Impact of Migration on Economic Growth and Human Development: Case of Sub-Saharan African Countries

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Abstract

This study empirically examined the impact of migration on economic growth and human development in selected sub-Saharan African countries. The estimations were carried out in a panel of 19 selected sub-Saharan African countries over the period 1990 to 2013, using the two-stage least squares (TSLS) estimation technique. Two measures of migration, namely stock of international migrants and the ratio of personal remittances received to personal remittances paid were used in the study to carry out this investigation. The results conform to the findings of existing literature, namely that social expenditure, domestic investment, financial inclusion, income inequality, income and human poverty are significant determinants of either human development or per capita GDP in sub-Saharan Africa. The distinctive feature of the study is the significant but negative role played by migration in explaining human development and economic growth in the region. The results from the panel estimations reveal that an increase in the measures of migration deteriorates the level of human development and growth of the region.

Keywords: migration, economic growth, human development, poverty, sub-Saharan Africa

JEL Classification Numbers: C23, C26, F15, F22, F24, F63, O40, O55

1. Introduction and Background

Cross-border movements of people remain a continuous process across the globe and also a significant part of global integration. Migration has different effects on the growth and development of any particular country. In some countries, it is seen as a positive catalyst to achieve sustained and broad-based economic growth and development, while other countries experience or perceive migration to be a setback. This study empirically examined the impact of migration on economic growth and human development in the sub-Saharan African (SSA) region. The estimations were based on a panel of selected SSA countries.

The movement of people across regions and countries is subject to many factors which could originate both internally and externally. Wage differentials and also government policies that affect the wellbeing of society, especially the active population, have been identified mostly in empirical literature (i.e. Greenwood, 1969; Greenwood and Sweetland, 1972; Pack, 1973; Hare, 1999; Hunt, 2006; Gibson and McKenzie, 2011; Ackah and Medvedev, 2012; McKenzie and Salcedo, 2014) as the push and pull factors that make individuals and/or households decide to migrate. Higher relative wages at home or better work incentives from the government for skilled workers may be pull factors to reduce emigration and/or increase immigration, while on the other hand lower relative wages and lack of work incentives could be push factors which increase emigration and make the home country unattractive to immigrants.

Given the established push and pull factors that drive migration within and across countries, the effects of migration on economic growth and development of countries remain an empirical question that has not been fully investigated in empirical literature. Many studies (Friedberg and Hunt, 1995; De Haas, 2010; De Haas, 2012) have assessed the effects of migration and/or remittances on economic growth, poverty and human capital development, but most lack empirical econometric investigations. They do, however, all point out the significant potential effects that migration/remittance has on economic development. However, mixed results are found regarding the relationship between migration and economic growth and development and the few recent econometric investigations that have been carried out use remittance flows as a proxy for migration.

For instance, Chami, Fullenkamp and Jahjah (2005) investigated how migration can be a source of capital for development. They developed a model which suggests that remittances are not profit-driven (as foreign direct investment (FDI) and other capital flows are), but are compensatory transfers and should have a negative relationship with GDP growth. Their results reveal the negative relationship and suggest that remittances may not be a source of capital for economic development. However, the flow of workers' remittances continues to be a major source of external finance for developing countries

and therefore should be an instrument for alleviating poverty and inequality. Based on this line of thought, Acosta, Calderon, Fajnzylber and Lopez (2008) investigated the impact of international remittances on poverty and inequality among the Latin American and Caribbean countries using a panel data econometric technique. Their results confirm that increasing remittances have inequality- and poverty-reducing effects but with a relatively small magnitude. On the other hand, the study by Singh, Haacker, Lee and Le Goff (2010) on selected SSA countries found a negative impact of remittances on economic growth and suggests that this adverse effect dominates at least in SSA countries. Ngoma and Ismail (2013) investigated the impact of migrant remittances on human capital formation from a panel of 89 developing countries. The result shows that an increase in migrant remittance inflows by 1% will lead to about 2% rise in average years of schooling both at secondary and tertiary levels, thereby indicating that remittances have the potential to ease liquidity constraints.

The effect of migration on economic growth and development is also subject to the pattern of migration within a region. Migration within the region may have a more direct and positive effect on growth and development than migration outside of the region. The decision to migrate outside of a region could drain human capital that could have been used towards the production and development of the region. Disaggregating migrant flows to detect their origin and destination will strengthen the empirical link between migration and economic growth and development, but this remains a major challenge in the data collection capacity of most developing countries.

