# How Robust is Worker Remittance-Inclusive Growth Connection in Sub-Saharan Africa?

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**Abstract**

*This study examines the robustness of worker remittance-inclusive growth connection in 32 sub-Saharan African countries. Based on the Solow growth model, a theoretical model has been developed, which shows that worker remittance can stimulate inclusive growth if it is effectively used for augmenting productive capacity. This research derived inclusive growth based on the adjusted human development index. Comparing the results from panel least square, Arellano and Bond, and Blundell and Bond estimation techniques, this study found that Blundell and Bond estimation techniques were best robust. The study concluded that worker remittance-inclusive growth connection, although positive, lacked robustness in the sampled subregion. This implies that, dollar for naira, the income remitted by workers from abroad can only robustly be a good predictor of equilibrium inclusive growth if it were more systematically conditioned on policies that are directly linked with improving education, life expectancy and health in SSA.*

**Keywords:** Worker remittance, inclusive growth, sub-Saharan Africa
**JEL Classification:** D31, F24, I32, O40

## Introduction

International migration is one of the most important factors affecting economic relations between developed and developing countries in the 21st century. The United Nations estimated the stock of international migrants at 231 million in 2013, meaning that 3.2% of the world's 6.9 billion people were living outside their country of birth (www.unmigration.org). These migrants often remit or send sizeable portion of their earnings to families and acquaintances back home. According to world development indicators, the nominal dollars officially recorded for worker remittance to sub-Saharan Africa increased from less than

US$25 billion around 2008, to US$29 in 2009 and US$32 in 2013. This amount was projected to reach US$38 billion by 2015 (World Bank, 2014). Chukwuone et al. (2008) believe that inflows from abroad have been key stabilising factors to the local currencies against international currencies since 2003. Analytical arguments supporting this financial flows revolve around the fact that access to foreign capital allows countries to borrow to smooth consumption in the face of adverse shocks, and that the potential growth and poverty reduction gains resulting from such international risk sharing can be large and permanent (Obstfeld, 1994).

Given the tremendous importance of worker remittance inflows into SSA, the economic impact on the receiving country emerged an important topic of study. Anyanwu and Erhijikarpor (2009), Kagochi at al. (2010) and Ozurumba (2013), having observed that little attention has been paid to examining the economic impact of worker remittance on economic growth in SSA, found significant relationship. However, Dollar and Kraay (2002) argued that inclusive growth is needed to generate the resources (food, health, energy, education and housing) necessary to satisfy the essential needs of human wellbeing and to address poverty reduction. Growth inclusiveness is a must for ensuring sustainable growth, because sustained long-term growth calls for an increasing participation of the labour force in the growth process and an expansion of the sources of growth (Ianchovichina and Lundstrom, 2009). This study attempted to integrate two strands of analyses while examining the robustness of worker remittance and inclusive growth connection. The purpose was to examine how robust worker remittance-inclusive growth connection is in SSA. The study continued with an empirical analysis based on annual data for 32 worker remittance recipient countries in SSA over the period 2010-2013 based on availability of data. Partially following UNDP (2011), this research calculated annual data for adjusted human development index (HDI), the growth rate of which was used to measure inclusive growth. Three different estimation methods were employed to determine the robustness of each estimation technique. The result for the analysis had important implications for remittance-inclusive growth.

This paper is structured as follows: section 2 presents a theoretical model, while section 3 reviews the different measurements of inclusive growth and outlines the HDI calculations. Section 4 presents the methodology, while the evidence is discussed in section 5. Section 6 is the conclusion.

## Theoretical Model

The relevance of foreign capital inflow in boosting economic growth and prosperity originated from both classical and neoclassical theories of growth, which postulate that foreign capital inflow can supplement domestic investment funds to enhance the capacity of an economy to grow (Fashola, 1998). Foreign capital inflows in term of remittances are, therefore, crucial determinant of growth, thus adding to domestic savings to generate a higher rate of investment allowing less developed countries to grow faster than the more developed ones (Aghion and Howitt,1998). To explore the link between worker remittances and inclusive growth, this study used a simple version of the Solow growth model. Hence, efficient savings mobilization can, therefore, greatly improve resource allocation and boost economic growth (Sirri and Tufano, 1995). The Solow-Swan mathematical growth model can be represented in a Cobb-Douglas production function type for any economy, such as:

$$Y = A F(K, L) \qquad 1$$

Where $Y$ is output, $A$ is technological progress and $L$ is labour. The model assumes that output per worker ( $y = Y/L$ ) depends only on capital per worker ( $k = K/L$ ), which can be presented in an intensive form, thus:

