Do Remittances Matter in Accelerating Labour Productivity and Capital Accumulation?

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DO REMITTANCES MATTER IN LABOUR PRODUCTIVITY AND CAPITAL ACCUMULATION?

By

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Abstract

In this paper, we examine the effect of remittances on labour productivity and capital accumulation through various channels. Our panel includes 25 African countries with data from 1990 to 2013. We employ the two-step generalized methods of moment estimator. The main results from this study are that remittances on their own do promote labour productivity but not capital accumulation. Indeed, remittances are observed to have a positive impact on labour productivity and a negative impact on capital accumulation. However, remittances do not promote labour productivity in resource rich countries. The effect of remittances on labour productivity is not clear when we interact remittances with life expectancy. Furthermore, remittances tend to promote capital accumulation in the presence of high quality human capital. Policies that promote remitting through formal channels will aid directing remittance inflows into productive investments thus encouraging human capital and labour productivity.

1 Introduction

The key to the sustenance of growth of an economy hinges on the idea gaps of human capital and the object gaps of physical capital within that economy. These two are related to the effect that countries that lack one type of capital tend to lack the other (Romer, 1993). The lack of access to finance is an impediment that keeps underprivileged economies from getting a toehold on the development ladder (Solow, 1956; Harrod, 1959; Sachs, 2005).

Africa is the second largest recipient of remittance after Asia. Coupled with its hefty share of the world's natural resource, this puts Africa on the dais of other capital rich continents. Remittances into Africa alone make available substantial inflows of physical capital. It outpaces official development assistance and other private capital inflows (World Bank, 2014). These monies are augmented by Africa's mineral wealth. Natural resources in Africa account for 77 percent of total exports and 42 percent of government revenue in 2012, (ANRC Report, AfDB, 2015). It is estimated that the continent's natural resources will contribute over $30 billion per annum in government revenues over the next 20 years (Africa Development Bank Annual report, Oct. 2013). Remittance, on the other hand, sent by 31 million international African migrants, through formal channels, have more than quadrupled since 1990, reaching $40 billion in 2010 equivalent to 2.6 per cent of Africa's gross domestic product (GDP) (Ratha & Mohapatra, 2012). It is expected to increase by 3.4 per cent in 2016 (World Bank, Regional Economic Outlook, April, 2016). It is worth noting that this is data are gathered from formal channels and are most likely to be understated due to the several informal channels via which these remittances are received.

It suffices to note that these two (remittances and mineral wealth) can be perceive as akin. If remittances are distributed among a large number of people, then, distributing resource revenue makes the two jointly unleash massive domestic capital, increasing per capita income and disposable income. Empirically, it is proven that countries receiving large revenues from natural resource

endowments raise less revenue from domestic taxation (Moore, 1998, 2007; Collier & Hoeffler, 2005; Collier, 2006; Bornhorst, Gupta, & Thornton 2008). It suffices to argue that this is likely to increase disposable income. Remittance inflows will further augment income levels. Ascertaining how labour productivity and capital accumulation are significantly impacted is imperative.

This notwithstanding, the Multidimensional Poverty Index (2015) shows that Africa is 75.3 percent rural, indicating the propensity to internationally migrate in search of greener pastures (Alkire, Conconi & Seth, 2014). Africa's growing population plagued with deprivation, poor mainly rural households, validates the probability of high propensity to international migration in search for greener pastures which inevitably leads to huge inflows of remittance. It is expected that Africa will continue to confronts its poverty with its hard cash receipts (remittances) in addition to wealth from its large natural resources and will amass significant natural capital, leapfrogging its capital base and providing opportunities to improve human capital. Africa cannot be poor.

For Africa's transformation, it must harness what it has to get what it needs. Employing its huge remittance inflow and resource wealth now to empowering its human capital into productive labour will ultimately sustain it far beyond the time when the continent's natural resource and their high prices run out. Turning finite wealth into infinite wealth, natural wealth into created wealth, and resource based economies into diverse knowledge and industry based economies which create jobs is imperative. Osabuohien & Efobi, (2013) find that the African diaspora contribute immensely to homeland development, however, the comprehensive macroeconomic policy options on how international remittance inflow impacts labour productivity and capital accumulation has not been adequately studied. Maximising natural and human capital is intrinsically linked, and the two constitute the twin and overarching objectives of this study.

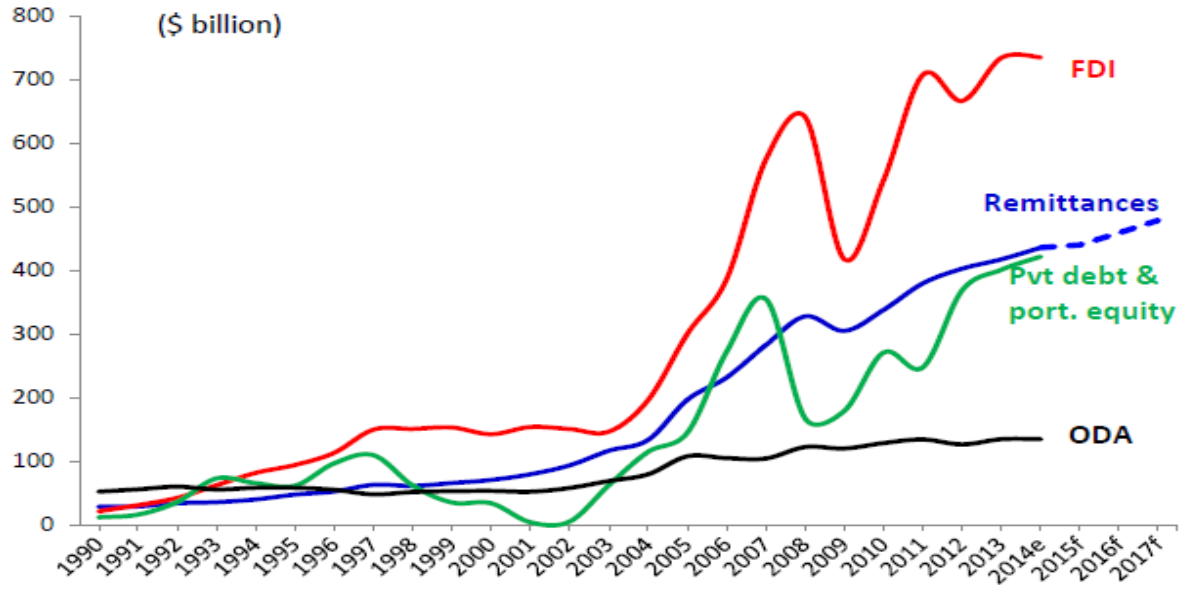
The quest in this study is twofold: using a panel of 25 African countries across 23 years. First, we established the full potential of remittance impact on labour productivity with respect to the

continent's natural resource capital; furthermore, we show the extent to which remittance impacts on labour productivity in environments where life expectancy is high. Secondly we investigate the difference human capital makes in remittance impact on capital accumulation in Africa.

