

The impact of skilled labour migration on remittance growth and development in Africa

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ABSTRACT

This study examines the impact of skilled labour migration on remittance growth in Africa using a general equilibrium. The demand for labour in USA has increased and the change in levels of remittances and savings is observed. The study finds that in general, labour migration has a positive impact on remittances but skilled labour migrations seem to have a larger impact. Further, it uses panel data analysis to explore the impact of remittances in the five East African countries where a positive relationship between remittances and economic growth is observed. This results show that although skilled labour migration has traditionally been seen as damaging for African countries, it could have positive impact through the remittance channel.

Keywords: Remittances, skilled labour migration, GMig2.

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INTRODUCTION

The debate on the impact of international migration on development in Africa has been dominated by the plight of refugees and the protracted refugee situation in Africa. The growing number of refugees has not been easy on the hosting countries like Zambia and Kenya. Most of the refugees are confined in camps where they are able to receive basic protection and assistance. However these camps are seen to perpetuate poverty and underdevelopment because they inhibit freedom (Norwegian Refugee Council, 2003). In order to ease the burden of refugees, there has been an effort of conflict resolution in the war-torn countries by the United Nations and African Union through peace building initiatives coupled with the refugee repatriation efforts by United Nations High Commissioner for Refugees (UNHCR).

Another approach used by UNHCR to solve the refugee problem is promoting third country resettlement initiatives. The resettlement country provides the refugee with legal and physical protection, including access to civil, political, economic, social and cultural rights similar to those enjoyed by nationals which allow for refugees to become naturalized citizens. According to UNHCR (2008) providing for effective integration for these refugees is beneficial for both the resettled refugee

and the receiving country and hence governments and non-governmental organization partners provide services to facilitate integration, such as cultural orientation, language and vocational training as well as programs to promote access to education and employment. For instance, Forced migration Review (Norwegian Refugee Council, 2003) reports that Sudanese refugees who have been resettled in USA have always retained some ties with the homes they leave behind. With the recent technology advancement in the 21st century, these immigrants are able to send money back home to support the families that they left behind some of who still leave in refugee camps. Given these recent trends of financial inflows from refugees in the Diaspora, it is unclear how these remittances most of which are undocumented will impact on the countries of origin in the long run.

The loss of skilled Africans to the developed world through international immigration has been another big challenge in Africa (UN, 2006). Many African countries face the challenge of skilled workers migrating to developed countries in search of better paying jobs and this has a serious impact in the already constrained human resource capacity. Bhorat et al. (2002) identify

both push and pull factors that have been responsible for skilled migration in South Africa. They identify push factors such as deteriorating quality of life, safety and security issues. The main pull factor is technological revolution in the developed world. The International Organization for Migration (IOM) has used the concept of Return Qualified African Nationals (RQAN) Programme in an attempt to check the brain drain problem which is aimed at checking emigration of highly skilled workers (Musonda, 2006). While many African countries including Kenya and Uganda have adopted this programme in the past, there is a paradigm shift where countries have recently turned their attention to mobilizing the diaspora by sensitizing them on development objectives and opportunities without necessarily promoting return.

There is growing evidence that international migration has positive effects on social and economic development in Africa. Remittances from the wages of migrants abroad, and the income multipliers they create, are critical resources for the sustenance strategies of receiving households. The extra resources at the disposal of these households in turn make them agents of local and national development (UNECA, 2006). In developing countries, remittances have been found to be the second largest source of external financing after foreign direct investment (IMF, 2005). Migrants have been seen to transfer more funds during hard times to help their families and friends. According to IMF (2005), the United States is the largest source of remittance outflows followed by Saudi Arabia, Switzerland and Germany. Studies have shown that remittances have reduced poverty headcount ratio in low income countries such as Uganda by enabling recipients to move up to a higher income group. Remittances can improve a country's credit worthiness and enhance its access to international capital markets. The ratio of debt to exports, a key indebtedness indicator, decreases significantly when remittances are included (IMF, 2005). In Turkey, remittances have been seen to help ease an unemployment problem and to improve the balance of payments (McDonald et al., 2006). As stated in the 2006 Global Economic Outlook (World Bank, 2006) domestic policies and an investment-friendly climate can significantly increase the contribution of remittances and migration to improved living conditions in the home countries in which case migration remains an important force for fighting poverty.