Against this background, this study examines the impact of migration on economic growth (measured by GDP per capita) and human development (measured by the human development index) within the context of sub-Saharan Africa. The link between migration and economic growth and development follows the growth-based, capacity-based and asset-based approaches to development as put forward by Sen (1999), Dollar and Kraay (2002), Fukuda-Parr (2003) and Moser (2007). This approach to estimating the growth and development impact of migration remains rare in empirical literature. Furthermore, two measures of migration were used in the study. Firstly, the ratio of personal remittances received (capturing rate of emigration) to personal remittances paid (capturing rate of immigration) was adopted and, similar to most empirical studies, was used as a measure of migration. This also incorporates the financial aspect – in terms of capital flows – of the impact of migration on growth and human development (Chami et al., 2005). The second measure was the number of migrants residing in a particular country and incorporates the non-financial aspect of the impact of migration on growth and human development.

In this context, this study investigates the rates of economic growth and human development at a given level of migration after controlling for other existing economic and non-economic factors. Economic growth and human development have been

empirically established to have bi-directional causality (Ranis, Stewart, and Ramirez, 2000; Suri et al., 2011). Therefore, economic growth and human development are determined separately and augmented by the two measures of migration discussed earlier. The models are estimated using the panel data technique which also correct for possible endogeneity. Endogeneity predicts that the independent variables in the models are determined by each other and may have been correlated with the error term. The study therefore adopted an instrumental variables regression (two-stage least squares) approach in order to derive robust estimates of the parameters in the models.

The results confirm the dual positive causality between economic growth and human development, but with a stronger effect from human development impact on economic growth. They also suggest that income and non-income poverty, financial and social inclusion, income inequality, social expenditure by government and domestic investment all have a major effect on income and human development levels in SSA countries. However, the rates of migration as measured and interpreted in the study tend to deteriorate the level of human development and per capita income. The exception is the link between the stock of migrants and per capita income growth, which revealed a strong positive relationship.

Section 2 which follow presents data analysis and stylised facts on GDP per capita, human development indicators, remittances flows and the stock of migrants, while Section 3 describes the methodology and estimation techniques used in the study. Section 4 explains the various estimation results and Section 5 concludes the study.

2. Data Analysis and Stylised Facts

The data used in this study have been obtained from the World Bank Databank, African Development Indicators, and IMF, International Financial Statistics database and in most cases the dataset is updated as used in Akanbi (2015). The data cover the period between 1990 and 2013 and 19 selected SSA countries. All data were accessed in 2015 and, where necessary, were measured in real terms (2005 prices) in US dollars and expressed in natural logarithms.

Following Akanbi's lead, the selected 19 SSA countries and time periods were based on the availability of data and this stands as one of the limitations of the study. Despite the inadequate data availability and weaknesses and the fact that the selected countries only represent about 39% of the 49 countries in the region, their geographical and socioeconomic representation remains highly significant. These countries recorded a significant economic and population size and are also spread across the sub-region. Six West African countries, 6 Southern African countries, 4 Eastern African countries and 3

Central African countries were included.[1] The countries' share of the region's total population and GDP is about 70% and 85%, respectively (Akanbi, 2015).

As explained by Akanbi (2015), availability and better quality data on development issues only began to materialise from the 1990s for most SSA countries; nevertheless there are still missing data points for some years. Therefore, to fill in the missing data points, an interpolation technique was adopted. Based on the nature of these data, the margins of error generated from the interpolation are highly insignificant and may not underestimate/overestimate the actual reported data.

Against the above background, the following provides a detailed explanation of how some variables used in the study were generated:

2.1 Measuring Migration

Two measures of migration were adopted in this study. The first measure relates to the widely adopted measure of remittance flows across countries, which are financial flows regarded as compensatory transfers. The use of remittance flows in this study as a measure of migration was based on the idea that changes in the levels of immigration or emigration in a particular country will be directly reflected in the amount of remittances received or paid. For instance, a rising level of immigration will translate into higher remittances paid; likewise, the rising level of emigration will lead to higher remittances received. Therefore, the ratio of personal remittances received (inflow) to personal remittances paid (outflow) is used as a measure of the level of migration.

The second measure of migration relates to the stock of migrants residing in a particular country. This deviation from the financial flows tends to capture whether the population of migrants in a country contributes directly to growth and development. As defined in the World Databank (2015), "international migrant stock is the number of people born in a country other than that in which they live. It also includes refugees. The data used to estimate the international migrant stock at a particular time are obtained mainly from population censuses. The estimates are derived from the data on foreign-born population (people who have residence in one country but were born in another country). When data on the foreign-born population are not available, data on foreign population (that is, people who are citizens of a country other than the country in which they reside) are used as estimates".