2 Stylized facts

Remittances have become an increasingly prominent source of external funding for many developing countries. Remittances are most often intended for consumption, by recipient households, should be less volatile than those intended for investment (Ratha, 2003) Migrants may increase remittances in times of economic hardship, especially in low-income countries where their families may depend significantly on remittances as a source of income and may live at close to subsistence levels. Economic downturns may also encourage workers to migrate abroad—and to begin transferring funds to families left behind. Even when the purpose behind remittances is investment, remittances are less likely to suffer the sharp withdrawal or euphoric surges that characterize portfolio flows to emerging markets.

Fig 1: Remittance flows show consistent and steady growth



Sources: World Bank, Global Development Finance; IMF, Balance of Payments Yearbook, various years.

Remittance flows are the second-largest source, behind FDI, of external funding for developing countries. Clearly remittances are more stable than private capital flows, which often move pro-cyclically, thus raising incomes during booms and depressing them during downturns. By

contrast, remittances are less volatile—and may even rise— in response to economic cycles in the recipient country. Remittances were smaller than FDI inflows, but larger than international capital market flows. Remittance receipts have exceeded official development assistance although it presents more predictable.

There are large variations in labour productivity growth between economies in the region, ranging from more than 4% in large economies such as Angola, Mozambique, Uganda, Ethiopia, to contractions in economies such as Democratic Republic of Congo, and Côte d'Ivoire and Madagascar.

Figure 2: the average growth of labour productivity of the sampled African countries.

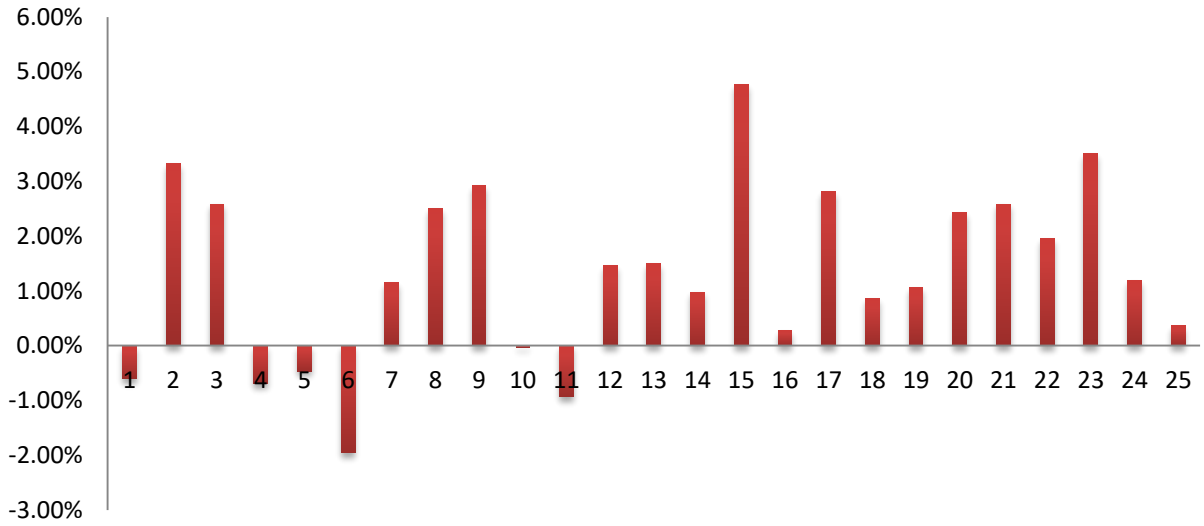


Figure 2. Source: Authors Compilation

(1.Algeria 2.Angola 3.Burkina Faso 4.Cameroon 5.Côte d'Ivoire 6.DR Congo 7.Egypt 8.Ethiopia 9.Ghana 10. Kenya 11.Madagascar 12. Malawi 13. Mali 14. Morocco 15.Mozambique 16.Niger 17.Nigeria 18.Senegal 19.South Africa 20.Sudan 21.Tanzania 22.Tunisia 23.Uganda 24.Zambia 25.Zimbabwe)

Twenty countries experienced positive growth in labour productivity over the period, with the highest peak in Mozambique (5%). Five countries, (Algeria, Cameroon, Côte d'Ivoire, DR Congo and Madagascar) present negative growth in labour productivity, with the lowest in DR Congo (-2%). North African countries in the sample show positive growth, except Algeria with negative

growth (-0.05%). Likewise, south eastern African countries show positive labour productivity growth, with the highest in Mozambique, except Madagascar with (-1%). Within the West African block, Angola has the highest growth (3.4%) and Cote d'Ivoire, the least (-0.02%) in West Africa.

Labour productivity remains the single most important determinant of a country's per capita income over the longer term as well as the source of a nation's comparative advantage, it remains imperative that African countries pursue national agenda that seek to enhance training and the acquisition of skills for effective labour. This inures favourably to the growth of labour productivity.

Figure 3: shows variability in average labour productivity and average personal remittances.

The absolute fear that remittance inflows are an alternative source of earning thus may result in Dutch disease for recipient is not valid (Al Mamum, Sohag, Samargandi &Yasmeen, 2016). Remittance flow moves in tandem with labour productivity. From figure 3, there is a positive relationship between remittance and labour productivity with both increasing steadily over time.

