use autocorrelation-robust estimators to ensure the reliability of econometric inferences.

Table 5: Autocorrelation Test Results

H0: absence of first-order autocorrelation	
F(1, 34)	37,900***
Prob > F	0.000

Source : Authors ; Significant at: *** 1%, ** 5%, * 10%.

Table 6 presents the results of the Hausman test, used to determine the most appropriate panel model between fixed effects (FE) and random effects (RE). The test statistic is $\chi^2 = 0.47$ with a p-value of 0.9763, well above the significance threshold of 5%.

These results lead to the non-rejection of the null hypothesis, which states that the differences between the coefficients of the fixed-effects and random-effects models are not systematic. This suggests the absence of a significant correlation between the unobserved individual effects and the explanatory variables.

Thus, the random effects (RE) model appears to be the most appropriate econometric choice, as it provides more efficient estimates under this assumption. Empirical analyses will therefore be conducted based on this specification.

Table 6: Results of the Hausmann test

H0: Difference in coefficients not systematic	
chi2(1)	0.047
Prob > chi2	0.9763

Source: Authors

Estimation results of the random effects model

Table 7 presents the results of the random effects model estimating the determinants of labor supply in African countries. The overall model is statistically significant, as indicated by the Wald chi-square statistic (192.64) and the associated probability value ($p < 0.001$). The explanatory power of the model is satisfactory, with an R-squared value of 0.342, indicating that the included variables explain approximately 34.2% of the variation in labor supply.

The coefficient of international migration is positive and statistically significant at the 5% level. This result suggests that an increase in international migration is associated with a rise in labor supply. Specifically, a one-percentage-point increase in the international migration rate is associated with an increase of approximately 0.214 percentage points in labor supply. This positive relationship may be explained by the effects of migration through remittances, knowledge transfers, and improved economic conditions for households in origin countries.

The coefficient of GDP per capita is positive and statistically significant at the 1% level. This indicates that higher levels of economic development are associated with greater labor supply. A one-unit increase in GDP per capita (in logarithmic form) increases labor supply by approximately 1.856 percentage points, suggesting that economic growth enhances employment opportunities and labor market participation.

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The coefficient of urbanization is negative and statistically significant at the 1% level. This finding implies that higher urbanization rates are associated with lower labor supply. In the African context, this may reflect the inability of urban labor markets to absorb the growing working-age population, leading to higher unemployment, underemployment, or informal employment.

The coefficient of education is positive and statistically significant at the 1% level, indicating that improvements in human capital contribute to higher labor market participation. Education enhances individuals' skills, employability, and access to economic opportunities.

The constant term is positive and statistically significant, indicating a baseline level of labor supply when all explanatory variables are equal to zero. Although this situation is not directly observed in the sample, the coefficient provides information about the model's intercept.

Overall, the results highlight that international migration, economic development, and education positively contribute to labor supply in African economies, while rapid urbanization may create challenges for labor market absorption. These findings emphasize the importance of structural policies aimed at improving employment opportunities and maximizing the benefits of migration.

Table 7: Results of the random effects model estimations

Variables	Random Effects Model
International migration	0.214** (0.096)
GDP per capita (log)	1.856*** (0.512)
Urbanization (%)	-0.178*** (0.052)
Education (%)	0.126*** (0.038)
Constant	42.573***
Observations	875
R-squared	0.342
Wald chi2	192.64
Prob > chi2	0.0000

Source : Authors ; Significant at: *** 1%, ** 5%, * 10%.

Robustness test results

To assess the robustness of the empirical findings, this study compares the results obtained from the random effects model with those from the system GMM estimator. While the random effects model controls for

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unobserved country-specific heterogeneity, the system GMM approach additionally addresses potential endogeneity issues arising from reverse causality, omitted variables, and the dynamic nature of labor supply. Therefore, differences between the two estimations provide useful insights into the reliability and interpretation of the estimated relationships.

The effect of international migration remains positive and statistically significant in both models, confirming the robustness of its relationship with labor supply. However, the magnitude of the coefficient differs substantially between the two estimations. In the random effects model, the coefficient is 0.214, while the system GMM estimate increases to 2.768. This stronger effect in the GMM model suggests that the random effects estimation may underestimate the contribution of international migration by not fully accounting for endogeneity. The GMM results indicate that migration may have a more significant role in expanding labor supply through channels such as remittances, household investment, skill transfers, and improved economic opportunities. This finding is consistent with the argument that migration effects cannot be fully captured without considering the potential two-way relationship between migration decisions and labor market conditions (de Haas, 2010; Ratha, 2013).