The major limitation of these measures of migration is the inability to detect the origin and destination of the migrants. Separating the effect of intra-African migration and inter-African migration from the data may reveal different trends and show how

[1] The countries investigated in the study are shown in Appendix A2.

immigration and emigration within and outside the region affect growth and development.

2.2 Measuring Human Development

The measure of human development adopted in this study follows the United Nations Development Programme (UNDP) human development index (HDI). The HDI serves as a way of measuring development by combining indicators such as life expectancy, educational level and income into a composite HDI. The HDI scores range from 0 to 1, with 0 representing the worst human development and 1 the best human development. Most of the HDI scores for sub-Saharan Africa remain below average, although there was a slight improvement between 1980 (0.37) and 2013 (0.5). Since the reported data span a 5-year period, the growth rate between each period was calculated and the average growth rate per year (growth rate divided by the number of years (5 years) in between) were used to generate the missing data points.

2.3 Measuring Poverty

The two measures of poverty adopted in this study strictly follow Akanbi's lead. The first measure of poverty (income poverty) follows the basic Foster-Greer-Thorbecke (FGT) index (Foster, Greer, and Thorbecke, 1984). This measure has three components: the incidence of poverty (absolute poverty), the depth of poverty and the severity of poverty.[2] The indices are calculated as follows:

$$P = \frac{1}{N}\sum_{i=1}^{Q}\left[\frac{Z-Y}{Z}\right]^{\alpha} \qquad (1)$$

where

N = population
Q = % of population living below poverty line (proxy = poor population)
Z = poverty line (World Bank estimate of US$2 per day)
Y = household final consumption expenditure per capita
α = poverty aversion parameter

α = 0, 1 and 2 for absolute, depth and severity of poverty, respectively. In line with existing literature (Akanbi and Du Toit, 2011; Ghani, Iyer, and Mishra, 2012; Akanbi, 2015), the study adopted the severity of poverty as a measure of poverty as it incorporates the level of inequality among the poor in society.

[2] More detailed explanations of the three components can be found in Foster et al. (1984) and Akanbi (2015).

The second measure of poverty (non-income) follows the human poverty index (HPI) developed by the UNDP (1997). The HPI is a composite index that brings together the different features of deprivation (i.e. survival, knowledge and standard of living) in the quality of life that are caused by non-income factors to arrive at an aggregate judgement on the extent of poverty in a community. Therefore, the indices are calculated as follows:

$$HPI = [\tfrac{1}{3}(P_1^{\alpha} + P_2^{\alpha} + P_3^{\alpha})]^{1/\alpha} \qquad (2)$$

P_1 = probability at birth of not surviving to age 40

P_2 = adult illiteracy rate

P_3 = unweighted average of population not using an improved water source and children underweight for age

α = 3 (weight for more acute deprivation)[3]

Unweighted average = 0.5* (% of population not using an improved water source) + 0.5* (% of children underweight for age)

2.4 Stylised Facts: Performance of Income (GDP Per Capita) and HDI in Relation to Migration Outcomes

In the selected SSA countries, a few basic trends have emerged over the past two and a half decades with regard to the level of human development, GDP per capita, remittance flows and the total number of migrant stock. Figure 1 (A & B) shows the levels in HDI, GDP per capita, share of personal remittances paid and received in total GDP and the international migrant stocks in the region.[4]

[3] See UNDP (1997) (technical note) and Akanbi (2015) for detailed analysis on the derivation of the above formula and more analysis on the derived HPI for selected SSA countries, respectively.

[4] To determine the actual trend, the averages of these series across the 19 selected SSA countries were calculated.

Figure 1: Performance of Income (GDP Per Capita) and HDI in Relation to Migration Outcomes