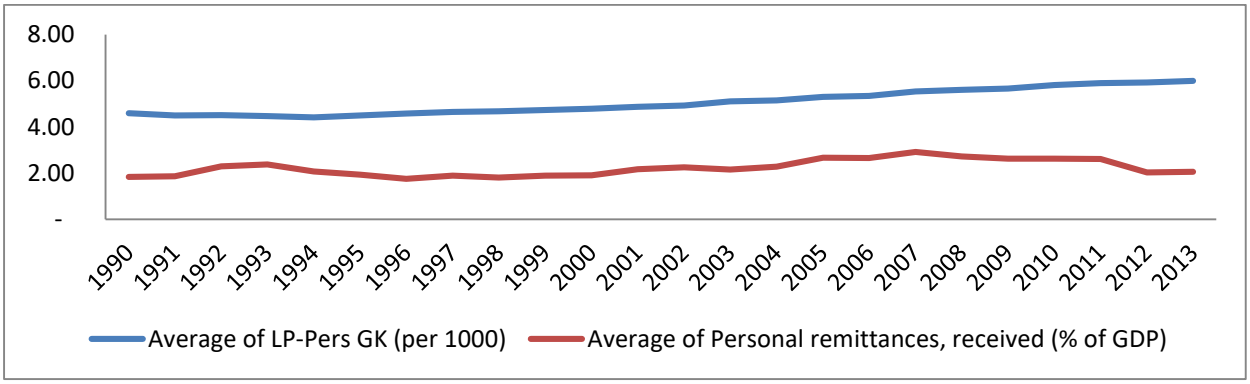
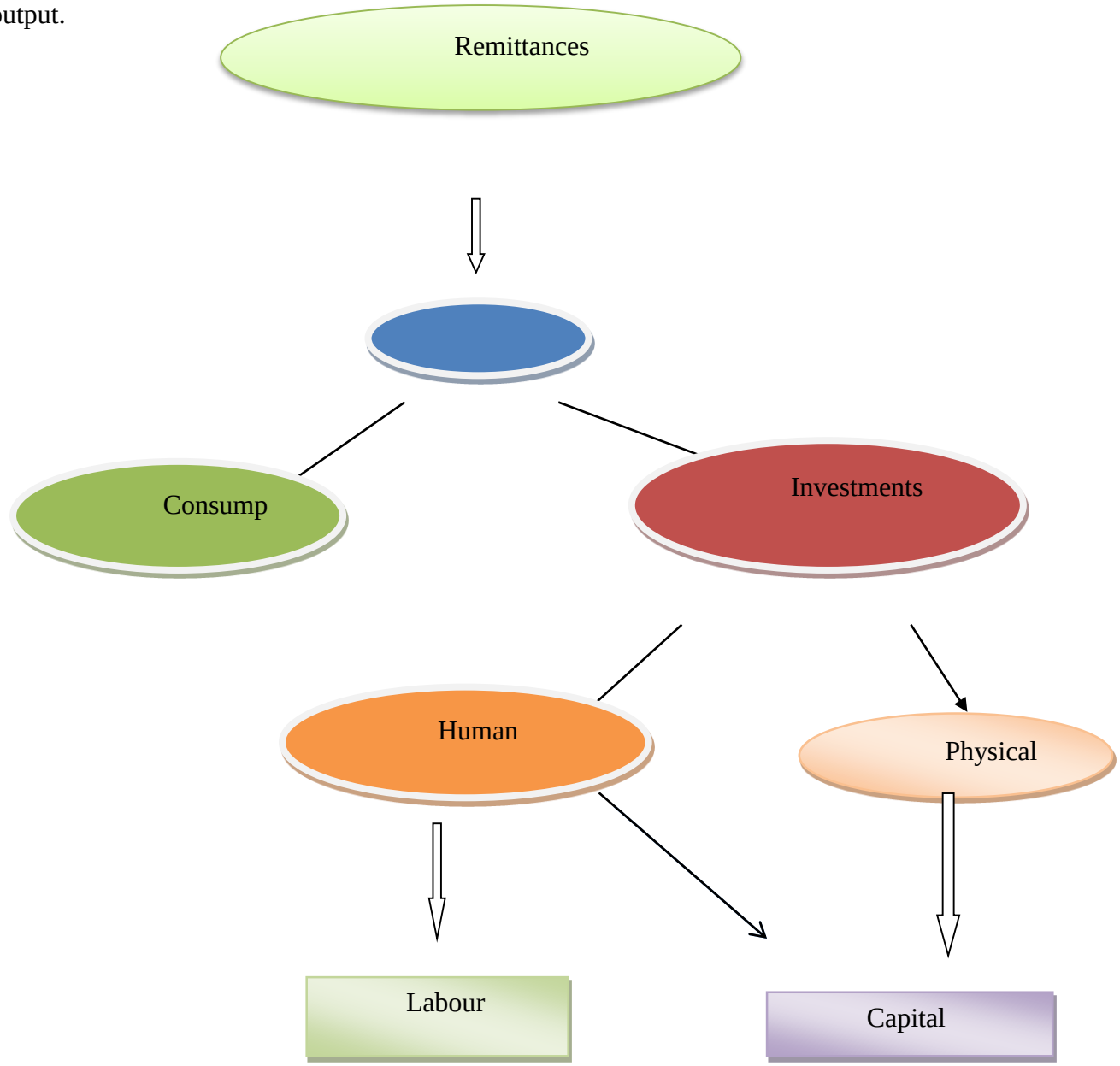


Figure3. Source: Authors compilation

3 Conceptualising Remittance Impact on Labour Productivity and Capital Accumulation

The underpinnings of this framework stem from (Al-Mamun, Sohag, Uddin, & Shahbaz, 2015). Balde, (2010:17) shows that remittance inflows increase saving, investment capital, human capital investment and have an overall multiplier effects on consumption, aggregate demand and output.



Source: Authors' own compilation, 2016

Diagrammatically we show that remittance inflows are either consumed (Sofranko& Idris, 2009; Chami, Fullenkamp & Jajah 2003) or invested (Woodruff & Zenteno 2007). Investing of remittance inflows can be made in human capital through the financing of training, skills acquisition and other forms of educational attainments of recipients, this having a spill- over effect on the productive potential of labour (Rapoport & Docquier, 2006; Caballe & Santos, 1993). Remittance inflows are also invested in productive assets leading to an increase in accumulation of capital (Chiodi, Jaimovich & Montes-Rojas 2012; Amuedo-Dorantes, 2014).

4 Literature

In the last two decades, the colossal remittance literature has focussed attention on issues other than the potential impact of remittance on labour productivity and domestic saving- enhancing capital accumulation.

Some empirical studies on remittances includes: remittance and economic growth (Dzeha, 2016; Nyamongo, Misati, Kipygoub & Ndurangu, 2012; Barajas, Chami, Fullenkamp, Gapen, & Montiel 2009); Rajan & Subramanian, 2005; Taylor & Wyatt, 1996; Nishat, 1991). Dzeha,(2016) finds that there is no consensus in both theoretical and empirical literature on the impact of remittance on economic growth. In the remittance and development literature (Adenutsi, 2010; Gupta, Patillo & Wagh 2009; Siddique & Kernal 2006; Adams & Page, 2005; Chami et al., 2005; 2003; Ratha, 2003; Adams, 1993).

