

## Research Article

### Remittances-Growth Nexus: What Does the Evidence in the Common Market for Eastern and Southern Africa Show?

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**Abstract:** This study uses country-level panel data covering the period from 2000 to 2014 to investigate the impact of remittances on the GDP per capita in nineteen member countries of the Common Market for Eastern and Southern Africa (COMESA) region. The one-step Generalized Method of Moments (GMM) difference estimator is used to estimate a dynamic panel of GDP per capita model. The results show that remittances from abroad exerts a positive and statistically significant impact on the GDP per capita in the COMESA region. Additionally, the absorptive capacity has a positive impact on growth and a positive effect on the ability of the COMESA region to absorb and benefit from the spillovers of remittances. The finding suggests that the region should strive to lower the costs of sending remittances, remove barriers to entry to the remittances market, introduce efficient technology systems and install tax or exemption schemes so as to redirect the uses of remittances to more productive sectors of the economy. The absorptive capacity of the region should also be improved so as to raise GDP per capita levels. (179 words).

**Keywords:** Absorptive capacity, COMESA, generalized method of moments, growth, remittances

## INTRODUCTION

Economists, policy analysts and researchers have accorded considerable attention to the relationship between economic growth and remittances in developing countries. Remittances have positive contribution to household welfare of host countries. For instance, remittances provide additional foreign exchange and funds for business investment (Amuedo-Dorantes and Pozo, 2006; Woodruff and Zenteno, 2007) and improving human capital development through increasing resources for health and education (Amuedo-Dorantes *et al.*, 2008; Edwards and Ureta, 2003; Gitter and Barham, 2007). However, remittances could result in a limited positive effect on growth if consumed and not invested, induce appreciation of the real exchange rates and reduce domestic output by decreasing labour effort and labour supply (Jongwanich, 2007).

The remittances received from abroad has been on the rise in Africa in general and the COMESA region in particular. According to the World Bank (2015) data the average workers' remittances from abroad went up from about USD 5.2 billion in 2000 to about USD 24.1 billion in 2014 while the average net remittances as a share of GDP fell from 4.8% in 2000 to 2.4% in 2014. The countries that contributed greatly to the overall

remittances between 2000 and 2014 include Egypt (USD 132.2 billion), Sudan (USD 13.2 billion), Kenya (USD 11.2 billion), Uganda (USD 8.7 billion), Ethiopia (USD 4.4 billion), Malawi (USD 3.4 billion) and Comoros (USD 1.2 billion) (World Bank, 2015). Africa has experienced fast growth since 2000 and sub-Saharan Africa is the third fastest growing region (5.59% per annum) after emerging markets and developing economies (5.98%) and developing Asia (8.39% per annum) (International Monetary Fund, 2015). Further, although the COMESA region realized an average GDP per capita growth rate of 1.90% per annum during the same period, many member countries of the region are the fastest growing in Africa (International Monetary Fund, 2015)<sup>1</sup>. However, the growth impact of the increased remittances in the region is not well known. This is because few studies have been conducted in the region and other previous regional empirical studies carried out omit many COMESA countries from their analysis. They include Chami *et al.* (2005) who omitted Burundi, Ethiopia, Kenya, Malawi, Mauritius, Uganda and Zambia from analysis of growth effects. Further, empirical evidence suggest that the growth impact of remittances is conflicting. The results shows that the impact is either positive, negative or indeterminate. For instance, Catrinescu *et al.* (2009), Jongwanich (2007) and

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Ramirez and Sharma (2008) show that remittances exert a positive and statistically significant impact on the economic growth, while Acosta *et al.* (2009), Amuedo-Dorantes and Pozo (2004) and Chami *et al.* (2005) found remittances to have a negative effect on growth and Ahlburg (1991), Stark and Levhari (1982) and Spatafora (2005) established that remittances do not produce a statistically significant coefficient.

The main objective of this study is to investigate the impact of remittances on GDP per capita in 19 developing countries of the COMESA region between 2000 and 2014. The paper examines the following specific research question: What is the impact of remittances received from abroad on the GDP per capita in the Common Market for Eastern and Southern Africa region? The paper tests the hypothesis that high volumes of remittances received from abroad exert a significant positive impact on the GDP per capita on the region. It tests the hypothesis that high volumes of workers' remittances from abroad exert a significant positive impact on the GDP per capita of the COMESA region by applying a dynamic panel data analysis and employing the one-step Generalized Method of Moments (GMM) estimation technique suggested by Arellano and Bond (1991).

#### **SELECTED LITERATURE REVIEW**

Workers' remittances are current transfers by migrants who are employed or intend to remain employed for more than a year in another economy in which they are considered residents. These transfers support growth in recipient countries through smoothing consumption and augmenting savings and domestic investment. According to Keynesian principles, the amount of transfers which is utilized for consumption is a major determinant of the net growth impact of such transfers. Research has indicated that a very high proportion of remittances are spent on consumption as opposed to productive investment. Consequently, the relationship between remittances and growth therefore can be positive or even negative. Remittances may generate positive spillovers through efficient financial markets, easing the credit constraints for business and individuals or on the contrary, it may increase consumption more than investment and lead to adverse growth effects via low labor participation, low investment and so on.