Given that remittances have a great potential in improving the poverty levels and unemployment in developing countries, African governments should be on the forefront to encourage skilled labour migration as one way of fighting poverty and unemployment. However, since there are also negative aspects of migration, it is important to quantify both the benefits and costs of skilled migration. This study uses a general equilibrium approach and GTAP database to

study the patterns of skilled labour migration from Africa in order to identify the major receiving countries and quantify the impact this has on growth of remittances to receiving countries. Further, the study uses a panel data analysis and World Bank remittance data to investigate the impact of remittance growth on the development of East African countries.

The study hopes to generate evidence on how emigrants can be instrumental in spurring growth in their home countries by remitting back their incomes and this is likely to have a multiplier effect. This is important for the East African Community as the partners gear themselves up to greater regional integration.

RECENT TRENDS IN LABOUR MIGRATION AND REMITTANCE IN EAST AFRICA

Migration patterns are complex and their implications for development need to be properly understood. In most East African countries, two types of migration flows can be identified - "forced" and "voluntary". Forced migration includes refugees and asylum seekers, whereas voluntary migrants include both skilled and unskilled workers who are either pushed out by the adverse socio-economic conditions in their home countries or are attracted by better career opportunities existing in the wealthier countries. In Uganda the last decade has seen a significant number of both skilled and unskilled Ugandans move out of the country in search of employment. Skilled labour has mainly migrated to America and Canada (Shitundu, 2006).

Majority of the emigrants from Kenya are professionals, technicians and business persons who migrate to seek opportunities in USA, Canada, UK and other European Countries. Migration has diverse consequences for both migrants and the country. While some migrants may get employment opportunities, better incomes and access to superior health, others end up in low quality jobs even below their academic qualifications. To the country, it is a loss of talent and investment on one hand and on the other, creation of employment opportunities for those left behind (Shitundu, 2006).

In 2010, Uganda recorded the highest number of emigrants 757.5 thousand which represented 2.2% of the population. The stock of emigrants in Kenya stood at 457.1 thousand which was only 1.1% of the population. For Tanzania, the stock of emigrants was 316.9 thousand (0.7% of population, Rwanda was 263.4 thousand (2.6% of population while Burundi was 356 thousand accounting of 4.2% of the population. However, given that according to the World Bank stock of emigrants also includes refugees, which implies that comparing the stock of emigrants with the remittance rates would be misleading in the sense that countries with large numbers of refugee emigrants will have lower remittances. Figure 1 compares the stock of emigrants

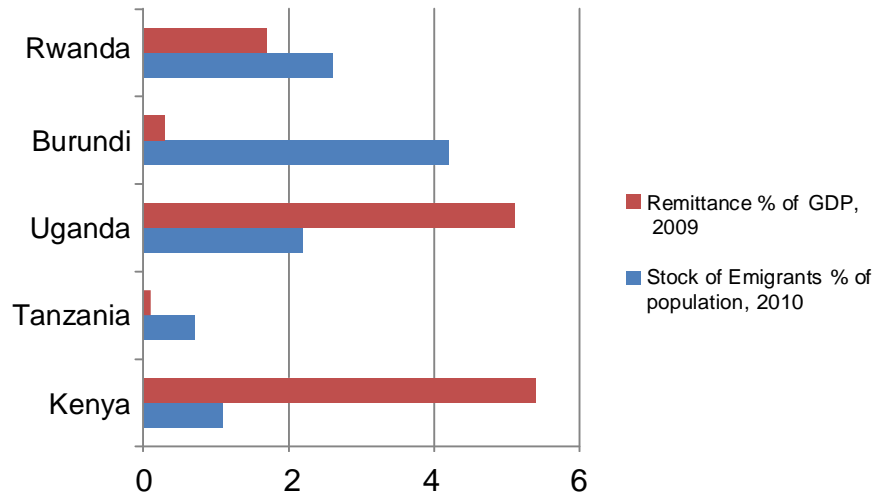


Figure 1. Stock of emigrants (% of Population, 2010) and Remittances (% of GDP, 2009). Source: World Bank Database.