The coefficient of GDP per capita is positive and significant in both models, although its magnitude varies. The random effects model reports a coefficient of 1.856, whereas the system GMM estimation provides a coefficient of 0.488. Despite this difference, both approaches confirm that economic development contributes positively to labor supply. The persistence of this relationship across specifications strengthens the validity of the finding. The GMM estimate is particularly relevant because it reduces possible biases associated with the simultaneous relationship between economic growth and labor market participation. Higher income levels may improve employment opportunities, encourage labor market participation, and enhance the capacity of economies to absorb their growing working-age populations.

The results for urbanization show greater differences between the two approaches. The random effects model indicates a negative and statistically significant effect (-0.178), suggesting that urban expansion may reduce labor supply due to limited employment opportunities, unemployment pressures, and the predominance of informal activities in African cities. However, the system GMM estimate is positive but statistically insignificant (0.0424), indicating that the negative relationship observed in the random effects model may be influenced by unobserved country characteristics. After controlling for potential endogeneity, urbanization does not appear to have a significant direct effect on labor supply. This result suggests that the impact of urbanization depends largely on complementary factors, such as infrastructure quality, industrial development, and the ability of urban economies to create productive employment.

The effect of education also differs across the two models. The random effects model shows a positive and significant coefficient (0.126), implying that higher educational attainment increases labor market participation. In contrast, the system GMM estimate is negative and statistically insignificant (-0.0648). This difference highlights the complexity of the relationship between education and labor supply in African economies. While education improves individual skills and employability, its effect on labor participation may be limited when labor markets cannot generate sufficient skilled employment opportunities. The GMM results suggest that the positive relationship identified by the random effects model may partly reflect omitted factors correlated with education and labor market outcomes.

The validity of the system GMM estimation is confirmed by the diagnostic tests. The AR(2) test indicates the absence of second-order serial correlation (p-value = 0.756), while the Hansen test confirms the validity of the instruments used (p-value = 0.342). These results support the reliability of the GMM specification and strengthen confidence in the estimated coefficients.

Overall, the robustness analysis confirms two main findings. First, international migration and GDP per capita consistently exhibit positive effects on labor supply across both estimation methods, indicating that these relationships are robust. Second, the effects of urbanization and education are sensitive to the estimation technique, suggesting that their impacts depend on broader structural and institutional conditions.

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Given the ability of the system GMM estimator to address endogeneity and potential omitted variable bias, the GMM results are considered the preferred estimates and therefore constitute the main basis for the conclusions of this study. However, the random effects results remain informative by providing complementary evidence on the relationships between migration, economic development, and labor supply. Consequently, the study's conclusions primarily rely on the system GMM findings, while recognizing the consistency of the main results across alternative specifications.

Table 8: GMM system model estimation

Variables	Labor supply
International migration	2.768*** (0.913)
GDP per capita	0.488*** (0.121)
Urbanization	0.0424 (0.0639)
Education	-0.0648 (0.0413)
Constant	57.23*** (2.544)
Observations	840
AR 1	0.0109
AR 2	0.756
Hansen	0.342
Sargan	0.000

Source : Author ; Significant at: *** 1%, ** 5%, * 10%.

Discussion of results

The system GMM estimation results presented in Table 8 provide important evidence on the determinants of labor supply in African countries. The results indicate that international migration and GDP per capita are significant determinants of labor supply, while the effects of urbanization and education are statistically insignificant. The validity tests confirm the reliability of the GMM specification, with no evidence of second-order serial correlation (AR(2), p-value = 0.756) and a valid set of instruments according to the Hansen test (p-value = 0.342).

The positive and significant coefficient of international migration (2.768) suggests that migration plays an important role in increasing labor supply. This result indicates that a one-percentage-point increase in international migration is associated with an increase of approximately 2.77 percentage points in labor supply. This finding may be explained by several mechanisms, including the contribution of remittances to household

income, increased investment capacity, and the transfer of skills and knowledge through migration networks. As emphasized by de Haas (2010) and Ratha (2013), migration can generate positive development effects when origin countries have the capacity to transform migration flows into productive economic activities. Moreover, the result supports the argument of Docquier and Rapoport (2012) that migration effects depend not only on the loss of human capital but also on potential gains through knowledge transfer and return migration.

The coefficient of GDP per capita is positive and statistically significant (0.488), indicating that economic development contributes to higher labor supply. This suggests that improvements in income levels and productive capacity increase employment opportunities and encourage labor market participation. However, GDP per capita alone does not fully capture the ability of African economies to generate productive employment. Other structural dimensions, such as economic diversification, industrial development, private sector expansion, and labor market efficiency, may also determine whether economic growth translates into higher labor demand and participation (McMillan, Rodrik, & Verduzco-Gallo, 2014).