There is empirical evidence that remittances contribute to economic growth through their positive effect on consumption, savings and investment. Studies by Ramirez and Sharma (2008) analyzed the impact of remittances on the economic growth of selected upper and lower income Latin American and Caribbean countries and found positive and significant impact of remittances on economic growth in both groups of countries. Remittances also spur growth through the mechanism of savings and investment. Since

remittances help in income smoothening, it creates demand for goods and services; which in turn generates employment opportunities but these benefits are conditional on sufficient excess capacity utilization. A similar study by Adams (2002) used panel data covering a period of five years to investigate rates of savings of seven various sources of income, including remittances, by rural households in Pakistan. The author found that the households save from separate income sources at marginal rates that significantly differ across the income sources. The author particularly found that between 1980 and 1990, the Marginal Propensity to Save (MPS) was higher (0.711) for incomes obtained from workers' remittances from abroad as compared to the MPS for incomes accruing from local remittances from urban to the rural areas (0.49) or incomes from rent investment (0.085). According to the model of precautionary saving, these variations in rates of savings from various income sources owe to uncertainty with less variable income saved at a lower marginal rate and the vice-versa. The author noted that the rural household in Pakistan are faced with challenges of incomplete markets of credit and capital and hence save incomes from sources that are more variable and uncertain. Equally high marginal propensity to save income obtained from remittance was established by Roberts *et al.* (2004: quoted in Mallick, 2008) in Armenia. The authors found that the remittances income marginal propensity to save was consistent and as high as 0.40.

Workers' remittances from abroad also contribute to high economic growth rates through raising the levels of income by the mechanism of multiplier effects of consumption, which have lasting effects on households who do not receive the remittances (Mallick, 2008). Desai *et al.* (2004) added that extra consumption particularly raises receipts obtained from indirect taxes, thereby raising the levels of savings and consumption by the government.

There is empirical evidence that remittances impact on growth through expansion of investment. For instance, Amuedo-Dorantes and Pozo (2006) showed that remittances provide extra foreign exchange that can be utilized in financing private investment and Lucas (2005) analysed several case studies and concluded that remittances accelerated investment in India, Morocco and Pakistan. Modelling the impacts of remittances on the investment and incomes in seven Mediterranean countries, Glytsos (2002) observed that rates of investment rise with rise in remittances in six of the seven countries. Further, the results of the analysis carried out for eleven transition economies of Eastern Europe by Leon-Ledesma and Piracha (2004) using data covering the period from 1990 to 1999 revealed that remittances exert a positive impact on employment and productivity through acceleration of domestic investment. Other scholars who found evidence of a positive association between remittances and economic

growth include Catrinescu *et al.* (2009), Jongwanich (2007) and Pradhan *et al.* (2008), among others. The foregoing empirical evidence is supported by Ratha (2003) who holds the view that net inflows of remittances impact on savings and investment. Thus, remittances influence savings, private consumption and investment through their growth effects.

Literature has shown that remittances can positively affect economic growth of recipient countries via several mechanisms. One of the mechanisms is proposed by Woodruff and Zenteno (2007) and Yang (2004) who argue that remittances decrease constraints of credit of receipts of households so as to raise entrepreneurial activities and investment by private investors. Jongwanich (2007) underscored the fact that households in developing economies are particularly faced with inefficient financial and credit markets, making access to markets of credit difficult. Migrant remittance net inflows from abroad enable households to set up entrepreneurial activities. Besides funding physical investment, a number of authors including Edwards and Ureta (2003), Gitter and Barham (2007) and Jongwanich (2007), among others, showed that remittances are utilized to fund education and health, which in turn promotes growth.

Ratha (2007) argued that improved country's creditworthiness is an important mechanism through which increased net inflows of remittances enhance the economy's access to world capital markets for financing developmental projects such as infrastructure. Jongwanich (2007) added that improvement in the creditworthiness of a country provides another way of raising human and physical investment and consequently enhance growth.

The multiplier-effect has also been identified as an important channel through which net inflows of remittances generate positive effects to economic growth in recipient countries. Jongwanich (2007) emphasized the importance of forward and backward linkages in investment activities. The author also pointed out that an increase in investment by one household could lead into a rise in the income of other households. According to the principle of increasing returns to scale, the growth of one sector could lead to an expansion of the size of other sectors and consequently higher economic growth rates.

Many past studies show that there exists a statistically significant positive relationship between remittances and household investment in many developing economies. For instance Brown (1994) analysed the utilization of remittances by households to investigate the relationship between remittances, savings and investment in the island countries of Tonga and Samoa. The author found that remittances contributed significantly to savings and investment in the two island countries. The finding also suggests that remittances are responsive to financial incentives and interest rate differentials between home and host

countries. Using a life-cycle model Mesnard (2004) analysed that effect of remittances in the economic growth of Tunisia and found that workers with limited access to financial markets utilized remittances for investment purposes. This means that remittances ease the credit constraints of such workers. The results also suggested that the migrants who invest after coming back home, accumulate more savings than salaried migrants (Mesnard, 2004). Further, Yang (2004) pointed out that net inflows of remittances improve child schooling, increase expenditure on education, reduce child labour and finance investment. Other researchers including Faini (2002), Stark and Lucas (1988) and Taylor (1992) established that remittances and economic growth in recipient countries are positively related.

In contrast, there are other studies that establish that remittances exert on GDP negatively. For instance, while a steady rise in net inflows of remittances improve the incomes of recipient households, it may eventually substitute wages and other incomes derived from working as some of the households that receive remittances are discouraged from more work. This could decrease supply of labour and contract economic growth. Altruistically motivated remittances compensate their recipients for bad economic outcomes and create incentives that support moral hazard problem. This is because remittance transfers are conducted under situations of asymmetric information in which the remitter of the transfer and recipient of the same are put apart by vast distances. This could court moral hazard hurdles where the recipients are reluctant to participate in the labour market by reducing labour effort and limiting their job search. In a study covering 113 nations over the period 1970 to 1998, Chami *et al.* (2005) used a variety of fixed effects models to establish that workers' remittances exert a negative and significant effect on economic growth because of moral hazard problem<sup>2</sup>. The authors also found that this problem is not limited to households, even governments take important policy decisions in anticipation of continuous inflow of remittances in future. Such policies can prove to be harmful because sudden discontinuity in remittances can create serious financial problems for governments. This finding proved the severity of the problem of moral hazard in remittances. Based on this finding, the authors demonstrated that remittances do not provide capital for economic development but compensation for poor economic outcomes of recipient countries.