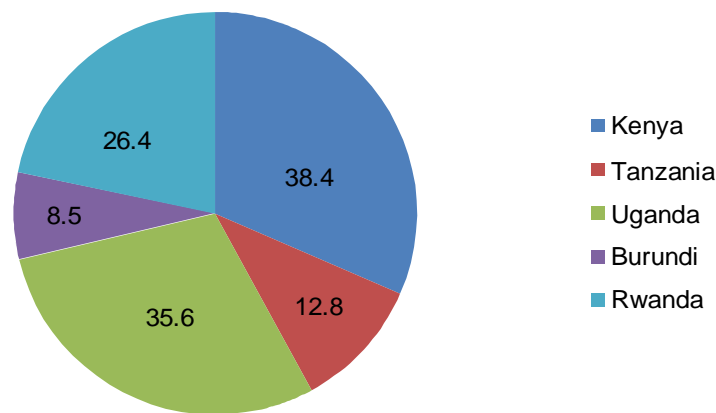


Figure 2. Emigration rate of tertiary-educated population, 2000. Source: World Bank Database.

with remittances.

This comparison shows that with a very small stock of emigrants, Kenya is leading in remittances while Burundi which has the highest stock of emigrants (% of population) has very low remittances. To give a better picture, it is important to consider emigration of skilled workers who are the source of remittances. Figure 2 presents the emigration rate of the tertiary educated population for the year 2000 in the East African region. This represents skilled labour migration.

Kenya recorded the highest rate of skilled emigration in 2000 followed by Uganda. The rate of skilled emigration in Rwanda was 26.4% while that of Tanzania was 12.8%. Burundi recorded the lowest rate at 8.5%. Given that skilled workers are expected to contribute more in remittances, this agrees with the earlier proposition that Kenya has the highest remittance inflows in the region while Burundi has the lowest remittance inflows.

It is important to examine the implication this trend has on development in the region. The debate on the impact of international migration on development in Africa has largely been shaped by the loss of skilled Africans to the developed world (UN, 2006). Since it may not be possible to stop emigration of talented and educated Africans, it is important that policies be developed to enable the African countries to benefit from the contributions of their citizens abroad. There is growing evidence that international migration has positive effects on social and economic development in Africa due to the fact that Africans living overseas have returned a considerable amount of their earnings to families in home countries. According to ECA (UNECA, 2006), remittances from the wages of migrants abroad, and the income multipliers they create, are critical resources for the sustenance strategies of receiving households. Remittances have become more significant as a source of external financing in developing

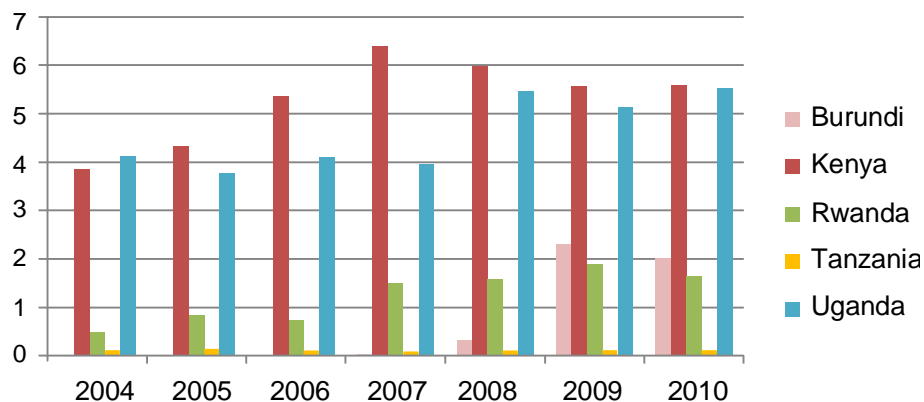


Figure 3. Remittances as a % of Gross National Income. Source: World Bank Database.

countries because they are seen to be more stable than other foreign currency flows.

Remittances have proven to bring macro-economic and household impacts in many African countries including Sub-Saharan Africa (Gupta et al., 2007; Baldé, 2009). Figure 3 presents the trend of remittances in the East African region.

It is evident that Kenya recorded the highest level of remittances in the region for all years followed by Uganda. For Rwanda there has been an increasing trend in remittances as well as Burundi especially for the last three years. Remittances to Tanzania have been very low for all years. The trend of skilled emigration is related to the remittance trend. For the years 2003 to 2008, the average workers remittance was 458.2 million for Kenya, 419.8 million for Uganda, 22.7 million for Rwanda, 7.2 million for Tanzania and 0.67 million for Burundi. This clearly shows that the more the emigration of skilled workers, the more the remittances.