The coefficient of urbanization is positive but statistically insignificant (0.0424), suggesting that urbanization does not have a direct and statistically measurable effect on labor supply after controlling for endogeneity. This result indicates that urban population growth does not automatically translate into greater labor market participation. In many African countries, rapid urbanization has occurred without a corresponding expansion of formal employment opportunities, leading to persistent unemployment, underemployment, and informal activities (Gollin, Jedwab, & Vollrath, 2016). Therefore, the impact of urbanization may depend on complementary factors such as infrastructure quality, industrialization, urban planning, and the capacity of cities to create productive jobs.

Education presents a negative but statistically insignificant coefficient (-0.0648). This result suggests that higher educational attainment does not necessarily increase labor supply in the African context. One possible explanation is the mismatch between educational outcomes and labor market requirements. Although education contributes to human capital accumulation, its effects on employment participation may be limited when economies are unable to provide sufficient skilled employment opportunities (Becker, 1964; Schultz, 1961). This finding highlights the importance of considering not only access to education but also education quality and labor market relevance.

Despite the significant contribution of the included variables, the model does not capture all factors influencing labor supply. Several important determinants are omitted, which may explain part of the remaining variation in labor market participation. These factors include institutional quality, governance effectiveness, political stability, demographic structure, labor market regulations, infrastructure development, foreign direct investment, technological progress, and the size of the informal sector.

Institutional factors are particularly important in African economies because they influence investment decisions, employment creation, and the functioning of labor markets. Strong institutions, effective governance, and political stability can improve economic incentives and create a more favorable environment for job creation (North, 1990; Acemoglu, Johnson, & Robinson, 2005). Similarly, demographic characteristics, such as population growth, age structure, and dependency ratios, directly affect the size and composition of the labor force (Bloom & Williamson, 1998).

The relatively limited number of explanatory variables also has implications for the interpretation of the results. Although the GMM estimation provides robust evidence of the effects of migration and economic development on labor supply, the estimated coefficients should not be interpreted as capturing all determinants of labor market participation. The omission of relevant variables may reduce the model's explanatory capacity and may influence the magnitude of some estimated effects.

Therefore, future research should extend the analysis by incorporating additional institutional, demographic, and structural variables, depending on data availability. Such improvements would provide a more comprehensive understanding of the mechanisms through which international migration influences labor supply in African economies.

CONCLUSION AND RECOMMANDATIONS

This study examined the effect of international migration on labor supply in 37 African countries over the period 2000–2024 using panel data techniques. The system GMM results show that international migration has a positive and significant effect on labor supply, suggesting that remittances, skills transfer, and migrant networks can contribute to strengthening productive capacities in origin countries. However, the effects of urbanization, GDP per capita, and education remain limited after controlling for endogeneity, indicating that migration outcomes depend largely on the structural characteristics of African economies.

From a policy perspective, African governments should promote diaspora engagement, productive use of remittances, and knowledge transfers to maximize the development benefits of migration. They should also strengthen labor market institutions, infrastructure, and employment creation strategies to better absorb the growing working-age population.

This study has some limitations. Although the system GMM approach addresses potential endogeneity issues, the model does not include all factors affecting labor supply. The moderate explanatory power suggests that institutional quality, demographic dynamics, labor market regulations, infrastructure, foreign direct investment, and informal employment may also influence labor market participation. Future research should incorporate these factors and further investigate the channels through which migration affects labor supply, particularly remittances, return migration, and skill transfers.

REFERENCES

1. Arellano , M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations . The Review of Economic Studies, 58 (2), 277–297. https://doi.org/10.2307/2297968
2. Arellano, M., & Bover , O. (1995). Another look at the instrumental variable estimation of error-components models . Journal of Econometrics, 68 (1), 29–51. https://doi.org/10.1016/0304-4076(94)01642-D
3. Baltagi , B. H. (2008). Econometric analysis of panel data (4th ed .). John Wiley & Sons.
4. Barro , R. J. (1991). Economic growth in a cross section of countries . The Quarterly Journal of Economics, 106 (2), 407–443. https://doi.org/10.2307/2937943
5. Becker, G.S. (1964). Human capital: A theoretical and empirical analysis, with special reference to education . University of Chicago Press.
6. Beine , M., Docquier , F., & Rapoport , H. (2008). Brain drain and human capital formation in developing countries: Winners and losers . The Economic Journal, 118 (528), 631–652. https://doi.org/10.1111/j.1468-0297.2008.02159.x
7. Bennell , P., & Al- Samarrai , S. (2007). Where has all the education gone in sub-Saharan Africa? Employment and other outcomes among secondary school and university leavers . Journal of Development Studies, 43 (7), 1271–1300. https://doi.org/10.1080/00220380701526592
8. Blanchard, O. (2000). Macroeconomics . Pearson Education.
9. Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models . Journal of Econometrics, 87 (1), 115–143. https://doi.org/10.1016/S0304-4076(98)00009-
10. Breusch , T. S., & Pagan, A. R. (1979). A simple test for heteroscedasticity and random coefficient variation . Econometrica , 47 (5), 1287–1294. https://doi.org/10.2307/1911963
11. Card, D., & Krueger, A.B. (1994). Minimum wages and employment: A case study of the fast-food industry in New Jersey and Pennsylvania . American Economic Review, 84 (4), 772–793. https://doi.org/10.1257/aer.84.4.772
12. De Haas, H. (2010). Migration and development: A theoretical perspective . International Migration Review, 44 (1), 227–264. https://doi.org/10.1111/j.1747-7379.2009.00804.x
13. Docquier , F., & Rapoport , H. (2006). The economics of migrants' remittances . In SC Kolm & JM Ythier (Eds.), Handbook of the economics of giving, altruism and reciprocity (pp. 1135–1198). Elsevier.
14. Docquier , F., & Rapoport , H. (2012). Globalization, brain drain, and development . Journal of Economic Literature, 50 (3), 681–730.