There is empirical evidence that large volumes and sustained inflows of remittances are likely to cause appreciation of the real exchange rate or even postpone depreciation of the exchange rate and make the production of tradable goods sector less profitable (Acosta *et al.*, 2009; Amuedo-Dorantes and Pozo, 2004; Lopez *et al.*, 2007). This problem is called the Dutch Disease. Acosta *et al.* (2009) developed a dynamic

stochastic general equilibrium model to analyse the impact of remittances in emerging market economies. The authors found that regardless of the motives, remittances from abroad are associated with reduction in labour supply and increases in demand for non-tradable commodities as a result market for non-tradable commodities expands and attracts labour. Remittances were also found to be beneficial for household welfare through smooth income flows. Using a panel of 13 countries of the Latin America and Caribbean Amuedo-Dorantes and Pozo (2004) analysed the effect of migrants' transfers on the real foreign exchange rate. The investigation showed that workers' remittances restrict performance of exports and limit output and employment of the countries that receive remittances by reducing their export competitiveness. In a cross-country study of 8 countries in Latin America over the period from 1990 to 2003, Lopez *et al.* (2007) analysed the impact of workers' remittances from abroad on real exchange rate appreciation. The authors used an instrumental variables method to control for endogeneity and reverse causality and established that a 1% rise in the ratio of remittances to GDP would lead to appreciation of real effective exchange rate by a significant magnitude of between 18 and 24%. Fajnzylber and Lopez (2007) found that appreciation of real exchange rate accompanied increase in remittances for the period between 1993 and 2005 in 7 out of 8 Latin American countries with the highest ratio of remittances to GDP, excluding Nicaragua. This appreciation of exchange rates adversely affected the export competitiveness of these economies. The findings of the foregoing studies compare well with results generated by models of Dutch Disease or Resource Boom, where discoveries of resources lead to appreciation of real exchange rate and shifting of resources from the traded sectors of the economy to the non-traded ones.

Some studies obtain limited impact of remittances on economic growth. For instance, Glytsos (2005) studied 5 countries for the period of 1969-1998. Using two-stage Least Squares (2SLS) estimation technique, the author found that fluctuations in remittances are associated with fluctuations in growth. Moreover, the negative effect of fall in remittances is higher than positive impact of its rise. Remittances were also found to be associated with rise in standard of living in recipient countries. One important feature of remittances is that it can indirectly affect labor supply. This could reduce economic growth through reduced labor supply. Moreover, large and consistent remittance inflows could make the exports less profitable through appreciated real exchange rate. For developing Asia and Pacific countries, Jongwanich (2007) found that remittances can raise standard of living if recipients are relatively poor. Since migration is not cheap, poor are least likely to be recipient of remittances from abroad hence the welfare gains might be negligible. Further,

Nishat and Bilgrami (1991) analyzed the impact on remittances on economic growth in Pakistan for the period between 1959-60 and 1987-88. The results show that remittances have a strong positive impact on Gross Net Product (GNP), consumption, investment and imports. They argue that remittances increase the dependency on imports through increase in import content of consumption demand and worsen balance of payments problems.

However, there are cases where remittances have had a positive but not a statistically significant impact on economic growth of recipient countries. They include Ahlburg (1991) and Stark and Levhari (1982) who show that remittances are mainly utilized for consumption, construction of houses, repayment of debts and even financing of future migration. Accordingly, remittances increase levels of consumption without promoting domestic economy. Stark and Levhari (1982) particularly noted that even in cases where remittances expand investment, the insurance cover provided by the migrant workers allows households at the source to invest in riskier income-generating activities. This is likely to result in lack of investment in productive activities and generation of limited economic growth in recipient countries.

Other empirical studies reveal that workers' remittances have negative but not statistically significant impact on economic growth of the recipient economy. They are Barajas *et al.* (2009) and Chami *et al.* (2005) who found a zero or negative relationship between remittances and economic growth in recipient countries. Other scholars such as Spatafora (2005) investigated the impact of remittances on economic growth in 101 countries for the period 1970 to 2003. Using an instrumental variables method to account for endogeneity, the authors found no statistically significant relationship between foreign remittances and either per capita output growth, investment or education. Additionally, the author cautioned that establishing the impact of remittances on economic growth, investment or education is complicated by presence of endogeneity and reverse causation (where remittances may both influence and be influenced themselves by GDP growth, investment and education). This study determines the direction and significance of the impact of remittances on GDP per capita in the COMESA region.

As such, while the theoretical literature points out that remittances received from abroad has positive growth impacts, the empirical evidence shows mixed outcomes.

## MATERIALS AND METHODS

**Data:** This study utilizes annual panel data covering the period between 2000 and 2014 for 19 countries (namely, Burundi, Comoros, Djibouti, Democratic

Republic of Congo (or DR Congo), Egypt, Eritrea, Ethiopia, Kenya, Libya, Madagascar, Malawi, Mauritius, Rwanda, Seychelles, Sudan, Swaziland, Uganda, Zambia and Zimbabwe), found in the Common Market for Eastern and Southern Africa.

The data is drawn from different sources and compiled to suit the analysis. The data on the GDP per capita, inflation and public debt are obtained from the World Economic Outlook reports published by the International Monetary Fund.

The data on workers' remittances from abroad, domestic investment (measured by gross capital formation), openness of the economy (measured by the total trade to GDP ratio), financial sector development (measured by access to credit to private sector) are obtained from the World Development Indicators published by the World Bank while the data on the quality of institutions of regulations, rule of law and order and control of corruption are obtained from the World Governance Indicators prepared by the World Bank Institute.

The data on human capital development from the Human Development Index report prepared by the United Nations Development Programme (UNDP), while data on the quality of overall infrastructure is obtained from the Global Competitiveness Report published by the World Economic Forum.