Given the relationship in the trend of skilled labour migration and remittance in East Africa, it is imperative to quantify the impact of skilled labour migration on the level of remittance and further examine if this has any impact on the development of the sending countries which are the five East African Countries.

IMPACT OF SKILLED LABOUR MIGRATION IN LITERATURE

Parsons et al. (2005) examined the global migration patterns and found that most migrants from developing countries (North Africa and the Middle East – MENA) are hosted in neighbouring countries with the region accounting for 34% of all migrants from the region. This may be understood from the point of view that these are the regions that are very prone to political instability causing a lot of cross-border movements of refugees. Another significant destination of migrants from the MENA region is Europe receiving 22% of these

migrants. This study however looks at the stock of migrants but does not distinguish between voluntary migration and forced migration as may be the case in most African countries. Further, the length and purpose of stay may be significant in determining the benefits of migration.

Recent studies have explored the benefits of free movement of labour to both sending and receiving countries. Using the Global Migration Model (GMig), Walmsley and Winters (2005) demonstrated that free movement of natural persons would significantly increase global welfare with the majority of benefits accruing to developing countries. Walmsley et al. (2007) use Gmig2 Data Base to examine the global labour migration patterns and find that the developing countries are the primary exporters of labor while the labour importers are the developed or richer developing economies. United States is found to be the largest importer of labour with 19.7% of all migrant workers living in the USA. The study also finds that migrant workers account for a significant part of the labour force in some developing countries including Saudi Arabia with 23% of the labor force being migrant workers, Australia with 20.9% , Canada with 18.3% and, USA where migrant workers account for 12.5% of the labour force.

The major concern of labour migration from African countries has been brain drain whereby skilled workers, most of who have been educated using taxpayers money, often have an incentive to migrate in search for better pay and living conditions while there is an expectation that they should remain and work in their countries and pay taxes to support the next generation. Walmsley et al. (2007) observe that more skilled workers migrate as compared to unskilled workers even when migration is within the same region. It is also evident from the study that migrants from African countries are skewed towards skilled workers as shown by the selection-skill bias index. For instance Uganda has an index of 9.67, Madagascar has an index of 9.48 and Mozambique has an index of 3.51 which are the

highest index reported (excluding China). It is also evident from their study that most of the migrants to USA are skilled workers. Walmsley et al. (2007) show that increasing the quotas of the developed labour-importing economies by 3% of their labour forces has an overall positive impact on world income as people move from low to high productivity locations. However, they assume a uniform increase in both skilled and unskilled labour force.

Given the significance of remittances in the labour migration debate, it is important to establish whether the bias towards skilled migration already established in literature increases remittance levels in the labour exporting countries. This is an important aspect that none of the reviewed studies have explored although it is an important factor in analyzing the benefits of voluntary labor migration.

REMITTANCES AND ECONOMIC GROWTH IN LITERATURE

Baldé (2009) use unbalanced panel and a Two Stage Least Stage (TSLS) instrumental variable method to estimate the impact of remittances on growth in 29 Sub-Saharan African countries from 1980 to 2004 and find that remittances do not have any direct impact on economic growth. However, he suggests that remittances promote growth through indirect channels such as saving, investment, financial development and education.

Jongwanich (2007) examines the impacts of remittances on growth and poverty in selected Asian and the Pacific countries using panel data over the period 1993 to 2003 and *Generalized Method of Moments* (GMM) method. He concludes that remittances seem to have a positive but marginal impact on economic growth in Asia and the Pacific countries through the improvement of domestic investment and human capital and a direct impact on poverty reduction through increasing income, smoothing consumption and easing capital constraints of the poor. Gupta et al. (2007) assess the impact of remittance flows on poverty in sub-Saharan Africa (SSA) and find that remittances have a direct poverty mitigating effect, and promote financial development. Fayissa (2008) explores the aggregate impact of remittances on economic growth within the conventional neoclassical growth framework using an unbalanced panel data spanning from 1980 to 2004 for 37 African countries and find that remittances boost growth in countries where the financial systems are less developed by providing an alternative way to finance investment and helping overcome liquidity constraints. In another study, Fayissa and Nsiah (2011) estimate the macroeconomic impact of remittances and several control variables on the economic growth and find that remittances have a statistically significant long-run impact on economic growth for all the three regions.