Gupta et al., (2009) show how remittances afford recipients the ability to increase consumption of basic necessities such as food, good healthcare, shelter, and clothing, alleviating poverty and enhancing the productive capacity of recipients. Adenutsi, (2010) finds that there are increased positive externalities resulting from high remittance inflows. These externalities include higher access to essential social infrastructure, potable water, healthcare facilities in import-dependent developing countries like SSA (perhaps with the exception of Republic of South Africa, Cote d'Ivoire and the Seychelles and some oil exporting countries like Nigeria and Namibia). For remittance impacts on human capital formation, on education and schooling (Adams & Cuecueha, 2010; Calero, Bedi & Sparrow,2009 ; Edwards & Ureta, 2003; Hanson & Woodruff, 2003). Edwards and Ureta (2003) find that remittances play a significant role in keeping younger members of the family at school by financing human capital in El Salvador. Caballe and Santos (1993) and Graça et al., (1995) show that increases in physical capital raise the return of education producing a positive spill-over effect on the level of human capital.

Remittance impact on consumption (Sofranko & Idris, 2009; Rapoport & Docquier, 2006; Quartey & Blankson, 2004) positively. Rapoport and Docquier, (2006) show that remittances enhance consumption smoothing and leads to the decline of poverty in many developing countries. Remittance and financial development (Nyamongo & Misati, 2011; Aggarwal & Horowitz 2010; Shahbaz et al., 2007; Giuliano.& Ruiz-Arranz, 2005; Gupta et al., 2003), substantiate remittance as a source of insurance and welfare (Gupta et al., 2009; Amuedo-Dorante & Pozo, 2006), arguing that remittance lead to Dutch Disease (Adenutsi, 2010; Acosta, Fajnzylber & Lopez, 2007 Vargas Silva,2009; Lartey et al., 2008; Bourdet & Falck, 2006). Adenutsi, (2010) expresses that an increase in remittance inflows results in a moral hazard arising from higher voluntary unemployment, higher income inequality, exchange rate appreciation and the Dutch Disease, especially in small open import--dependent economies. In remittance and labour participation studies, Chami et al., (2005) show that remittance receiving households in Pakistan experience a decline in their active involvement in agriculture. Bayangos and Jansen, (2011) find remittances have a significantly positive effect on the Philippines' domestic labour market. Rodriguez and Tiongson (2001) indicate that remittances reduce employment among men and women in the Philippines

Amuedo-Dorantes and Pozo (2006a) find evidence that remittances tend to encourage Mexican men to change their allocation of labour supply across types of employment and thus to a drop in the labour supply of Mexican women. In agreement, Acosta (2006) finds that remittances are negatively related to the female labour supply in El Salvador, while male labour force participation seems to be insensitive. Adenutsi, (2010) and Ariff (2010) find that the disincentive to work is associated with the inflow of remittance.

Sofranko & Idris, (2009) conclude that workers' remittance is mainly for consumption. Ssozi and Asongu, (2015) with data from 31 Sub-Saharan Africa (SSA) countries across 1980-2010, show that current remittance receipts boost consumption. but have a negatively insignificant impact on investment. They however show that it is previous remittance received that boosts investment

through increased consumption and not current receipts. Woodruff & Zenteno (2007) show that remittance inflows employed in financing domestic investments, lead to capital accumulation.

While there exist no data on how much of remittances are consumed or invested, studies show that the monies are mostly consumed (Gupta, Pattillo, & Wagh, 2009; Adams & Page, 2005). Others find that remittances are invested as business start-up capital (Mesnard, 2004; Woodruff & Zenteno, 2004; Dustmann & Kirchkamp, 2002;) or directly into domestic savings (Osili, 2007; Ameuedo-Dorantes & Pozo, 2006). Remittance receipts are also invested in education, acquisition of skills through training and personal development (Vlase, 2013; Bredl, 2010; Calero et al., 2009; Amuedo-Dorantes et al.,2008 ; Acosta et al., 2007; Acosta, 2006).

León-Ledesma & Piracha (2001) studied 11 Central and East European (CEE) transition countries across 1990-1999 and found that remittance impacted positively on productivity and employment both directly and indirectly via its effect on investment. Al Mamun, Sohag, Uddin, & Shahbaz, (2015) using data from 1980–2012 on 61countries show that remittances impact positively on labour productivity, but it is insignificant. They also show that beyond a certain threshold, remittances have negative impacts on domestic labour productivity.

Clearly, there is dearth in literature as to how remittance impacts on labour productivity and domestic savings in Africa that has much resource wealth, making this study imperative.

Remittances unlike loans have no direct interest payments or financial obligations attached, hence have the potential to augment financial wealth. If natural resource wealth improves domestic capital, then both may accrue to disposable income, all things being equal. These afford recipients excess income over expenditure which can be channelled into various forms of investments. These investments include: purchase of real physical assets which generate wealth and increase savings and capital accumulation or the options of investing into education, acquisition of skills through training, enhancing labour productive quality. We fill the gap by exploring remittance impact on labour

productivity with respect to resource wealth and longevity of life. We further explore the difference remittance will make in capital accumulation through- domestic savings with respect to human capital in Africa.

5 Methodology

5.1 Introduction

This study contributes to knowledge, first by establishing the full potential of the remittance impact on labour productivity with respect to the continent's natural resource wealth. Furthermore, we show the extent to which remittance has an impact on labour productivity in environments where life expectancy is high. Secondly we investigate the difference human capital makes in remittance impact on capital accumulation in Africa.

5.2 Model specification and description of data

This study ascertains the impact of remittance on Labour productivity and capital accumulation, together in two different models: Labour productivity *(Lp)* is defined as labour productivity per person employed according to the 1990 US$ which is converted at the Geary Khamis Purchasing Power Parity. The Geary-Khamis dollar (International dollar) is a currency unit used by economists and international organizations to compare the values of different currencies, adjusted to absorb variations in currency exchange rates as well as reflecting purchasing power parity (PPP) and average commodity prices within each country. We employ the model in Al- Mamun, et al., (2015) that looks at labour productivity per economically active men globally. We however depart from their studies by considering the total labour productivity per person (both male and female), sourced from 'The Conference Board database 2015'

Labour productivity Lp_{it} however in this study is the dependent variable and is a function of a vector of explanatory variables X'_{it}.

$$Lp = f(Rem, Gdp/cap, Investment, FinOpen, Manv, Empgrowth, Popgrowth) \quad (1)$$

$$Lp_{it} = \alpha_0 + X'_{it}\beta + \mu_i + \lambda_{it} + \varepsilon_{it} \quad (2)$$

Where i stands for cross-sectional dimension, $i = 1,2,3, \ldots\ldots J$ and t represents the time period, $t = 1, 2, 3 \ldots\ldots\ldots T$ and $X_{it} = (X_{it1}, X_{it2}, X_{it3} \ldots\ldots X_{itk})$ is a vector of explanatory variables, $\beta = (\beta_1, \beta_2, \beta_3 \ldots\ldots\ldots\ldots \beta_k)$ is a vector of K regression parameters where $\beta_j = (J = 1, 2, 3 \ldots\ldots K)$ represents the average change in Lp_{it} per a unit increase in J^{th} explanatory variables $X_{itj} = (J = (1, 2, 3, \ldots\ldots\ldots\ldots K)$ while α_0 stands for an intercept parameter μ_{it} and ε_{it} are the vectors of country specific fixed effect errors and time specific errors respectively.