**Theoretical framework:** Following De Mello (1997), Fedderke and Romm (2006), Kitonyo (2016) and Ramirez (2000) the analytical framework that links remittances to growth is investigated through an augmented Cobb-Douglas production function, expressed as follows:

$$Y = A f \{ (H^z L), K_D, X \} \quad (1)$$

Replacing  $H^z$  with  $\xi$  gives Eq. (2):

$$Y = A (\xi L)^\alpha K_D^\beta E^{(1-\alpha-\beta)} \quad (2)$$

where  $H^z = \xi$ ,  $Y$  is real output,  $K_D$  is stock of domestic capital,  $L$  is labour force,  $H$  is the level of educational,  $z$  is the return to education level relative to labour force,  $A$  is the total factor productivity or the real output per unit of input and  $E$  refers to the externality or spillover effect ( $\neq 1$ ) generated by the additions to the stock of remittances in the local economy. In Eq. (2), the symbols  $\alpha$  and  $\beta$  represents the shares of domestic labour force and stock of domestic capital, respectively. Additionally,  $\alpha$  and  $\beta$  are assumed to be less than one, implying presence of diminishing returns to each factor input.

We represent the externality,  $E$ , by a Cobb Douglas function of the kind shown below by:

$$E = \{ (\xi L) K_D K_F^\theta \}^\lambda \quad (3)$$

where  $K_F$  denotes remittances received from abroad while  $\theta$  and  $\lambda$  represents the marginal elasticity and inter-temporal elasticity of substitution between domestic investment and remittances, respectively. Substituting Eq. (3) into Eq. (2) obtains:

$$Y = A (\xi L)^{\alpha+\lambda(1-\alpha-\beta)} K_D^{\beta+\lambda(1-\alpha-\beta)} K_F^{\theta\lambda(1-\alpha-\beta)} \quad (4)$$

From Eq. (4),  $(\partial K_D / \partial K_F) / (K_F / K_D) = \theta$ , such that  $\theta \neq 0$ . This implies that domestic investment and remittances may either serve as complements or substitutes to each other. Intuitively, this may correspond to the crowding-in and crowding-out effects of remittances, respectively. It is argued that when  $\theta > 0$  then remittances crowds-in domestic investment and when  $\theta < 0$  then the presence of remittances crowd-out domestic investment and reduce the economic growth rate in the host nation. Contrastingly,  $\lambda$  captures the spillover effect of remittances on the productivity of capital and labour. Consequently,  $\theta$  is interpreted as the instantaneous or marginal effect of remittances on output and  $\lambda$  as the long-run or inter-temporal elasticity of substitution between domestic investment and remittances received from abroad.

Finally, a dynamic production function, expressed as shown in Eq. (5), is produced by taking the logarithms and time derivatives of Eq. (4):

$$g_y = g_A + (\alpha + \lambda(1-\alpha-\beta))g_{\xi L} + (\beta + \lambda(1-\alpha-\beta))g_{K_D} + (\theta\lambda(1-\alpha-\beta))g_{K_F} \quad (5)$$

In Eq. (5),

$g_y$  = The rate of economic growth

$g_A$  = The growth rate of total factor productivity

$g_{\xi L}$  = The rate of change of the labour force<sup>3</sup>

$g_{K_D}$  = The rate of change of the domestic capital

$g_{K_F}$  = The rate of change of the remittances received from abroad

The general formulation of Eq. (5) is expressed as a panel data Eq. (6) by taking the following two steps. First, the coefficients  $(\alpha + \lambda(1-\alpha-\beta))$ ,  $(\beta + \lambda(1-\alpha-\beta))$  and  $(\theta\lambda(1-\alpha-\beta))$  in Eq. (5) are rewritten as  $\gamma_1$ ,  $\gamma_2$  and  $\gamma_3$  while the terms  $\xi L$ ,  $K_D$  and  $K_F$  are rewritten as  $l$ ,  $k_D$  and  $k_F$ , respectively. Second, other factors that explain economic growth,  $F^4$  and absorptive capacity factors, denoted by  $A$  and interaction terms between absorptive capacity factors and remittances,  $A * K_F$ , are added into Eq. (5). The addition of the interaction terms follows Catrinescu *et al.* (2009)<sup>5</sup> and Kitonyo (2016)<sup>6</sup>:

$$y_t = \tau + \gamma_1 l_{i,t} + \gamma_2 k_{D,i,t} + \gamma_3 k_{F,i,t} + \gamma_4 F_{i,t} + \gamma_5 A_{i,t} + \gamma_6 (A * k_F)_{i,t} + e_t + v_{i,t} + \varepsilon_{i,t} \quad (6)$$

where, letters in lower case growth rates;  $y$  represents the real GDP per capita growth rate;  $l$  is the labour force growth rate;  $k_D$  represent the growth rate of local

investment;  $k_F$  represent growth rate of remittances;  $F$  is the growth rate of a set of other factors that explain economic growth such as openness of the economy, public debt and inflation;  $A$  is the growth rate of absorptive capacity factors;  $(A * k_F)$  is the growth rate of the interaction terms between the factors of absorptive capacity and remittances received from abroad;  $\tau$  is a constant;  $e_t$  time-specific effects which are also assumed to be independently and identically distributed over all time periods;  $v_i$  is an unobserved country-specific effects which are independently and identically distributed overall the countries,  $\varepsilon_{i,t}$  is a normally distributed error term; and  $\gamma_1, \gamma_2, \gamma_3, \gamma_4, \gamma_5$  and  $\gamma_6$  are the parameters to be estimated.