$$y = A f(k) \qquad 2$$

Equation (2) implies that, for output per worker to change, capital per worker must change. The model further assumes that $k$ has smooth and twice-differentiable property: $f'(k) \succ 0; f''(k) \prec 0$ with Inada-condition: $f'(0) = \infty; and f'(\infty) = 0$. The capital accumulation equation is given by:

$$\dot{k} = \pi(k) \equiv A s f(k) - (n - d) k \qquad 3$$

Where $\dot{k} \equiv dk/dt =$ time derivative of capital per worker. It is assumed that proportion $s$ of net output is saved and invested. The first term on the right-hand side, $sf(k)$, represents gross investment; the second term, $d + n$, is the sum of depreciation rate ($d$) and the labour force growth rate ($n$). Sachs et al. (2004), observing that the actual behaviour of a poor economy deviates from the standard Solow model, argued that poor

economies suffer from positive, negative and neutral types of poverty traps (Huang and Quibria, 2013).

The following highlights three types of poverty traps:

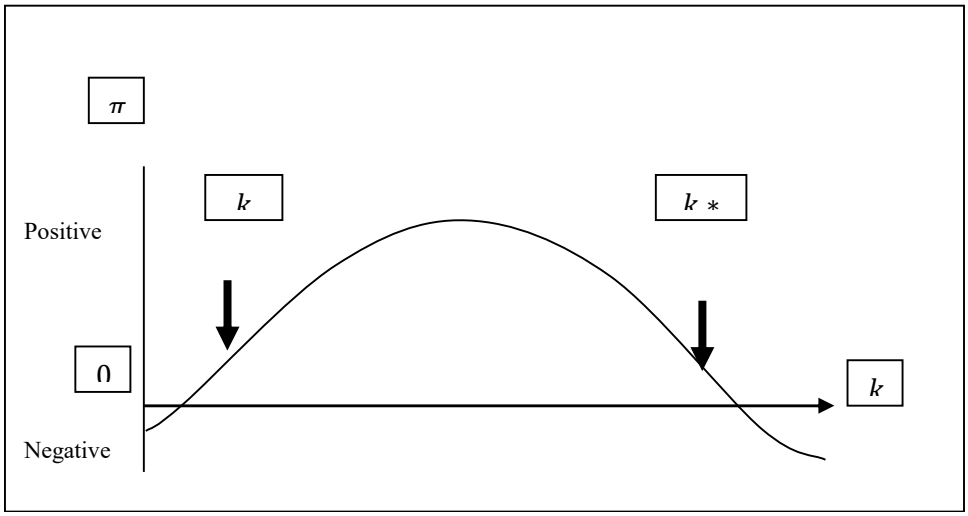


**Figure 1: Poverty traps**
*Source*: Huang and Quibria, 2013

## The low-productivity trap

In the standard Solow model, the marginal productivity of capital is very high (infinity) when $k$ is very low. However, in poor countries, marginal productivity of capital tends to be low when $k$ is low, because production processes require a minimum threshold amount of capital. This threshold can be in the form of basic infrastructure and/or human capital. In other words, assume that there is a threshold $k^*$ so that for $\forall k \le k^*$, $\pi(k) \equiv sAf - nk \le 0.$ That is, for $k \in (k^*, \infty), f(k)$ follows the standard neoclassical production properties with $f' \succ 0$ and $f'' \prec 0$; Moreover, there is $k^{**}$ so that $\pi(k^{**}) \equiv Asf(k^{**}) - (n+d)k^{**}.$ The above trap is depicted in figure 1.

## The savings trap

The savings function is less likely to be positively proportional at all income levels, as assumed in the standard model. It has been argued that with a very low

level of *k*, the savings rate is likely to be zero, or even negative, because the poor may need to use all their income for survival. To formalize this, let us assume that there is a $k^* \succ 0$ so that for $\forall k \leq k^*$ , $\pi(k) \equiv sAf - nk \leq 0$. After $k \geq k^*$, the savings rate becomes positive and proportional. With that assumption, there is $k^{**}$ so that $\pi(k^{**}) \equiv Asf(k^{**}) - (n+d)k^{**} = 0$. It is obvious that the phase diagram will have the same shape and properties as in figure 1.