The specific equation is,

$$lnlp_{it} = \alpha_0 + \beta_1 lp_{it-1} + \beta_2 Rem_{it} + \beta_3 NatRes_{it} + \beta_4 Rem * NatRes_{it} + \beta_5 lifeExp_{it} + \beta_6 Rem * lifeExp_{it} + \beta_7 Gdp/cap_{it} + \beta_8 invest_{it} + \beta_9 finope_{it} + \beta_{10} Manv_{it} + \beta_{11} empgrwth_{it} + \beta_{12} popgrwth_{it} + \mu_{it} + \varepsilon_{it} \quad (3)$$

Being aware of the limitation in the measurement of international migrant remittance *(Rem)* under the circumstance we adopt the definition from the world development indicators (WDI), 2015. Define as the sum of worker's remittances (which are the monetary transfers sent home from workers residing abroad for more than one year under the current account subcategory as 'current transfers' and migrants' transfers representing the net wealth of migrants who moved from their country of employment to another, often captured under the capital account subcategory as 'capital transfers' and compensation of employees). It is expected that remittance will positively impact labour productivity. Natural Resource *(NatRes)* is measured as total natural resource rent scaled by

gross domestic product and total life expectancy at birth for both males and females in years. All sourced from WDI, 2015 and are expected to positively impact labour productivity.

We further interact remittance and natural resource *(Rem*NatRes).* The intuition is that remittance flow in to increase incomes thus in resource rich countries, disposable incomes will further be increased. This is like to increase labour productivity if such incomes are invested in human capital development. The literature documents that countries receiving large revenues from natural resource endowments raise less revenue from domestic taxation (Moore, 1998, 2007; Collier & Hoeffler, 2005; Collier, 2006; Bornhorst,et al., 2008). It suffices to argue that the reduction in tax collection is likely to increase disposable income. Remittance inflows will further augment income levels and therefore we expect that it will promote labour productivity. Ascertaining the effect of this on labour productivity is imperative.

We further argue that the longer life expectancy and remittance inflows move in tandem. Higher inflows of remittance are received by older people for their upkeep. A dummy was created for countries with a life expectance ratio greater than 55 years as '1', for high life expectancy, and those with less than 55 years as '0', for lowlife expectancy. We interact remittance with high life expectancy to ascertain its effect on labour productivity. It is hope that older people towards the end of their working years become less productive thus, are more likely to attract the inflows of remittance although these will be useful for consumption smoothing. This may or may not directly promote labour productivity hence interacting remittance and life expectancy *(Rem*lifeExp)* will enable us ascertain its impact on labour productivity. We further argue that longevity undergirds and strengthens labour productivity through the transmission of knowledge, skills and expertise to the younger generation. If older recipients of remittance are skilled and trained, they may live longer to share their skills and expertise with the younger generation enhancing labour productivity. This makes its effect undecided.

The factors that can affect labour productivity are numerous in an economy in transition towards a market economy, such as Africa where economic policies and productive structures are changing dramatically. We employ other control variables which include the gross domestic product per capita *(Gdp/cap)*, investment *(Inv)* is proxy as gross fixed capital formation, financial openness *(fdi)* proxy as foreign direct investment all normalised at GDP. All three are sourced from WDI, 2015 data and are expected to have a positive impact on labour productivity. Other control variables sourced from the WDI, 2015 include manufacturing value to Gdp *(Manv)* and annual employment *(empgrwth)* which were expected to impact positively on labour productivity. Population growth *(popgrwth)* is annual date and expected to have a negative impact.

The second model explores the impact of remittance on capital accumulation, as per (Hossain, 2013).

$$Ca = f(Rem, Finopen, Inv, \frac{Gdp}{cap}, Humcap, Inf, Trade, Agedep, IR) \quad (4)$$

$$Ca_{it} = \alpha_0 + X'_{it} + \mu_i + \lambda_{it} + \varepsilon_{it} \quad (5)$$

Specific model estimated is;

$$Ca_{it} = \alpha_0 + \beta_1 Ca_{it-1} + \beta_2 Rem_{it} + \beta_3 Rem * Humcap_{it} + \beta_4 finopen_{it} + \beta_5 inves_{it} + \beta_6 Gdp/cap_{it} + \beta_7 humcap_{it} + \beta_8 Inf_{it} + \beta_8 Trade_{it} + \beta_{10} Agedep_{it} + \beta_{11} IR_{it} + \vartheta_{it} + \varepsilon_{it} \quad (6)$$

Capital accumulation *(Ca)* is the dependent variable, proxy growth of gross domestic savings which directly augment domestic capital that can be harnessed and channelled into productive investments enhancing the productivity of labour. It is a function of personal remittance received from abroad to Gdp *(Rem)* as the key endogenous variable. Data were sourced from the World Bank - World Development Indicators, 2015. We anticipate that remittances will augment domestic savings if their recipients are more knowledgeable, skilled and trained. It is much more likely that such recipients will channel remittance inflows into more productive domestic investments. This will

increase the accumulation of capital. We thus interact remittance and human capital *(Rem*Humcap)* and expect that it impact on capital accumulation will be positive. We also expect human capital *(humcap)*, proxy as secondary school enrolment, to positively promote domestic savings- capital accumulation. Financial openness *(fdi)* proxy as foreign direct investment normalised by gdp, investment *(inv)* proxy as gross fixed capital formation, growth in gross domestic product per capita *(gdp/cap)*and trade to Gdp *(Trade)* are all sourced from WDI, 2015 and are expected to promote domestic savings.

Inflation *(inf)* deflated by Gdp and Age dependency *(Agedep)* also from WDI, 2015 data are expected erode capital thus have a reduction effect on capital accumulation. It is expected that real interest rate *(IR)* has both a positive and negative impact on capital accumulation.

5.3 Methods of Estimation

Prominent concerns in the migration and development literature is the issue of endogeneity. We employ panel data estimation is the best suited for pooling cross-section and time-series data together.

The use of the Ordinary Least Square (OLS), Fixed and Random estimators are not deemed fit for the estimation of the parameters in our panel regression model. Basically, the assumptions undergirding these estimators are violated given the data available for the study, its best to employ the Generalised Method of Moment. Moreover, the independent variable, remittances, is seen as endogenous to the model, creating biased estimates should the OLS be used. According to Arellano, Manuel, Bover and Olympia, (1995), a regressor is endogenous if it is not orthogonal to the error term. That is, if it does not satisfy the orthogonality condition. With an intercept in the equation, endogeneity arises if and only if the regressor is correlated with the error.