Figure 1A

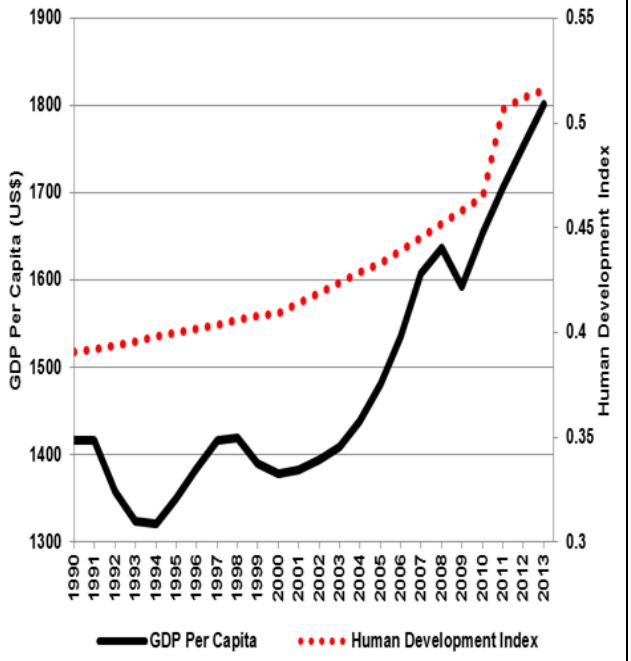
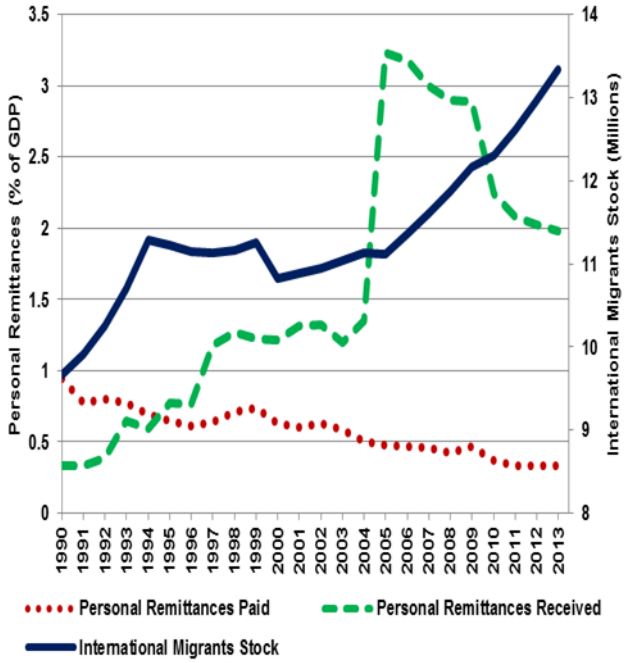


Figure 1B



Source: World databank (2015) and authors' calculations

From Figure 1A, it can be seen that GDP per capita increased on average by about 1.1% between 1990 and 2013, rising from about $1,420 in 1990 to $1,800 in 2013. This increase may have been perpetuated by the increase in the HDI – given that income is a component of HDI – which rose from a 0.4 index point to a 0.52 index point during the same period.

With regard to personal remittances paid and received, there seems to be a divergence between these two series. Remittances paid have been on a declining trend, falling from about 1% of GDP in 1990 to about 0.33% of GDP in 2013. Remittances received remained on a rising trend from 1990, recording about 0.33% of GDP and reaching a high of about 3.2% of GDP in 2006 and thereafter declining to about 2% of GDP in 2013. Before 1994, remittances paid in the selected SSA countries were greater than those received from outside the individual countries and thereafter payment fell below receipt. This is an indication that post-1990s a tremendous emigration of citizens in the region was experienced, and at the same time the region began to be an unattractive destination for immigrants. Despite this divergence, the stock of international migrants continued to increase from about 9.7 million in 1990 to about 13.3 million in 2013.

3. Methodology and Estimation Techniques

The underlying framework of the effects of migration on the economy is embedded in growth and development theories. As established in empirical literature, economic

growth and human development has bi-directional causality (Ranis et al., 2000; Suri et al., 2011). Building on this established framework, the study distinctively augments the effects of migration on economic growth and human development. In addition, the framework incorporates the growth-based, capacity-based and asset-based approaches to development and poverty reduction. Considering the bi-directional causality in empirical literature between growth and development, the study explains growth and human development as a function of social and financial inclusion, income and non-income poverty, social expenditure, income inequality, domestic investment and migration.