**The Malthusian trap**

There is a strong correlation between low per capita income and high fertility rate. This demographic trap may lead to a situation where *n* is very high at low *k*. To formalize, let us assume that for $\forall k \leq k^*$, *n* is high and $\pi(k) \equiv sAf(k) - (d+n) \leq 0$. When $k \succ k^*$, *n* becomes low and constant. Other things remaining the same, then there is $k^{**}$ so that $\pi(k^{**}) \equiv Asf(k^{**}) - (n+d)k^{**} = 0$. It is again obvious that the phase diagram will have the same shape and properties as in figure 1.

In summary, all the three cases above point to the existence of multiple equilibria in poor countries. There is a level of foreign remittance $z > 0$ which can help a poor economy go over the threshold level of capital stock *k** and help settle the economy to good equilibrium. Even when the economy is not mired in a poverty trap, a given amount of remittance that adds to the investment and the existing capital stock can lead to an increase in the long-run steady-state per capita income. Similarly, a given amount of remittance targeted at the financial sector can enhance the productivity of labour and lead to an increase in the long-run steady state income.

Inclusive growth, as discussions in the next section will indicate, has been diversely defined as growth with declining inequality or improving social opportunities. Following this lead in the literature, the study posited the indicator of inclusive growth by:

$$I = y\psi \qquad 4$$

Where *y* is per capita income and $\psi$ is an income distribution parameter. The study, however, defined relative factor shares as:

$$\psi \equiv w/rk \qquad 5$$

Equation 4 can be rewritten, in terms of proportionate change, as:

$$\hat{I} = \hat{y} + \hat{\psi} \qquad 6$$

Note that $\hat{y} = \hat{A} \equiv \varpi$ is the total factor-productivity growth. By taking log on both sides, equation 6 can be rewritten as:

$$\ln \psi = \ln (w/r) - \ln k \qquad 7$$

Differentiating both sides with respect to $k$, the following is found:

$$d ln\psi / d \ln k = d \ln (w/r) / d \ln k - 1 = \left(\frac{1}{\sigma}\right) = \left(\frac{1-\sigma}{\sigma}\right) \qquad 8$$

Where $\sigma \equiv \frac{d \ln k}{d \ln (w/r)}$ is the elasticity of substitution in production.

As equation 8 suggests, as worker remittance $z$ increases, it affects $k$, which, in turn, affects both per capita income ($y$) and income distribution $(\psi)$. While remittances $z$ affect $y$ positively, the impact on income distribution $\psi$ is ambiguous and would depend on the elasticity of substitution in production $\sigma$. Equation 8 can be re-written as:

$$\hat{I} = \psi + \left(\frac{1-\sigma}{\sigma}\right) \qquad 9$$

Equation 9 suggests that remittance will have a positive impact on inclusive growth, namely, growth with equity, for reasonable values of the elasticity of substitution of the aggregate production function. When the production function exhibits high degree of elasticity in substitution, there may be replacement of labour by capital, leading to an adverse distribution of labour income. For realistic values of the parameter $\sigma \in [0,1]$, the distribution impact is favourable. Even when elasticity exceeds unity, the distributional impact will continue to be favourable as long as the technological progress is neutral and robust. This would suggest that remittances can be a potent instrument for inclusive growth if effectively used for augmenting productive physical or human capacity. In keeping with the above definition of inclusive growth, the empirical section of

the paper uses the growth rate of the human development index adjusted for inequality in the distribution of each dimension across the population.

## Measuring Inclusive Growth

Much has been written on the measurement of inclusive growth literature but not without definitional diversity. Ali and Son (2007), using a social opportunity function, considered growth to be inclusive if it enhances the social opportunity function. More specifically, these authors examined the extent to which social opportunities, such as access to health and education are aligned along the income distribution and whether improvements are pro-poor. But as pro-poor improvements in health or education can occur with or without income growth, the concept of these researchers is non-income dimension wellbeing biased (Klasen, 2010). Klasen has argued that a measure of growth inclusiveness must include both income and non-income dimensions of wellbeing, such as access to education and health. He defined inclusive growth as non-discriminatory and disadvantage-reducing; he stated that growth is inclusive if it allows all members of society, especially the poor and disadvantaged, to participate in and contribute to the growth process, and if it promotes an inequality decline in the non-income dimension of wellbeing, including education, health, nutrition and social integration. ADB (2012) has proposed a framework of inclusive growth indicators made up of a set of 35 markers; but the question of how to weigh and aggregate these indicators was left unanswered by ADB.