Remittance inflows are presumed to influence labour productivity and capital accumulation of a country; although it is believed that some other independent variables may be dependent on the

labour productivity and capital accumulation. For instance, it is likely that the per capita GDP growth affects labour productivity and capital accumulation and, inversely, labour productivity and capital accumulation might affect GDP growth in an economy through the channel of savings and investment. This comes with issues of endogeneity.

The Generalized-Method-of-Moments (GMM) estimators developed for dynamic panel data introduced by Arellano and Bond (1991) is utilised in our estimation. Arellano and Bond (1991) proposed a one-step and two-step generalized method of moments (GMM) framework to estimate coefficients of panel regression and argued that additional instruments can be obtained in a dynamic model if one utilizes the orthogonality conditions that exist between lagged values of dependent variables and the disturbance term. The first-difference of the model taken eliminates the individual effects and then estimates are computed using two or higher period lagged dependent variables as instruments, following Sargan-Hansen's optimal GMM framework (Baltagi & Kao 2000).

Although GMM proven to be more efficient with short time series and employs the use of internal instruments as oppose to other IV estimators which use external instruments, one of its limitation is the asymptotic weakness of its precision and that of the instruments which involve considerable bias in finite samples.

The GMM allows the elimination of country-specific effect by; taking the first-differences of equations (3) and (6).

$$y_{it} - y_{it-1} = \alpha(y_{it-1} - y_{it-2}) + \beta(X_{it} - X_{it-1}) + (\varepsilon_{it} - \varepsilon_{it-1}) \quad (7)$$

Thus, this eliminates potential biases with unobserved fixed country effects. The use of instruments required deals with (1) the endogeneity of the explanatory variables, and, (2) the problem created by constructing the new error term $\varepsilon_{it} - \varepsilon_{it-1}$ which correlates with the lagged dependent variable, $y_{it} - y_{it-1}$ is eliminated. Under the assumptions that the error term is

not serially correlated and the explanatory variables are weakly exogenous (i.e., the explanatory variables are uncorrelated with future realizations of the error term), the GMM dynamic panel estimator uses the following moment conditions:

$$E[y_{it-s} \,.\, (\varepsilon_{it} - \varepsilon_{it-1})] = 0 \qquad \text{for} \quad s \geq 2; \quad t=3\text{……..,T}$$

$$E[X_{it-s} \,.\, (\varepsilon_{it} - \varepsilon_{it-1})] = 0 \qquad \text{for} \quad s \geq 2; \quad t=3\text{……..T}$$

6 Discussion of Results

We initially used descriptive statistics to have a clear and generalized view of the data. In table 1, the description of the entire panel is exhibited. It shows that the average level of labour productivity per year (real GDP per person employed converted to Geary Khamis Purchasing power parity) is $ 5062.62. The level of remittance receipts per Gross domestic product per year is 2.2% averagely. Maximum remittance received per year under the coverage period, is 14% per Gdp with variability of 2.5%. The average growth of Gdp per capita per year is approximately 1.6%. Average investments proxy as gross fixed capital formation yearly and is 19%. Growth in employment and population growth is 2.9% and 2.4% respectively. Among the variables, labour productivity has the greatest variability and the least variable is remittance and population growth.

Table 1: Descriptive statistics

Variable	Mean	Std. Dev.	Min	Max	Observations
Labour Productivity	5062.617	4760.746	645.8616	21134.06	600
Remittances	2.227774	2.570737	.000039	14.58351	567
Gdp per capita	1.611339	4.993255	-26.28907	54.95331	600
Investment	19.14834	6.962468	0	40.31781	579
Financial Openness	2.738478	4.20194	-5.980459	42.84896	598
Manufacturing value	4553320	2.65e+07	0	2.03e+08	570
Employment Growth	2.945064	2.616311	-16.043	22.8662	600
Population Growth	2.479564	.9237034	-1.664223	7.633476	600

Table 2 presents the bivariate correlations among the variables. Labour productivity is significant and positively correlated to remittance as well as Gdp per capita growth and investment. While it surprisingly correlates negatively with financial openness, manufacturing, employment growth and population growth, it is significant to manufacturing and population growth. Remittance inflows negatively correlate to population growth, although significant to its inflow.

The results generally show relatively low correlations among the variables. Additionally, we assessed whether multicollinearity was a problem by computing the variance inflation factors (VIFs).

None of the VIFs approached the threshold value of 10 suggested by Neter, Wasserman, and Kutner (1985).

Table 2: Pairwise correlation among variables

	LabProd	Rem	Gdpcapita	Invest	Finopen	Manuv	EmpGrwth	PopGrwth
Labour Productivity	1.000							
Remittance	0.317	1.000						
Gdp/capita	0.092	0.131	1.000					
Investment	0.246	0.186	0.196	1.000				
Financial. opening	-0.045	0.007	0.115	0.171	1.000			
Manufacurng	-0.083	0.125	-0.003	0.098	-0.033	1.000		
Employment Growth	-0.057	0.016	0.122	0.091	0.011	0.004	1.000	
Population Growth	-0.565	-0.140	-0.114	- .032	0.027	0.069	0.174	1.000

Clearly, the regression results in table 3 show that previous productivity of labour has more than a hundred percent positive impact on current labour productivity. An increase in remittance inflow has a significantly positive impact on labour productivity. This suggests that although remittances are sent basically with altruistic motives, it is not just for consumption or leisure. It is also employed as fees and payments for acquisition of skills and training. The results of this study also reveal that natural resource endowment has a positive impact on the productivity of labour in Africa, however it is insignificant. Guha (2013) shows that natural resource--rich countries are vulnerable to macroeconomic volatility and structural change and this enhances remittance inflows.

Interestingly, however, remittance inflow into resource rich countries significantly reduces labour productivity. This is in agreement with Al Mamun et al's (2015) assertion that beyond a certain threshold, remittance inflows tend to have a negative impact on labour productivity. Per this finding, it is worth noting that the interaction of remittance and natural resource augments domestic

capital and increase disposable income in countries that are resource rich. This is likely to effect Dutch Disease and its rippling consequences.

Visibly from the findings, it is worth noting that while high life- expectancy in insignificant to labour productivity, it does have a positive impact. It may be argued that the higher the average life expectancy, the more people become more productive, effective and efficiency due to accumulation of skills and expertise over the years although the effect is not significant. It may also be conjectured that the longer the average life expectancy, the higher the tendency to be less productive. Remittances received by retirees may be massive as their income earning potential reduces toward the end of their lives, however they are mostly meant for consumption smoothing. Remittances received into countries with high life expectancy (beyond fifty five year) decrease labour productivity significantly.