Given that labour mobility is one of the considerations of the East African common market protocol, the impact of remittances on development in the region is an important factor worth considering. None of the reviewed studies have studied remittances and development in East Africa and this is the gap that this study seeks to fill.

EMPIRICAL MODELS

Modeling skilled labour migration and remittances in the GMig2 model

This study uses the Bilateral Labor Migration Model (GMig2) due to Walmsley, Winters and Ahmed (2007) together with the GMig2 database due to Walmsley et al. (2007). This database is based on the GTAP 6 Data Base (Dimaranan and McDougall, 2005) but includes data on bilateral population, labor by skill, wages and remittances which makes it very useful in modeling migration and remittance issues.

The remittance analysis in this study follows Walmsley et al. (2005) who look at the remittance per person living abroad and conclude that regions that paid higher wages also had the highest remittances outflows. However, this study examines the migration patterns of skilled labour from the MENA region and assumes that they are attracted by higher incomes abroad. Their choice of destination countries is assumed to be determined by the migrant labour force demand as has already been established by Walmsley et al. (2007).

This study only examines the impact of skilled labour migration on households' income (YH) which is modeled as follows. There are two sources of households' income; primary factor income (FY) that comes from the sale of factor services and from the remittances (REMITs). Therefore, household income (YH) is defined as:

$$YH(r,s) = FYS(r,s) + REMITS(r,s)$$

Where

YH(r) is the income of households from r; FYS(r,s) is primary factor income in r net of depreciation; REMITS(r,s) is remittances from people from r and in s.

To implement this, two experiments are conducted on the GMig2 model. The first experiment is to increase both the demand of skilled and unskilled labour to USA which has been established as one of the main recipients of migrants from Africa by 10% in the GMig2 model. The assumption here is that the better living and working conditions in the USA will attract both skilled and unskilled migrants. The second experiment assumes that only skilled migrants will be attracted by the better living and working conditions in the USA and

increases the skilled labour demand by 10% leaving unskilled labour demand unchanged. In both experiments, the impact on savings, stock of labour force, value of wages, remittances and household incomes is observed for the USA as the host region and MENA as the sending region. In order to examine whether the change in demand for labour affects neighbouring countries, the impact of these changes will also be observed for Canada which also is a major host region for African migrants. The impact on the households in the MENA region will also be observed.

Modeling remittance and economic growth

The empirical analysis of the role of remittances on economic growth involves an estimation procedure based on a panel data model, in which GDP growth rate is the dependent variable and remittances the independent variable. It also involves a number of control variables which include lagged GDP per capita, Inflation, Terms of Trade, ODA and FDI. The basic panel data model is specified as follows:

$$it = \beta_0 + \beta_1 \text{REMIT}_{it} + \beta_2 Y/P_{it-1} + \beta_3 \text{ODA}_{it} + \beta_4 \text{FDI}_{it} + \beta_5 \text{TOT}_{it} + \beta_6 it + \varepsilon_{it}$$

Where

it : is annual percentage growth rate of GDP at market for country i in year t

REMIT_{it} : is migrants remittances as a percentage of GDP in country i in year t . Y/P_{it-1} is the lagged GDP per capita for country i in year t

ODA_{it} : is the net official development assistance (ODA) received by country i in year t

FDI_{it} : is the net inflows of investment to country i in year t

TOT_{it} : is the net barter terms of trade index for country i in year t

it : is the rate of inflation measured by the change in the index of consumer prices in country i in year t

B_i : is a vector of parameters to be estimated and ε_{it} is the error term

The model will be estimated first using a pooled OLS method. Using pooled OLS in a panel data setting implies that the panel data characteristics of the data are ignored. There is a potential danger of having standard errors that are understated and significance levels which are overstated although the coefficients may be consistent. To ensure that the estimation results are efficient, a panel data model is estimated whereby a choice between a fixed effects model and random effects model is informed by the Hausman test. While many scholars have included both investment and remittances as explanatory variables in the models estimating the

impact of remittances on growth (Jongwanich, 2007; Fayissa, 2008), Balde (2009) notes that investment is the main channel through which remittances affect growth which presents a risk of colinearity bias in the model. Rapoport and Docquier (2005) argues that this bias is the reason that some studies have reported a negative impact of remittances on economic growth in developing countries (Ralph et al., 2003). In this case if the presence of collinearity is confirmed, the model will be estimated at two levels as suggested by Balde (2009) first including all the explanatory variables and secondly omitting FDI in the set of explanatory variables so that the results are more robust.