The incorporation of dynamics into Eq. (6) requires that it be rewritten as an AR(1)<sup>7</sup> model by including the past values of GDP per capita as an independent variable. This operation produces Eq. (7):

$$y_t = \tau + \gamma_0 y_{i,t-1} + \gamma_1 l_{i,t} + \gamma_2 k_{D,i,t} + \gamma_3 k_{F,i,t} + \gamma_4 F_{i,t} + \gamma_5 A_{i,t} + \gamma_6 (A * k_F)_{i,t} + e_t + v_i + \varepsilon_{i,t} \quad (7)$$

where,  $\gamma_0$  is the parameter for the difference of lagged values of GDP per capita. The rest of the terms are as explained in Eq. (6).

**Econometric model:** The estimated equation used in this study in the empirical analysis, is given by Eq. (8):

$$\begin{aligned} GDPPC_{i,t} = & \tau + \gamma_0 GDPPC_{i,t-1} + \gamma_1 HUMCAP_{i,t} + \\ & \gamma_2 DINV_{i,t} + \gamma_3 TRADE_{i,t} + \gamma_4 PUBDEBT_{i,t} + \\ & \gamma_5 INFLA_{i,t} + \gamma_6 REMIT_{i,t} + \gamma_7 Abscap_{i,t} + \gamma_8 (Abscap * RE \\ & MIT)_{i,t} + e_t + v_i + u_{it} \end{aligned} \quad (8)$$

where,  $GDPPC_{i,t}$  is the GDP per capita in country  $i$  during period  $t$ ;  $GDPPC_{i,t-1}$  is lagged GDP per capita;  $HUMCAP$  is the human capital stock (measured by the Human Development Index, HDI);  $DINV$  is the domestic investment (measured by the share of gross fixed capital formation in constant dollars to GDP ratio);  $TRADE$  is openness of the economy (measured by the share of total imports and exports to GDP);  $PUBDEBT$  is the public debt (measured by the share of the gross debt liabilities to GDP ratio);  $INFLA$  is the changes in annual general level of prices;  $REMIT$  represents the remittances received from broad expressed as a share of GDP;  $Abscap$ <sup>8</sup> are the set of selected absorptive capacity factors that influence the ability of the Common Market for Eastern and Southern Africa to absorb and benefit from spillovers of the REMIT;  $Abscap * REMIT$  is the interaction term between the factors of absorptive capacity and remittances;  $\gamma_0$  is a parameter reflecting the speed of convergence of GDP per capita from one year to the next;  $\tau$  is a constant;  $e_t$  time-specific effects which are also assumed to be independently and identically

distributed over all time periods;  $v_i$  is an unobserved country-specific effects which are independently and identically distributed over the countries in COMESA region;  $u_{it}$  the error term which is assumed to be independently and identically distributed over all time periods in country  $i$ ; and  $\gamma_1, \gamma_2, \gamma_3, \gamma_4, \gamma_5, \gamma_6$  and  $\gamma_7$  are the parameters to be estimated. A positive (negative) sign of the parameters suggests that an increase in the respective variable by one percent leads to a rise (fall) of GDP per capita by the percentage size of the coefficient. In model equation 8, the coefficient(s)  $\gamma_8$  is interpreted as the marginal rise in the impact of REMIT on the real GDP per capita when the concerned absorptive capacity factor improves. The vice-versa also holds true.

**Variables used in the study:** The overall performance of an economy is measured by the growth performance of GDPPC. The lagged GDP per capita,  $GDPPC_{i,t-1}$ , is expected to have a positive effect on the current GDPPC. In other words, high values of real GDP per capita in the past are expected to positively influence growth of the current real GDP per capita in the COMESA region. The GDP per capita in this study is measured by the nominal real GDP per capita deflated by the GDP deflator (base 2000 = 100). Consequently,  $\gamma_0 > 0$ .

$HUMCAP$ , represented in this study by the Human Development Index (HDI), affects current GDPPC positively and enhances the ability of the COMESA region to absorb and benefit from FDI spillovers. High level of human development in terms of leading a long and healthy life (measured by life expectancy at birth), being knowledgeable and educated (measured by adult literacy and school enrolment) and having a decent standard of living (measured by GDP per capita at purchasing power parity (PPP) US Dollars) promotes economic growth and enable the host nation to absorb and benefit from spillovers of remittances from abroad. Therefore,  $\gamma_1 > 0$ .

$DINV$  positively affects GDPPC. Increased rate of domestic investment promote productivity in a country. Domestic investment in this study is measured by the share of gross fixed capital formation in constant dollars to GDP ratio. Hence,  $\gamma_2 > 0$ .

Openness of the COMESA region's economy, measured by the share of trade (imports and exports) to GDP, could enlarge markets and expand domestic investment to meet increased demand for goods and services (Feder, 1982). The performance of COMESA region's total imports and exports and adoption of trade liberalization by host countries could also increase the effect of the growth impact of remittances.  $TRADE$  is therefore expected to impact positively on GDPPC and enhance the ability of the COMESA region to absorb

and benefit from spillovers of remittances. It is therefore expected that  $\gamma_3 > 0$ .

High level of debt liabilities in the form of Special Drawing Rights, currency and deposits, debt securities, loans, insurance, pensions and standardized guarantee schemes and other accounts payable, represents the risk for an economy to encounter difficulties in reimbursing its public debt and to face a financial crisis. The presence of a large public debt can also adversely affect investment by reducing the funds available to invest, given that the return from new investment will be overly taxed in order for the government to repay the debt. The study therefore anticipates a positive impact of PUBDEBT, measured by the share of the gross debt liabilities to GDP ratio, on GDPPC. Hence,  $\gamma_4 > 0$ .

Macroeconomic instability, reflected by high, rising and unstable general levels of prices, reduces real future profits and cause uncertainties to investors. Macroeconomic instability provides a less reliable economic environment, which does not enable the investors to benefit from the existing profit opportunities (Larraín and Vergara, 1993; Servén and Solimano, 1992). The a priori expectation is that INFLA, measured by the annual percentage change in the Consumer Price Index (CPI), impacts positively on GDPPC of the host country. Hence,  $\gamma_5 < 0$ .