15. Docquier , F., Rapoport , H., & Salomone , S. (2012). Remittances, migrants' education and immigration policy: Theory and evidence from developing countries . Regional Science and Urban Economics, 42 (5), 817–828. https://doi.org/10.1016/j.regsciurbeco.2012.04.001
16. Drukker , D. M. (2003). Testing for serial correlation in linear panel-data models . The Stata Journal, 3 (2), 168–177.
17. Greene, W. H. (2012). Econometric analysis (7th ed .). Pearson Education.
18. Gujarati, D.N., & Porter, D.C. (2009). Basic econometrics (5th ed .). McGraw-Hill.
19. Harris, J.R., & Todaro , M.P. (1970). Migration, unemployment and development: A two-sector analysis . American Economic Review, 60 (1), 126–142.
20. Henderson, J. V. (2003). The urbanization process and economic growth: The so-what question . Journal of Economic Growth, 8 (1), 47–71. https://doi.org/10.1023/A:1022860800744
21. Im , K. S., Pesaran , M. H., & Shin, Y. (2003). Testing for unit roots in heterogeneous panels . Journal of Econometrics, 115 (1), 53–74. https://doi.org/10.1016/S0304-4076(03)00092-7
22. Kennedy, P. (2008). A guide to econometrics (6th ed .). Blackwell Publishing.
23. Layard, R., Nickell, S., & Jackman, R. (1991). Unemployment: Macroeconomic performance and the labor market . Oxford University Press.
24. Levin, A., Lin, C.F., & Chu, CSJ (2002). Unit root tests in panel data: Asymptotic and finite-sample properties . Journal of Econometrics, 108 (1), 1–24. https://doi.org/10.1016/S0304-4076(01)00098-7
25. Lucas, R.E. (1988). On the mechanics of economic development . Journal of Monetary Economics, 22 (1), 3–42. https://doi.org/10.1016/0304-3932(88)90168-7
26. Mankiw , N.G., Romer , D., & Weil, D.N. (1992). A contribution to the empirics of economic growth . The Quarterly Journal of Economics, 107 (2), 407–437. https://doi.org/10.2307/2118477
27. Massey, DS, Arango , J., Hugo, G., Kouaouci , A., Pellegrino, A., & Taylor, JE (1993). Theories of international migration: A review and appraisal . Population and Development Review, 19 (3), 431–466.
28. McMillan, MS, Rodrik , D., & Verduzco -Gallo, Í. (2014). Globalization, structural change, and productivity growth, with an update on Africa . World Development, 63 , 11–32. https://doi.org/10.1016/j.worlddev.2013.10.012
29. O'Brien, R. M. (2007). A caution regarding rules of thumb for variance inflation factors . Quality & Quantity , 41 (5), 673–690. https://doi.org/10.1007/s11135-006-9018-6
30. International Labor Organization. (2020). World employment and social outlook: Trends 2020. International Labor Organization.
31. Ratha , D. (2013). The impact of remittances on economic growth and poverty reduction . World Bank.
32. Rodrik , D. (2016). An African growth miracle? Journal of African Economies, 25 (5), 747–764. https://doi.org/10.1093/jae/ejw027
33. Stark, O. (1991). The migration of labor . Basil Blackwell.
34. Stiglitz , J.E. (2016). The great divide: Unequal societies and what we can do about them . WW Norton & Company.
35. Todaro , M. P. (1969). A model of labor migration and urban unemployment in less developed countries . American Economic Review, 59 (1), 138–148.
36. Todaro , M. P. (1997). Economic development (6th ed). Addison Wesley.
37. United Nations, Department of Economic and Social Affairs. (2019). International migrant stock 2019 . United Nations.
38. United Nations, Department of Economic and Social Affairs. (2022). International migration 2022 report . United Nations.
39. World Bank. (2020). World development indicators
40. World Bank. (2023). World development indicators
41. Wooldridge, J.M. (2016). Econometric analysis of cross section and panel data . MIT Press.