A panel data econometric technique (two-stage least squares (TSLS) estimation technique) was used to estimate the impact of migration on economic growth and human development in the selected SSA countries over the period 1990-2013. The econometric models are presented alongside their *a priori* sign below:

$$hdi_{it} = \beta_1 + \beta_2 gdppc_{it} + \beta_3 soc\_\exp_{it} + \beta_4 fin\_incl_{it} + \beta_5 soc\_incl_{it} - \beta_6 inc\_pov_{it} - \beta_7 gini_{it} \pm \beta_8 mig_{it} \pm e_{it} \quad (3)$$

$$gdppc_{it} = \beta_1 + \beta_2 hdi_{it} + \beta_3 fin\_incl_{it} + \beta_4 soc\_incl_{it} - \beta_5 hum\_pov_{it} + \beta_6 inv_{it} - \beta_7 gini_{it} \pm \beta_8 mig_{it} \pm e_{it} \quad (4)$$

where

hdi = level of human development

gdppc = level of GDP per capita

inc_pov = level of income poverty (FGT index)

hum_pov = level of human poverty (HP index)

fin_incl = level of financial inclusion/deepening

soc_incl = level of social inclusion

soc_exp = level of government expenditure on health and education

gini = level of income inequality

inv = level of domestic investment

mig = two measures of migration discussed earlier and used interchangeably in the models

e = error terms

The subscript it refers to country and time period, respectively. All variables are presented in their natural logarithm forms. The focus of the study was to determine the overall effect of migration on economic growth and human development, after controlling for other economic and non-economic fundamentals as additional explanatory variables in the model.

The GDP per capita is expected to pose a positive and bi-directional relationship with the HDI, as evidenced in the literature. Therefore, an increase in GDP per capita should improve the level of human development; likewise, an improvement in human development should lead to a rise in GDP per capita.

As mentioned earlier, income poverty and human (non-income) poverty are derived separately and used interchangeably in the models. The models were augmented by the two forms of poverty as an additional explanatory variable following empirical evidence of the bi-directional causation between GDP and poverty and the intuitive channel that there is a high correlation between human poverty and human development and income poverty and GDP per capita. Therefore, the study chose to investigate the link between human poverty and GDP per capita and income poverty and human development, The two variables are expected to pose negative relationships with HDI and GDP per capita, meaning that a rising level of income and human poverty is directly translated into falling levels of human development and GDP per capita, respectively.

The level of financial inclusion/deepening was measured by the growth in domestic credits extended to the private sector, while social inclusion was measured by the ratio of female to male labour force participation. Social expenditure was measured as the sum of government expenditure on health and education and domestic investment was measured by the gross fixed capital formation. These variables are expected to pose a positive relationship with either the level of GDP per capita or human development. The exception is the social inclusion variable, which could be ambiguous given the numerator and denominator effects of the variable (Akanbi, 2015). Both GDP per capita and human development is expected to deteriorate as income inequality (measured by the Gini index) widens.

The effects of the two measures of migration (ratio of personal remittances received to personal remittances paid and the stock of international migrants) on HDI and GDP per capita could be ambiguous, depending on the rate and quality of immigration and emigration within and outside the region. For instance, when the level of international migrant stock increases, the migrants are expected to contribute positively – through human capital development – to GDP per capita and the overall level of human development of the country in which they reside. On the other hand, the quality of immigrants and emigrants will also determine the extent to which they can contribute positively to per capita GDP and human development. If highly skilled citizens emigrate out of the region and immigrants coming in to the region are not skilled, this could lead to a falling level of GDP per capita and human development. As was the case in this study with a panel of selected SSA countries, a positive response of GDP per capita and human development to a rise in the ratio of personal remittances received to

personal remittances paid is an indication of the presence of intra-Africa migration; a negative response seems to indicate an absence of intra-Africa migration.

From the model specification in equations (3) and (4), there seemed to be a possible endogeneity problem among the regressors, thus rendering the use of ordinary least squares technique to be inappropriate in the estimation strategy. To resolve the issue of endogeneity in the models, an instrumental (TSLS) variable regression was adopted as the most appropriate technique to derive robust parameter estimates. To correct for possible omitted variables and error in variables, suitable instruments were used that were assumed to be highly correlated with the observed explanatory variables and uncorrelated with the error term (Wooldridge, 2010, pp. 89-115). The instruments used were one period lagged value of all independent and dependent variables in the model.