REMIT, measured by the share of workers' remittances received from abroad to GDP, is expected to impact positively to GDPPC in the COMESA region. Increased worker's remittances from abroad are expected to promote growth by providing additional foreign exchange capital to finance domestic business investment, improve human capital by increasing resources for health and education and reduce macroeconomic volatility. Conversely, consumption of worker's remittances may result in low investment and consequently poor GDP per capita growth rates. Therefore,  $\gamma_6 > 0$  or  $\gamma_7 < 0$ .

The a priori expectation is that FSD or financial sector development, measured by the share of bank credit to GDP, impacts positively on GDPPC and enhances the ability of the COMESA region to absorb and benefit from spillovers of remittances from abroad. Improvement in access to bank credit promote growth (Durham, 2003; Shahbaz *et al.*, 2011). Hence,  $\gamma_7 > 0$ .

High regulatory quality, effective and efficient rule of law and order and low prevalence of corruption encourage investment, enhance protection of property and contract rights of investors and promote economic growth (Durham, 2003). REGQUA, RULAW and COC are expected to impact positively on GDPPC and enhance the ability of the COMESA region to absorb and benefit from FDI. The three institutional quality variables are measured by the score on the aggregate

world governance indicators. It is therefore expected that  $\gamma_7 > 0$ .

Development of a high quality overall infrastructure, roads, railroads, ports, air transport and availability of airline seat kilometres, electricity supply, fixed telephone lines and mobile telephone subscriptions all reduce cost of doing business, improve private investment returns, attract more foreign investment and promote productivity and economic growth (Aschauer, 1989; Barro, 1990; World Economic Forum, 2015). The priori expectation is that INFRAC impacts positively on GDPPC and enhances the ability of the COMESA region to absorb and benefit from FDI spillovers. Therefore,  $\gamma_7 > 0$ .

**Data analysis and estimation technique:** The study utilizes a panel data drawn from 19 countries in the COMESA region and covers the period running from 2000 to 2014. A dynamic panel data GDP per capita model, where the lagged dependent variable, the GDP per capita, is added to the explanatory variables, is estimated. It is argued that the lagged GDP per capita has an impact on the current GDP per capita.

However, it is also acknowledged that dynamic panel data models are faced with challenges such as biased coefficients if mis-specification of dynamics results into autocorrelated errors. Dynamic panel data models also ignore stationarity of variables. However, the major challenges of dynamic panel data modelling are endogeneity, unobserved heterogeneity and short panel bias. These challenges are resolved by including appropriate and adequate explanatory variables into the growth equation, lagging the potentially endogenous variable(s) by one or more periods, using appropriate proxies for variables and estimating the growth model by using the Generalized Method of Moments (GMM) technique suggested by Arellano and Bond (1991). This estimation method is known to account for dynamics and resolve endogeneity and unobserved heterogeneity problems. They also resolve the short panel bias.

The first step of the technique is to remove the time effect,  $e_t$ , by subtracting from each variable its cross average in period  $t$  in Eq. (8). Next, the variables are transformed into first differences so as to eliminate unobservable heterogeneity ( $v_i$ ). The endogenous problems are addressed by using a second and higher order lags of these variables as instruments in the case of Arellano and Bond (1991). This approach is valid so long as there is no second order serial correlation, something which is tested in each specification. In addition, to ensure this approach is valid, a Sargan test of over-identifying restrictions, which assesses the contemporaneous correlation between the set of instruments and the residual, is reported together with the results. Arellano and Bond's (1991) m2 test, which ensures that the residuals from the estimated

Table 1: Summary descriptive statistics

Variable	Mean	Median	Min.	Max.	S.D.
GDP Per Capita (PPP US Dollars)	4,842.47	1,822.30	377.20	29,646.60	6,487.77
Domestic investment (%GDP)	21.035	19.922	2.000	51.788	8.736
Human capital development (HDI)	0.464	0.420	0.220	0.810	0.152
Public debt (% GDP)	66.362	53.527	1.012	202.05	46.169
Openness of the economy (% GDP)	75.944	64.000	21.000	225.000	43.254
Inflation (%)	8.716	7.445	-72.729	57.000	11.943
Workers' Remittances received from abroad (% GDP)	3.077	1.002	0.001	43.512	5.999
Financial sector development (% GDP)	22.201	16.800	0.200	108.100	18.873
Quality of infrastructure (index)	2.662	2.560	1.520	4.750	0.707
Quality of institution of regulations (index)	-0.819	-0.700	-2.260	0.980	0.684
Quality of institution of rule of law and order (index)	-0.709	-0.780	-1.950	1.060	0.640
Quality of institution of control of corruption (index)	-0.614	-0.680	-1.710	0.680	0.551

Author's computations; Minimum; Max.: Maximum; S.D.: Standard deviation

Table 2: Correlation matrix of variables in levels

Variable	GDPPC	DINV	HUMCAP	PUBDEBT	TRADE	INFLA
GDPPC	1.000					
DINV	0.338	1.000				
HUMCAP	0.585	0.273	1.000			
PUBDEBT	-0.124	-0.220	-0.182	1.000		
TRADE	-0.570	0.119	0.590	-0.097	1.000	
INFLA	-0.166	-0.059	-0.123	0.208	-0.040	1.000
REMIT	0.181	-0.219	-0.108	0.133	-0.116	0.044
FSD	0.304	-0.122	0.432	0.025	0.303	-0.162
REGQUA	0.170	0.247	0.369	-0.221	0.267	0.023
RULAW	0.403	0.263	0.579	-0.008	0.423	-0.042
COC	0.280	0.134	0.407	0.139	0.452	-0.051
INFRAC	0.498	0.250	0.590	-0.342	0.469	-0.301
Variable	REMIT	FSD	REGQUA	RULAW	COC	INFRAC
GDPPC						
DINV						
HUMCAP						
PUBDEBT						
TRADE						
INFLA						
REMIT	1.000					
FSD	0.045	1.000				
REGQUA	0.148	0.372	1.000			
RULAW	0.304	0.498	0.0774	1.000		
COC	0.334	0.384	0.591	0.0786	1.000	
INFRAC	0.205	0.556	0.530	0.558	0.472	1.000

Author's own computations

regressions are first-order correlated but not second-order correlated<sup>9</sup>, is also reported.