RESULTS AND DISCUSSION

General equilibrium from GMig2 model simulations

In order to evaluate the effect of the experiments on the GMig2 model it is important to understand the behavior of the variables of interest in the base data for the three regions; USA, Canada and MENA and compare them with the results from the two experiments.

Table 1 presents the level of savings from the base data and after the two experiments. Examining the changes in the level of savings after the two experiments, it is observed that an increase in the demand for both skilled and unskilled labour has a greater impact on savings than the increase in the demand for skilled labour alone in all regions.

Examining the impact of the increased demand of migrant workers in the USA, labour migrants from MENA region cause a 0.3% increase in the USA labour force stock of which of which 35% are unskilled and 65% are skilled; a 0.1% increase in the Canada labour force stock of which 30% are unskilled and 70% are skilled; and a 97% increase in the MENA region of which 77% are unskilled and 23% are skilled as reported in Table 2.

Examining the value of wages for the two groups in the three regions, the value of wages for skilled workers in USA is 7.7 million compared to only 3 million for unskilled workers. For Canada, the value of wages for skilled workers is 1.1 million compared to only 0.5 million for unskilled workers.

For MENA region, the value of wages for skilled workers is 8.4 million compared to 215.2 million for unskilled workers. This shows that migrant labour force is generally attracted by higher wages and will normally migrate to areas where they are likely to get the highest value for their labour. Examining the level of remittance for migrants from MENA region in the base data, migrants from MENA living in the USA remit 25% of their earnings of which 27% is from unskilled labour and 73% from skilled labour, those living in Canada remit only 4% of their earnings of which 27% is from unskilled labour and 73% from skilled labour and those in the MENA region remit 23% of their earnings of which 63%

Table 1. Comparison of level of savings in regions in millions of USDs.

Region	Base data	Experiment 1		Experiment 2	
		In USD	% Change	In USD	% Change
USA	610	629.4	3%	617.2	1%
Canada	96.9	97.9	1%	97.3	0.4%
MENA	123.3	124.7	1%	124.2	0.7%

Source: Simulations using GMig2.

Table 2. Relationship between structure of labour force, wages and remittances in base data.

Variable/region	USA		Canada		MENA	
	Skilled	Unskilled	Skilled	Unskilled	Skilled	Unskilled
Structure of labour force	65%	35%	70%	30%	23%	77%
Value of wages (in millions)	7.7	3	1.11	0.45	8.4	215.2
Level of remittances	73%	27%	73%	27%	37%	63%

Source: Simulations using GMig2.

Table 3. Relationship between structure of labour force, wages and remittances after experiment 1.

Variable/region	USA		Canada		MENA	
	Skilled	Unskilled	Skilled	Unskilled	Skilled	Unskilled
Structure of labour force	63%	37%	70%	30%	23%	77%
Value of wages (in millions)	14.5	6.4	1.12	0.46	8.6	216.4
Level of remittances	44%	56%	50%	50%	44%	56%

Source: Simulations using GMig2.

is from unskilled labour and 37% from skilled labour.

As described earlier, experiment 1 seeks to increase the demand of both skilled and unskilled labour in the USA by exogenously increasing the quota uniformly at a 10% increase. The relationship between Structure of Labour force, Wages and Remittances is reported in Table 3.

Change in labour force from MENA to USA changes by 0.6% an increase of 0.3%. However, the flow of labour from MENA to Canada and MENA regions remains the same at 0.1 and 97% respectively. Looking at the structure of labour force, while there is a slight shift in the stock of migrant labour force in the USA where the share of skilled labour force in the total change in labour force falls by 2 points with that of unskilled labour force increasing by 2 points, there is no change in the shares for Canada and MENA regions. It is interesting to note that the value of wages in the USA has doubled for both skilled and unskilled workers but there is no change in Canada and MENA region.

Looking at the changes in household incomes of migrants from MENA countries living in different areas, the income of those living in the USA changes by 71% while the income of those living in Canada increases by 0.7%. The incomes of those in the MENA region

increases by 0.9%. Looking at the change in remittances flowing from USA to MENA region, this has increased by 73% whereby 56% of the increase is attributed to unskilled labour and 44% to skilled labour. Primary factor income in the USA grew by 0.9%, in Canada by 0.1% and in MENA region by 97%. Remittances from Canada have grown by 0.6% the change being distributed equally between skilled and unskilled labour. Remittances from MENA region grew by 0.4%, 52% being from unskilled labour and 44% from skilled labour.