Beyond remittances, economic growth through per capita income is important for increasing productivity of labour. Financial openness significantly and positively increases labour productivity, and this is robust. It may be argued that financial openness facilitates the flow of funds needed to lubricate business endeavours. This has the tendency of raising productivity. Employment growth however, robustly and significantly reduces labour productivity. Population growth is also significantly positive to labour productivity although not robust. Manufacturing value to Gdp is insignificant but increases labour productivity. This is in congruence to Al Mamun et al., (2015) as seen in table 3.

Table 3: Results of the impact of remittances on labour productivity

VARIABLES	(1) Fixed Effect	(2) Random Effect	(3) GMM
Lag of Labour Productivity			1.002***
			(0.002)
Remittances	-0.149***	-0.151***	0.006**
	(0.042)	(0.042)	(0.003)
GDP per Capita	0.004***	0.004**	0.010***
	(0.002)	(0.002)	(0.000)
Investment	-0.005***	-0.005***	-0.000
	(0.001)	(0.001)	(0.000)
Financial Openness	0.004**	0.004**	0.000***
	(0.002)	(0.002)	(0.000)
Manufacturing value	-0.062**	-0.023	0.001
	(0.030)	(0.021)	(0.002)
Employment Growth	-0.006**	-0.005**	-0.009***
	(0.002)	(0.003)	(0.000)
Population Growth	-0.038***	-0.043***	0.010***
	(0.011)	(0.011)	(0.001)
Natural Resource	-0.003**	-0.003**	0.000
	(0.001)	(0.001)	(0.000)
Life Expectancy	0.037***	0.038***	0.000
	(0.003)	(0.003)	(0.000)
Rem_ life Expectancy	0.002***	0.002***	-0.000**
	(0.001)	(0.001)	(0.000)
Rem_ Natural Resource	0.001***	0.001***	-0.000
	(0.000)	(0.000)	(0.000)
Constant	6.596***	6.426***	-0.036*
	(0.163)	(0.179)	(0.019)
AR (1)			*0.060 **
AR (2)			*0.354*
Sargan Test			*0.947*

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

The role of remittance in capital accumulation

We further discuss results of the second model in equation 6 of unbalanced panel that models remittance impact on capital accumulation. We first explore the variables in a descriptive statistics in

table 4. The average remittances received, normalised by Gdp, are 2.4%, while Gdp per capita is 1.5% and trade to Gdp as well as interest rate is averagely 60% and 10% respectively. Average inflation, Gdp deflator is 90%, and financial openness proxy as foreign direct investment to Gdp averages to 2.7%, while investment, proxied as gross fixed capital formation to Gdp, is 19%. Averagely, the age dependency shows that the proportion of dependents per 100 working age is 86. Averagely human capital, proxied as the percentage of net of secondary school enrolment is 40.

Table 4: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Capital Accum	579	13.66061	10.97020	-33.41301	57.06182
Remittances	501	2.42449	2.61532	.00004	14.58351
Fin Openness	595	2.74416	4.21163	-5.98046	42.84896
Investment	579	19.14834	6.96247	0	40.31781
Gdp/capita	600	1.51073	4.62366	-27.14594	30.34408
Human Capital	393	40.07172	27.37636	5.16489	110.76360
Inflation	575	90.89918	1035.013	-8.484249	23773.13
Trade	598	60.29282	23.33337	10.74832	178.9938
Age dependency	600	86.53102	15.33133	43.47878	111.4636
Interest Rate	353	10.20820	24.03883	-94.21993	252.1153

Table 5 shows the bivariate correlations among the variables and evidently suggests that capital accumulation proxy as domestic saving and correlates positively with remittance. Surprisingly, financial openness is negatively correlated to capital accumulation as well as age dependency. Investment, Gdp per capita growth, human capital and trade are positively correlated to capital accumulation contrarily; inflation and interest rate which summaries macro economy are negatively correlated to capital accumulation. Inflation generally erodes capital. Unattractive domestic rates of interest discourage savings and investments domestically. The interaction between human capital and remittance positively correlated to capital accumulation. Moving in tandem, an increase in remittance receipts by skilled and trained persons leads to an increase in domestic savings and capital accumulation as shown in table 5.

Table 5: Bivariate correlation between variables

	CA	Rem	Finopen	Inv.	Gdp/cap	HumCap	Inf	Trade	Agedep	IR	HumCap*Rem
Cap.Accum.	1.000										
Remittance	0.016	1.000									
FinOpenness	-0.013	0.041	1.000								
Investment	0.288	0.160	0.174	1.000							
Gdp/cap	0.206	0.064	0.140	0.264	1.000						
HumCap	0.533	0.166	-0.053	-0.026	0.124	1.000					
Inflation	-0.004	-0.052	-0.023	-0.091	-0.138	-0.038	1.000				
Trade	0.190	0.084	0.320	0.123	0.106	0.205	-0.002	1.000			
Agedepency	-0.390	-0.187	0.090	-0.181	-0.073	-0.781	0.054	-0.219	1.000		
Int. Rate	-0.296	0.014	-0.093	-0.203	-0.166	-0.181	-0.548	-0.061	-0.016	1.000	
Humcap*Rem	0.187	0.834	-0.002	-0.040	0.094	0.514	-0.036	0.163	-0.367	-0.162	1.000

Clearly from table 6 it is observe that capital accumulated today increases as a result of domestic saving and capital accumulated previously. Remittance receipts are significant to capital accumulation, but have a reduction effect on capital accumulation. For every 1% of remittance received it leads to 0.09% fall in capital accumulation and domestic savings. This finding agrees with Chami and Jahjal (2003) who find that most of remittance income is spent on consumption goods and does not aid savings and economic investment in the short run. However in the long run, it augments aggregate demand and culminates into growth and development.

Human capital is significant and has a positive impact on capital accumulation. The interaction between remittance and human capital has a significant and positive impact on capital accumulation. This suggests that although remittances are presumed to be consumed if it flows to educated and skilled recipients, they are better saved and channelled into productive investment leading to an increase in capital accumulation. This is in agreement with (Fishlow, 1966; Barro,

1991) who find physical capital accumulation in the US was driven by high levels of education as human capital development in the 1900s.

Investment is key to capital accumulation; it is robustly significant and has a positive impact on capital accumulation. Investment robustly leads to an increase in domestic savings. Gdp per capita growth significantly raises domestic savings (capital accumulation) and has a positive impact. Economic variables, as inflation and interest rate, are significant to domestic saving (capital accumulation), however they have negative relationships with domestic savings. An increase in inflation by 1% is likely to erode domestic savings by 0.12%, as high inflation is a disincentive to savings. Interest rate robustly reduces domestic saving. 1% increase in interest rate leads to decrease in 0.01% capital accumulation.