## RESULTS AND DISCUSSION

The analysis starts by presenting the descriptive statistics in Table 1. The results describe the features of the data used in the study. The panel data set is rich and therefore deemed normal and appropriate for the empirical analysis.

Next, the results of the correlation of variables are then presented in Table 2. An explanatory variables correlation matrix is used to test the presence of multicollinearity in the dynamic panel data GDP per capita model specified in Eq. (8).

According to Gujarati (2004), multicollinearity is a serious problem if the zero-order correlation coefficient between two regressors is in excess of 0.8. The results of the variables correlation matrix shows that all the

zero-order correlation coefficients between any two regressors are low, ruling out the presence of perfect or near perfect linear relationship. Thus, there is no relationship among the independent variables, implying that the regression obtains determinate coefficient and finite standard errors. The results shows that GDP per capita has a positive correlation with domestic investment, human capital development, workers remittances received from broad, financial sector development, development of quality infrastructure, regulatory quality and quality of the institutions of rule of law and order and control of corruption, as theoretically predicted. Conversely, growth is negatively correlated with public debt and inflation, as theoretically predicted. Further, economic growth is negatively correlated to openness of the economy, contrary to economic theory.

Table 3 presents estimates of the dynamic panel GDP per capita Eq. (8). The first column describes the



Table 3: Arellano and Bond (1991) GMM-Difference Estimates of the Growth Impact of Workers' Remittances in the COMESA Region, 2000-2014

Dependent variable = Growth (GDPPC)	Dynamic panel data growth model
Growth (GDPPC <sub>t-1</sub> )	0.422868 (0.00001)***
Human capital development (HUMCAP)	22720.6000 (0.00001)***
Domestic investment (DINV)	53.3107 (0.20644)
Public debt (PUBDEBT)	-33.4292 (0.00001)***
Economy openness (TRADE)	-42.0981 (0.00001)***
Inflation (INFLA)	-14.0636 (0.64978)
Workers' Remittances (REMIT)	1763.3400 (0.00007)***
Financial sector development (FSD)	121.4970 (0.00001)***
Overall infrastructure (INFRAC)	3345.8900 (0.00001)***
Regulatory quality (REGQUA)	4135.31 (0.00001)***
Rule of law and order (RULAW)	9345.88 (0.00001)***
Control of corruption (COC)	4153.63 (0.00133)***
REMIT *HUMCAP	6728.32 (0.00002)***
REMIT *TRADE	-23.7057 (0.00001)***
REMIT *FSD	131.5530 (0.00001)***
REMIT *INFRAC	644.9820 (0.06686)*
REMIT *REGQUA	1347.4000 (0.00002)***
REMIT *RULAW	2006.0400(0.00001)***
REMIT *COC	44.1388 (0.83794)
Constant	7.49625 (0.95679)
Number of observations	190
Number of instruments	104
A-B test 1 <sup>st</sup> Order	-3.3844 (0.0007)***
A-B test 2 <sup>nd</sup> Order	0.149397 (0.8812)
Sargan over-identification test	167.127 (0.2341)
Wald (joint) test	4.54757e+014 (0.0000)***
Adjustment Speed, $\lambda = 1-\gamma_0$	0.5771

p-values are reported in parentheses with \*, \*\*, \*\*\* denoting significance at 10, 5 and 1%, respectively. The Arellano and Bond (A-B) Z-statistic tests the null hypothesis that the residuals are first-order correlated (A-B test 1<sup>st</sup> Order) and the residuals are not second-order correlated (A-B test 2<sup>nd</sup> Order). The Wald test, a test of joint significance, tests the null hypothesis that the coefficients of time dummies are zero.

Author's computations

estimated variables, number of observations, number of instruments, diagnostic tests and adjustment speed. The second column presents the estimates generated by using the one-step GMM estimator suggested by Arellano and Bond (1991).

The regression results shows that the constant term is not statistically significant at all levels of significance, meaning that the estimated variables explain the models well. The Arellano and Bond (1991) first-order tests of serial autocorrelation shows that there is no second-order serial autocorrelation in the disturbance term. Thus, the lagged levels provide sufficient information about the first-differenced variables (Arellano and Bover, 1995; Blundell and Bond, 1998). The GMM estimator therefore generate reliable and efficient estimates. The result of the Sargan over-identification restrictions test is not statistically significant. Thus, GMM estimator produces valid instruments. Finally, the result of the Wald test is statistically significant, implying that the independent variables are jointly significant, unrelated to each other and therefore should be retained in the econometric model. The results show that the speed of adjustment,  $\lambda$ , is fairly high, that is 0.5771, meaning that there is 57.7% adjustment of GDP per capita from one year to the next. This result also confirms absence of a weak instrument problem.

The parameters of the workers' remittances on the GDP per capita shown by the regression results presented in the second column of Table 3 is positive

and statistically significant at 1% level of significance. The coefficient is 1763.34. This result implies that an increase in remittances by 1% is accompanied by a direct rise in the GDP per capita in the COMESA region by 1763.34%. This result is consistent with economic theory.