These instruments were entered into the reduced-form equations for the endogenous variables as follows:

From Equation (3)

$$gdppc_{it} = \alpha_1 + \alpha_2 gdppc_{it}(-1) + \alpha_3 soc\_exp_{it}(-1) + \alpha_4 fin\_incl_{it}(-1) + \alpha_5 soc\_incl_{it}(-1) + \alpha_6 inc\_pov_{it}(-1) + \alpha_7 gini_{it} + \alpha_8 mig_{it} + u1_{it}$$

$$soc\_exp_{it} = \chi_1 + \chi_2 gdppc_{it}(-1) + \chi_3 soc\_exp_{it}(-1) + \chi_4 fin\_incl_{it}(-1) + \chi_5 soc\_incl_{it}(-1) + \chi_6 inc\_pov_{it}(-1) + \chi_7 gini_{it} + \chi_8 mig_{it} + u2_{it}$$

$$fin\_incl_{it} = \delta_1 + \delta_2 gdppc_{it}(-1) + \delta_3 soc\_exp_{it}(-1) + \delta_4 fin\_incl_{it}(-1) + \delta_5 soc\_incl_{it}(-1) + \delta_6 inc\_pov_{it}(-1) + \delta_7 gini_{it} + \delta_8 mig_{it} + u3_{it}$$

$$soc\_incl_{it} = \gamma_1 + \gamma_2 gdppc_{it}(-1) + \gamma_3 soc\_exp_{it}(-1) + \gamma_4 fin\_incl_{it}(-1) + \gamma_5 soc\_incl_{it}(-1) + \gamma_6 inc\_pov_{it}(-1) + \gamma_7 gini_{it} + \gamma_8 mig_{it} + u4_{it}$$

$$inc\_pov_{it} = \lambda_1 + \lambda_2 gdppc_{it}(-1) + \lambda_3 soc\_exp_{it}(-1) + \lambda_4 fin\_incl_{it}(-1) + \lambda_5 soc\_incl_{it}(-1) + \lambda_6 inc\_pov_{it}(-1) + \lambda_7 gini_{it} + \lambda_8 mig_{it} + u5_{it}$$

$$gini_{it} = \pi_1 + \pi_2 gdppc_{it}(-1) + \pi_3 soc\_exp_{it}(-1) + \pi_4 fin\_incl_{it}(-1) + \pi_5 soc\_incl_{it}(-1) + \pi_6 inc\_pov_{it}(-1) + \pi_7 gini_{it} + \pi_8 mig_{it} + u6_{it}$$

$$mig_{it} = \rho_1 + \rho_2 gdppc_{it}(-1) + \rho_3 soc\_exp_{it}(-1) + \rho_4 fin\_incl_{it}(-1) + \rho_5 soc\_incl_{it}(-1) + \rho_6 inc\_pov_{it}(-1) + \rho_7 gini_{it} + \rho_8 mig_{it} + u7_{it}$$

From Equation (4)

$$hdi_{it} = \alpha_1 + \alpha_2 hdi_{it}(-1) + \alpha_3 inv_{it}(-1) + \alpha_4 fin\_incl_{it}(-1) + \alpha_5 soc\_incl_{it}(-1) + \alpha_6 hum\_pov_{it}(-1) + \alpha_7 gini_{it} + \alpha_8 mig_{it} + u1_{it}$$

$$inv_{it} = \chi_1 + \chi_2 hdi_{it}(-1) + \chi_3 inv_{it}(-1) + \chi_4 fin\_incl_{it}(-1) + \chi_5 soc\_incl_{it}(-1) + \chi_6 hum\_pov_{it}(-1) + \chi_7 gini_{it} + \chi_8 mig_{it} + u2_{it}$$

$$fin\_incl_{it} = \delta_1 + \delta_2 hdi_{it}(-1) + \delta_3 inv_{it}(-1) + \delta_4 fin\_incl_{it}(-1) + \delta_5 soc\_incl_{it}(-1) + \delta_6 hum\_pov_{it}(-1) + \delta_7 gini_{it} + \delta_8 mig_{it} + u3_{it}$$

$$soc\_incl_{it} = \gamma_1 + \gamma_2 hdi_{it}(-1) + \gamma_3 inv_{it}(-1) + \gamma_4 fin\_incl_{it}(-1) + \gamma_5 soc\_incl_{it}(-1) + \gamma_6 hum\_pov_{it}(-1) + \gamma_7 gini_{it} + \gamma_8 mig_{it} + u4_{it}$$

$$hum\_pov_{it} = \lambda_1 + \lambda_2 hdi_{it}(-1) + \lambda_3 inv_{it}(-1) + \lambda_4 fin\_incl_{it}(-1) + \lambda_5 soc\_incl_{it}(-1) + \lambda_6 hum\_pov_{it}(-1) + \lambda_7 gini_{it} + \lambda_8 mig_{it} + u5_{it}$$

$$gini_{it} = \pi_1 + \pi_2 hdi_{it}(-1) + \pi_3 inv_{it}(-1) + \pi_4 fin\_incl_{it}(-1) + \pi_5 soc\_incl_{it}(-1) + \pi_6 hum\_pov_{it}(-1) + \pi_7 gini_{it} + \pi_8 mig_{it} + u6_{it}$$

$$mig_{it} = \rho_1 + \rho_2 hdi_{it}(-1) + \rho_3 inv_{it}(-1) + \rho_4 fin\_incl_{it}(-1) + \rho_5 soc\_incl_{it}(-1) + \rho_6 hum\_pov_{it}(-1) + \rho_7 gini_{it} + \rho_8 mig_{it} + u7_{it}$$