Experiment 2 considers the fact that USA is more interested in skilled migrants as opposed to unskilled workers. As reported earlier the skilled workers are likely to move to the USA because they have a higher value of wages while unskilled workers will look elsewhere where the value of their wages is greater. In that case, an assumption that only the demand for skilled migrants increases is reasonable. The experiment therefore seeks to increase the demand of only skilled labour leaving the demand of unskilled labour constant in the USA by exogenously increasing the quota for skilled labour by 10%. The relationship between Structure of Labour force, Wages and Remittances is reported in Table 4.

Change in labour force from MENA to USA changes by 0.5% which is higher than that of the base data by

Table 4. Relationship between structure of labour force, wages and remittances after Experiment 2.

Variable/region	USA		Canada		MENA	
	Skilled	Unskilled	Skilled	Unskilled	Skilled	Unskilled
Structure of labour force	78%	21%	70%	30%	23%	77%
Value of wages (in millions)	14.3	3.0	1.11	0.46	8.6	216.4
Level of remittances	99%	1%	49%	51%	39%	61%

Source: Simulations using GMig2.

Table 5. Summary statistics.

Variable	Mean	Standard deviation
GDP growth rate	5.59	2.846
Remittances	2.21	2.27
ODA	16.34	13.604
FDI	1.85	1.97
GDP per Capita	349.78	180.17
Inflation	8.3	5.48
TOT	111.5	33.42

Source: Computed from Stata.

0.2% but lower than experiment 1 by 0.1%. Again the flow of labour from MENA to Canada and MENA does not change. Looking at the structure of labour force, there is a big change in the stock of migrant labour force in the USA where the share of skilled labour force in the total change in labour force increases by 15% with that of unskilled labour force falling by 15%. However, there is no change in the shares for Canada and MENA regions. Comparing the value of wages with those reported in the base data, the value of wage doubles in the USA doubles for skilled but remains unchanged for unskilled workers but there is no significant change in the case of Canada and MENA regions.

Examining the household incomes of migrants from MENA countries living in different areas, the income of those living in the USA changes by 73% while the income of those living in Canada increases by only 0.4%. The incomes of those in the MENA region increases by 0.8%. Primary factor income in the USA grow by 0.9%, in Canada by 0.1% and in MENA region by 97% which is the same as in experiment 1. Looking at the change in remittances flowing from USA to MENA region by skills, remittances increased by 73% up from 71% in experiment 1 where 99% of the increase is attributed to skilled labour and only 1% to unskilled labour. In the case of remittances from Canada grew by 0.45 with 51% is attributed to unskilled and 49% to skilled labour. In the MENA region, remittances from the region increased by 0.4% with 61% of the increase being attributed to unskilled labour and 39% to skilled labour.

In summary the simulations done on the GMig2 model

show that when a region targets the kind of labour that is more productive in their region, it will have greater impact on remittances.

Increased labour migration has a positive impact on both savings and remittances in all regions. In the USA where labour demand increased, the level of remittance from skilled labour is higher than that remittances from unskilled labour though these effects don't seem to have a spillover effect in Canada and the MENA region. The modest increase in the value of wages in the USA does not affect the value of wages in other regions

Panel data model

This analysis begins by presenting the summary statics of the variables used in the estimation as presented in Table 5

Examining the summary statistics, the mean growth rate for the 11 years period in the 5 East African countries is 5.6 though with a modest standard deviation while the average remittance is 2% of GDP. The mean per capita income is 349.8 with very large variations. Mean inflation in the region is 8.3 but also varies moderately. For ODA and TOT, the means are 16.3 and 111.5 respectively with very large standard deviations. The variations in most of these economic variables could be understood from the fact that the five countries differ greatly in their level of development and the economic environments they operate in.

The econometric model is estimated first as a pooled

Table 6. Pooled OLS and fixed effects estimation results.