This finding concurs with Faini (2002), Stark and Lucas (1988) and Taylor (1992) who found a positive relationship between remittances and economic growth. Remittances contribute to economic growth through their positive impact on consumption, savings or investment. This argument is also supported by Amuedo-Dorantes and Pozo (2006) and Woodruff and Zenteno (2007) who both argued that remittances promote economic growth by providing additional foreign exchange that can be used to finance private investment. This result is further supported by Lucas (2005) who found that remittances accelerate investment, Glytsos (2002) who observed direct positive effects of remittances on incomes in seven Mediterranean countries and Leon-Ledesma and Piracha (2004) who concluded that remittances had a positive direct impact on productivity and employment for eleven transition economies of Eastern Europe during 1990-1999. Workers' remittances from abroad therefore have a significant positive micro impact on the GDP per capita in the COMESA region.

The coefficients of the interaction terms between the inflows of workers' remittances from abroad and human capital development, financial sector

development, regulatory quality and quality of rule of law and order exert a positive and statistically significant impact on the GDP per capita in the COMESA region. This finding suggests that improvement in the absorptive capacity has a positive effect on the growth impact of workers remittances from abroad in the COMESA region.

Additionally, the coefficients of the human capital development, financial sector development, development of quality infrastructure and quality of the institutions of regulations, control of corruption and rule of law and order are positive and statistically significant at their various levels of significance. This finding suggests that the absorptive capacity has a positive growth impact in the COMESA region.

The coefficients of the past values of the GDP per capita is statistically significant at 1% level of significance. This result suggests that the past values of GDP per capita growth has a significant positive impact on the current growth rate.

The openness of the economy and public debt exerts a negative and statistically significant growth impact in the COMESA region.

### CONCLUSION

The objective of this study was to investigate the growth impact of remittances from abroad in the Common Market for Eastern and Southern Africa region over the period 2000-2014. The empirical studies reviewed in this study showed conflicting outcomes, where results of some studies are positive, while others are negative and indeterminate. In order to attain the aim of the paper, a dynamic panel data GDP per capita model is estimated using the one-step GMM estimators suggested by Arellano and Bond (1991).

The results shows that workers' remittances from abroad exert a positive and statistically significant impact on GDP per capita in the region. The results indicate that growth in human capital development; improvement in access to credit to private sector; development of high quality infrastructure; and installation of high quality institutions of regulations, control of corruption and rule of law and order exert a significant positive impact on the GDP per capita. The absorptive capacity exert a positive effect on the impact of remittances on economic growth in the COMESA region. However, the rise in volumes of public debt and more openness of the economy through expansion of trade exhibit a negative and statistically significant impact on the GDP per capita in the COMESA region.

The findings suggest lowering the costs of sending remittances by promoting competition and removing any barriers to entry to the remittances market so as to raise the volumes of remittances flowing into the region from abroad. For instance, the capital requirements on remittance services should be lowered and the formal networks of financial intermediaries should be widened

via allowing local banks from origin countries to operate overseas and encouraging the participation of credit unions and microfinance institutions in according cheap and safe remittances services. Additionally, support should be accorded to the introduction of technology in payment systems and allocate greater resources in technology so as to improve on the transfer of remittances by making the money transfer to the COMESA easier, cheaper and secure. Further, the utilization of tax or exemption schemes to redirect the uses of remittances to more productive sectors of the economy should also be considered. Finally, growth of the stock of human capital; improvement of the access to credit to private sector; development of high quality overall infrastructure; and development of high quality institutions of regulations, control of corruption and rule of law and order; and utilization of public debt to finance development projects and not recurrent expenses should be encouraged so as to raise their GDP per capita levels in the region.

### END NOTES

1. These countries include Djibouti (2.4% per annum), Egypt (2.4% per annum), Ethiopia (6.0% per annum), Libya (2.3%), Mauritius (3.5% per annum), Rwanda (4.7% per annum), Seychelles (2.4% per annum), Sudan (4.1% per annum), Uganda (3.1% per annum) and Zambia (3.6% per annum), among others (International Monetary Fund, 2015).
2. Moral hazard problem occurs when in anticipation of continuous future inflows of remittances, recipients start providing less labour.
3. Labour force can be measured by either productivity, number of people in the working population, education or skills.
4. The other factors that influence economic growth include among others openness of the economy, public debt and inflation.
5. Catrinescu *et al.* (2009) examined the effect of remittances on growth through institutions of a country as an important channel. The authors tested the hypothesis that institutions affect the impact of remittances on economic growth by interacting remittances variable with different indexes of institutional quality such as TI corruption index and ICRG indicators of bureaucracy quality, corruption, ethnic tensions, law and order, democratic stability, government stability, socio-economic conditions, investment profile and political risk. The study tested the significance of the interacted coefficient.
6. Kitonyo (2016) investigated the growth impact of remittances received from abroad in the Common Market for Eastern and Southern Africa (COMESA). The author tested the hypothesis that absorptive capacity affect the impact of short term

foreign capital flows on economic growth by interacting short term foreign capital flows variable with different factors of absorptive capacity. The study tested the significance of the interacted coefficient.

7. AR(1) stands for autoregressive dynamic panel data model of order one.
8. The absorptive capacity factors analyzed in this study as important in influencing the ability of the Common Market for Eastern and Southern Africa to absorb and benefit from spillovers of the remittances include human capital development (measured by the Human Development Index, HDI), openness of the economy (measured by the total imports and exports to GDP), infrastructure development (measured by the indicator of quality of overall infrastructure, roads, railroads, ports, air transport and availability of airline seat kilometres, electricity supply, fixed telephone lines and mobile telephone subscriptions), financial sector development (measured by the share of bank credit to GDP) and quality of institutions measured by the the score on the aggregate world governance indicators of regulation, rule of law and order and control of corruption.
9. Arellano and Bond (1991) argued that, if the residuals  $u_{it}$  were first-order correlated, then  $y_{i,t-2}$  would be correlated with  $\Delta u_{it}$  and therefore it could not be used as an instrument. The same is true of any independent variable which is correlated with  $u_{it}$ .

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