Where $u1$ to $u7$ = error term

However, if $\alpha_2, \chi_3, \delta_4, \gamma_5, \lambda_6, \pi_7, \rho_8 = 0$ and all other parameters in the reduced-form equations are not equal to 0, then the structural equation is identified, because the instruments are relevant in the equation determining them. Furthermore, country-specific and time-specific characteristics were considered in the estimations under the assumption that, although these countries may have similar economic structures, there

are still major differences in their patterns of investment and they are exposed to different exogenous shocks at a particular point in time. Given this, the TSLS fixed effect estimation technique was therefore applied.[5]

4. Empirical Results

Based on the framework adopted above, the estimation results from the specified equations (3) and (4) are now presented. Given the two measures of migration used in the study, four estimated equations were performed in order to determine the varying impacts of migration on GDP per capita and human development. Balanced panel estimations were carried out with 437 pooled observations after the necessary adjustments had been made. After solving for the possible endogeneity problem that could render the coefficients invalid, the entire explanatory variables examined in both estimations were found to be statistically significant determinants of GDP per capita and human development. The exception was social inclusion, which remained statistically insignificant in all the estimated equations (Table 1).[6] This is an indication that the structural equation (TSLS) was identified and the instruments adopted were valid.

Table 1: Estimated coefficients for the determinants of domestic investment

Independent variables	Dependent variable			
	HDI		GDP per capita	
Ratio of remittances	-0.02 (-2.77)***		-0.03 (-2.4)**	
International migrant stock		-0.02 (-2.07)**		0.22 (9.96)***
Real GDP per capita	0.10 (1.94)**	0.20 (4.83)***		
HDI			0.90 (10.30)***	0.90 (11.15)***
Social expenditure	0.13 (5.53)***	0.10 (5.30)***		
Domestic investment			0.24 (7.70)***	0.31 (11.65)***
Financial inclusion	0.06 (4.92)***	0.05 (4.75)***	0.10 (3.88)***	0.10 (3.54)***
Social inclusion	0.06 (0.71)	0.08 (1.06)	0.05 (0.38)	0.1 (0.78)
Income inequality	-0.06 (-1.86)*	-0.07 (-2.21)**	-0.09 (-1.93)**	-0.11 (-1.84)*
Income poverty	-0.02 (-2.93)***	-0.01 (-2.16)**		
Human poverty			-0.47 (-3.87)***	-0.11 (-1.74)*
Constant	-5.11 (-19.17)***	-4.72 (-18.44)***	-0.62 (-0.87)	-3.93 (-5.62)***
Number of observations	437	437	437	437
R-square	0.94	0.95	0.99	0.99

Note: ***Significant at 1% level. **Significant at 5% level. *Significant at 10% level. T-statistics are recorded in parentheses.
Source: Author's calculation and analysis of data from Eviews 8.

[5] This technique circumvents the outliers that may exist in the data for some countries.
[6] It should be noted that in the case of a TSLS estimation, the coefficient of variations (R-square) presented are no longer valid since we can no longer decompose the variation in poverty into different independent components (Wooldridge, 2010, pp. 89-115).

The results from the estimations portray a robust parameter estimate and suggest that migration does not have much direct and significant economic effect on the level of human development in the region. The effects of the two measures of migration on human development are found to be similar and negative. That is, a 1% increase in the stock of international migrants and the ratio of remittances received to remittances paid will lead to about a 0.02% decline in the level of human development (Table 1). This is similar to the result found by Chami et al. (2005), who state that flows of remittances are regarded as compensatory transfers and should be negatively related to the growth in income. This also suggests that the pattern and flow of migration does not circulate within the region and has tended to drain out human capital to other regions of the world. By the same token, the stock of migrants residing in the region may be low-skilled migrants that do not contribute directly to the level of human development. On the other hand, the economic effect of the stock of migrants seems to be relatively significant and positive towards GDP per capita. With regard to the ratio of remittances received to remittances paid, the negative relationship and insignificant economic effect persist. A 1% increase in the stock of migrants and in remittances received relative to remittances paid will translate into about a 0.22% rise and a 0.03% decline in the level of GDP per capita, respectively (Table 1). This shows that, irrespective of whether migrants are low skilled, they will still render their services and earn some income, and this is added to the level of GDP and eventually GDP per capita. But with the rising level of emigration (especially skilled emigrants) outside the region, GDP per capita will tend to fall.