Variable	Pooled OLS	Fixed effects
Constant	1.788 (2.209)	3.039* (1.696)
Remittances	-0.132 (0.137)	0.429 (0.490)
ODA	0.032 (0.029)	0.063* (0.037)
FDI	0.596*** (0.161)	0.299*** (0.004)
GDP per capita	0.004**(0.002)	0.003 (2.209)
Inflation	-0.199*** (0.063)	-0.095* (0.061)
TOT	0.022* (0.013)	-0.002 (0.014)
R-squared	0.35	0.14
N	55	55

Source: From pooled OLS estimation using Stata. The figures in parentheses are the standard errors. ***, **, and * denote significance levels at 1, 5 and 10% respectively based on t-statistics.

OLS model. However, it should be noted that using pooled OLS in a panel data setting implies that the panel data characteristics of the data are ignored. There is a potential danger of having standard errors that are understated and significance levels which are overstated although the coefficients may be consistent. The pooled OLS results are reported in Table 6.

From the pooled OLS results, remittances and ODA have no significant impact on growth of GDP. In fact, remittances seem to have a negative impact on growth of GDP. All the other factors namely FDI, GDP per Capita and TOT have a positive and significant impact on growth of GDP which agrees with results from earlier studies. Inflation has a negative and significant relationship with growth of GDP which is expected. The R^2 is quite low implying that the model has a low goodness of fit.

To ensure that the estimation results are efficient, a panel data model is estimated. There are two common models for panel data estimation; a fixed effects model and a random effects model; which differ in their assumption of the error term. The fixed effects model assumes that the error term u_{it} and the regressors are correlated through the firm specific effects such that $E(x_{it}, u_{it}) \neq 0$.

For a random effects model, it is assumed that this correlation does not exist and hence $E(x_{it}, u_{it}) = 0$. To decide which of the two is appropriate, a Hausman test is performed whose null hypothesis is 'coefficients estimated by the efficient random effects estimator are same as those estimated by the consistent fixed effects estimator'. If they are, implied by an insignificant P-value, then it is safe to use random effects. However, if the P-value is significant, fixed effects model should be used. Estimating both a fixed effects model and random effects model and performing the Hausman test, a P-value of 0.00 is obtained which is significant making the fixed effects model appropriate. A fixed effects model is estimated and the results reported in Table 6.

Examining the results of the fixed effect model, ODA,

FDI and Inflation are significant in explaining GDP growth. The marginal effects of FDI and ODA on GDP growth are positive while that of Inflation is negative. This agrees with pooled OLS results. Although Remittances, GDP per Capita and TOT all have the expected signs as observed earlier in pooled OLS model, they are all insignificant in explaining GDP growth. The R-squared gives a very low explanatory value of the model that stands at only 14%. However the F-test is significant at 5% level which is an indication that the model as a whole has statistically significant predictive capability. Given this fact, we can make inference about the reported coefficients.

Among all the funding alternatives in the model which are ODA, FDI and remittances, remittances seem to have a 43% positive impact on economic growth while FDI and ODA have 30 and 6% impact respectively on economic growth. This seems to agree with the widely held perception that remittances are becoming a more significant source of investment funding than other sources such as FDI. However, these results need to be treated with caution given the fact that remittance is not significant in the model.

The test for multi-collinearity bias is performed and multi-collinearity is ruled out from the correlation matrix and also by examining the Variance Inflation Factors (VIFs). In this case, omitting FDI in the regression is not necessary. Moreover, the coefficient of remittances in the fixed effects model is positive as expected.

CONCLUSION

This study sought to examine the impact of skilled labour migration on remittance growth using a general equilibrium on one hand and on the other hand it sought to examine the impact of remittance on economic growth using a panel data methodology.

The results show that increased labour migration has a positive impact on both savings and remittances in all regions. In the USA where labour demand increased,

the level of remittance from skilled labour is higher than that remittances from unskilled labour though these effects do not seem to have a spillover effect in Canada and the MENA region. The modest increase in the value of wages in the USA does not affect the value of wages in other regions.

Results from the fixed effect model review that although Remittance variable is insignificant in the model, it has a 43% impact on economic growth FDI and ODA have a significant and positive impact on economic growth while inflation has a negative but significant relationship with economic growth which is expected.

Given these results, it is important that African countries encourage skilled labour migration whose net effect on economic growth is positive both on the sending country and host country. They should however restrict the movement of unskilled labour since their net effect is negative. Therefore rules on international labour migration should be proactively set and investment opportunities should be made available for small businesses where remittances can be channeled.

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