Table 6: Results of Remittance impact on Capital accumulation.

Variable	OLS	Random	Fixed	GMM
Lag of Capital Acum.				0.213***
Remittance	-0.097***	-0.042	-0.029	-0.086***
Financial openness	-0.007	-0.003	-0.001	-0.003
Investment	0.530***	0.630***	0.653***	0.283**
Gdp/Capita	0.025**	0.013*	0.012	0.021**
Human Capital	0.011***	0.007	0.003	0.011***
Inflation	-0.227***	-0.052	-0.062	-0.122***
Trade	0.001	0.001	0.001	-0.003
Age dependency	0.001	0.004	0.006	0.005
Interest Rate	-0.020**	-0.008**	-0.007*	-0.011***
HumanCap*Remitt.	0.001	0.000	0.001	0.001*
cons	0.910	0.068	0 .140	0.654
AR (1)				*0.001****
AR (2)				*0.993*
Sargan test				*0.161*

legend: * p<0.05; ** p<0.01; *** p<0.001

7 Concluding Remarks

In this study we investigate the impact of remittance on labour productivity and capital accumulation in Africa in simultaneous models. We validate the optimistic view that inflow of remittance into Africa can be harnessed to improve and increase labour productivity, as in Al Mamun et al., (2015). We conclude also, that although remittance is imperative to labour productivity but in resource- rich countries, it has a debilitating and impeding effect on labour productivity. We also conclude that longevity- high life expectancy is crucial for recipients of remittance to upsurge labour productivity, however if the recipient country has high life expectancy it leads to a sharp decrease in labour productivity. This may be explained by the fact that although remittance flowing to the hands of the aged may be massive it basically for consumption smoothing and therefore does not directly lead to labour productivity. Remittances for such purposes are not saved and therefore do not enhance capital accumulation. Explaining this, Amuedo- Dorantes & Pozo, (2014) in a household study find that remittance will only enhance asset accumulation if its inflow is volatile, hence its unpredictability leads to precautionary savings.

On the other hand, we find that although remittance is significant to capital accumulation through domestic savings, it has a lowering effect on domestic savings, resonating with the finding of Gupta et al., (2007). Gupta et al., (2007) find that remittances are not a panacea nor a substitute endeavour for curing low- income countries. We find, however, that remittance impacts capital accumulation significantly and positively through its interaction with human capital. Remittance increases capital accumulation is in support of Barajas, Chami, Fullenkamp, Gapen & Montiel (2009) study which shows that if the recipient of remittance is less skilled in allocating capital, then it will lead to a reduction in the efficiency of domestic investment and a fall in capital accumulation. Growth in Gdp per capita, human capital- net, proxied for secondary school enrolment and investment are crucial in increasing capital accumulation through domestic savings. We find in our

study that inflation significantly erodes capital. Hence as inflation rises capital accumulation through domestic savings falls. Interest rate has a negative relation with capital accumulation. Amazingly, we find that financial openness, trade to Gdp and age dependency are shown to be insignificant to capital accumulation-domestic savings.

7.1 Policy implications

Africa's growing population plagued with deprivation signifies the probability of a high propensity to migrate in search of greener pastures. This is accompanied by huge inflows of remittance, confirming Africa as the second largest recipient of remittance. However there is dearth of comprehensive macroeconomic policies on remittances' impact on labour productivity and capital accumulation. Thus, Policy implications to this end are of principal significance to guide the stimulation of the inflow of remittance.

Given that remittance impact labour productivity, there is the need to strategically channel efforts at improving the efficiency in the inflows of remittance diaspora (living abroad), especially through formal channels. Boosting the continuous inflows will be especially useful for African countries that are much less endowed in natural resources. The findings show that beyond remittance policies that tend to encourage financial openness and raise incomes are vital for labour productivity.

Additional, as shown in the findings, although remittances directly reduce capital accumulation (domestic savings), it indirectly increase capital accumulation through human capital. This suggests that remittances will promote capital accumulation in countries with high quality of human capital. Since quality human capital is important for capital accumulation, a more pragmatic approach in pursuit of national agenda that seeks to equip labour with requisite skills through training is imperative for Africans governments. This will inure to labour productivity and capital accumulation.

Inflation rate and interest rate summaries the state of macro economy of a nation. An unstable macro economy will erode capital. The pursuit of policies that tends to stabilise macro-economy in Africa is imperative for increasing domestic savings and capital accumulation. Formulating policies that will reduce Dutch disease resulting from remittance receipts and capital inflows from natural resource is highly recommended. It is expected that Africa will continue to confront its setbacks with its hard cash receipts through remittances capital, leapfrogging its capital base and providing opportunities to improve human capital.

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Appendix:

Appendix 1:

Sampled African Countries and their Labour productivity Growth

Ccode	Country	LPGrowth %	Ccode	Country	LPGrowth %
1	Algeria	-0.05	14	Morocco	0.95
2	Angola	3.40	15	Mozambique	4.95
3	Burkina Faso	2.80	16	Niger	0.02
4	Cameroon	-0.06	17	Nigeria	2.90
5	Côte d'Ivoire	-0.02	18	Senegal	0.70
6	DR Congo	-2.00	19	South Africa	1.00
7	Egypt	1.10	20	Sudan	2.20
8	Ethiopia	2.50	21	Tanzania	2.50
9	Ghana	2.90	22	Tunisia	2.80
10	Kenya	3.00	23	Uganda	3.50
11	Madagascar	-1.00	24	Zambia	1.00
12	Malawi	1.50	25	Zimbabwe	0.02
13	Mali	1.50	-	-	-

Source; Authour's compilation

Control variables

Variables	Description	Source	Expected sign
Gdp per capita	Gross domestic capital per capita	Wdi	+
gross fixed capital formation	investment made in land improvements; plant, machinery and equipment purchases; construction of roads, railways, schools, offices, hospitals, private residential dwellings, commercial and industrial buildings; and net acquisitions of valuable,	Wdi	+
Financial openness	proxies as foreign direct investment inflow to Gdp	Wdi	+/ -

Manv	manufacturing value to Gdp	Wdi	+/-
Empgrowth	employment growth annual	Wdi	+
Popgrowth	Population growth annual	Wdi	-
NatRes	Total natural resource rent to Gdp	Wdi	+/-
LifeExp	Life Expectancy total (year)	Wdi	+
humcap	Secondary school enrolment	Wdi	+
Inf	Inflation		-
Trade	Trade to Gdp	Wdi	+
Agedep	Age dependency	Wdi	+