Looking at the effects of GDP per capita on human development – estimation of equation (3) – an increase in per capita GDP by 1% will lead to about a 0.1% improvement in the HDI when the ratio of remittances is used in the estimation. This effect is bigger – an improvement of about 0.2% – when the stock of international migrants is used in the estimation. An increase in social expenditure by 1% will translate into about a 0.13% and 0.1% improvement in HDI when the ratio of remittances and stock of international migrants are used in the estimations, respectively. By the same token, financial and social inclusion is found to have a positive impact on HDI. An increase in financial and social inclusion by 1% is expected to lead to about a 0.06% improvement in HDI when the ratio of remittances is used in the estimations. But when the stock of international migrants is applied to the estimations, HDI will improve by about 0.05% and 0.08% as financial and social inclusion increase by 1%, respectively. Income poverty and inequality are found to have an *a priori* negative relationship with HDI in both estimations. A fall in income poverty and inequality by 1% will translate into about a 0.02% and 0.06% improvement in the level of human development, respectively, when the ratio of remittances is used in the estimation. But the improvement in the HDI will be smaller (at 0.01%) for a fall in income poverty and bigger

(at 0.07%) for a fall in income inequality when the stock of international migrants is applied to the estimations.

With regard to the estimation of equation (4), which shows the effects of human development on per capita GDP, an improvement in HDI by 1% will lead to about a 0.9% increase in the level of per capita GDP both when the ratio of remittances and when the stock of international migrants is used in the estimations (Table 1). The almost one-to-one response of per capital GDP to changes in HDI is an indication that policy actions should be focused more on achieving higher development outcomes than higher income level for citizens. An increase in domestic investment by 1% will translate into about a 0.24% and 0.31% increase in GDP per capita when the ratio of remittances and stock of international migrants are used in the estimations, respectively. With financial inclusion, an increase of 1% is expected to lead to about a 0.1% increase in GDP per capita when the ratio of remittances and stock of international migrants are used in the estimations. But changes in social inclusion by 1% will increase GDP per capita from 0.05% to 0.1% when the ratio of remittances and stock of international migrants are applied to the estimations. Human poverty and income inequality are also found to have an *a priori* negative relationship with per capita GDP in both estimations. A fall in human poverty and income inequality by 1% will translate into about a 0.47% and 0.09% increase, respectively, in the level of per capita GDP when the ratio of remittances is used in the estimation. But the rise in the per capita GDP will be smaller (at 0.11%) for a fall in human poverty and bigger (at 0.11%) for a fall in income inequality when the stock of international migrants is applied to the estimation.

5. Conclusions

This study empirically examined the impact of migration on economic growth and human development using a panel of 19 selected SSA countries. The estimations performed after controlling for other determining factors portrayed a robust estimate of the parameters in the models. The stylised facts presented revealed a positive correlation between migration, GDP per capita and HDI, but the causal effect from the estimations stated otherwise.

The results from the panel estimations confirm that social expenditure, domestic investment, financial inclusion, income inequality, income and human poverty are significant determinants of either human development or per capita GDP in sub-Saharan Africa. This corroborates the existing literature. The dual causal relationship between human development and per capita GDP reveals that the impact of human development on per capita GDP is stronger than the impact of per capita GDP on human development. This indicates an important policy implication that considerable effort from the government should be made on improving the human capabilities of its population but without undermining efforts to grow the economy.

The distinctive feature of this study was to investigate the significant role played by migration in explaining the level of human development and per capita GDP in sub-Saharan Africa. The results of the panel estimations reveal that the rates of migration as measured and interpreted in the study tend to deteriorate the level of human development and per capita income. This is except for the link between the stock of migrants and per capita income growth, which revealed a strong positive relationship. This suggests that the pattern and flow of migration does not circulate within the region and has tended to drain out human capital to other regions of the world. By the same token, the stock of migrants residing in the region may be low-skilled migrants that do not contribute directly to the level of human development.

Moreover, availability of quality data especially on migration flows remains the major limitation of this study. Improvement in this area will surely improve the parameter estimates of the models specified in the study.

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