In a study of the inclusiveness of growth in Asian developing countries, Habito (2009) examined patterns of growth from a 'weak absolute' pro-poor growth dimension —i.e. concerned with whether growth reduced poverty and, more specifically, with the poverty elasticity of growth. Habito compared the poverty elasticity of growth with both a one dimensional (income-based) and a multidimensional (using United Nations' human poverty index) measure of poverty, finding significant differences between them. Habito's conclusion points to the importance of approaching poverty from a holistic perspective to better inform development interventions. This is in line with the inclusive growth definition by the European Commission (2010). The Commission articulated in its Europe 2020 Strategy that inclusive growth should be based on a high-employment economy and the assurance that all social groups not only participate in the growth process but also enjoy its benefits. Inclusive growth should promote a high-employment economy that delivers social inclusion and economic, social and territorial cohesion.

Adopting a comprehensive perspective, Ianchovichina and Gable (2012) presented an analytical framework for assessing inclusive growth, paying attention to both the pace and the pattern of growth. The authors argued that the major instrument for inclusive growth is productive employment; hence, government policies that encourage the creation of productive employment and strengthen the productive resources and capacity of individuals are sine qua non.

Covering several inclusive growth dimensions of most of the authors above offers no concrete index of growth inclusiveness. To fill this gap, McKinley (2010) proposed an inclusive growth index based on the Asian Development Bank's Long-Term Strategic Framework 2008–2020, which identified that inclusive growth entails: (i) achieving sustainable growth that will create and expand economic opportunities, and (ii) ensuring broader access to these opportunities so that members of society can participate in and benefit from the growth (McKinley, 2010). McKinley argued that inclusive growth must include indicators of growth, productive employment, economic infrastructure, income poverty and equity, gender equity, human capabilities and social protection.

Inclusive growth, as defined by the UNDP International Policy Centre for Inclusive Growth (IPC-IG), must ensure that everyone can participate in the growth process, and that everyone shares equitably the benefits of such growth. Based on the UNDP definition, Ramos, Ranieri and Lammens (2013) and Huang and Quibria (2013) suggested that inclusive growth measurement must enhance benefit-sharing and participation. The authors included three indicators in the analysis: income poverty, inequality (as proxy for the benefit-sharing dimension) and the employment-to-population ratio (as proxy for participation). The index gives prominence to poverty and inequality, which have consistently been the core indicators of pro-poor and inclusive growth, combining them with the indicator of employment to account for the participation dimension. They gave the three indicators equal weight in the index in an attempt to attenuate the shortcomings of arbitrarily determining the weight of each indicator. Following Ramos, Ranieri and Lammens (2013), Huang and Quibria (2013) and UNDP's (2011) human development index, the current study calculated annual data for an inequality-adjusted HDI (IHDI), the growth rate of which was used to measure inclusive growth. It calculated the inequality-adjusted human development index (IHDI). By adjusting HDI for inequality in the distribution of each dimension across the population, IHDI was computed as a geometric mean of three dimension indices adjusted for inequality.

$$HDI = \sqrt[3]{I_{Life} \times I_{Education} \times I_{Income}} \qquad 10$$

Where $I_{Life}, I_{Education}, I_{Income}$ are life expectancy index, education index and income index, respectively. According to World Bank (2014), inclusive growth, $INCGR_{it}$, is defined as the growth rate of $HDI_{it}$, as follows:

$$INCGR_{it} = 100 \bullet \left( HDI_{i,t+1} - HDI_{it} \right) / HDI \qquad 11$$

## Methodology

Following the theoretical framework, this section makes use of an extended empirical model in which inclusive growth rate, $ING_{it}$, is a function of its lag $(ING_{i,t-1})$, worker remittance indicator ($WR_{it}$) and a number of control variables for country $i(i=1,2,...32)$ at time period $t(t=1,2,...4)$. The parametric remittance-inclusive growth model can be written as:

$$ING_{i,t} = \alpha y_{i,t-1} + \psi' X_{i,t} + u_{i,t} \qquad 12$$

Where $ING$ is a measure of inclusive growth, $ING_{i,t-1}$ is the lag of inclusive growth. $X$ represents the set of explanatory variables (other than that controlling for other factors associated with inclusive economic growth), $u$ is the error term, and the subscripts $i$ and $t$ represent country and time period, respectively.

As mentioned in the introduction, many theoretical models show that inclusive growth is likely endogenous (e.g. McKinley, 2010), which implies that $E\left(\varepsilon_{i,t} / WR / ING\right) \neq 0$. Estimating model 1 directly will generate biased estimators (Arellano and Bond, 1991). This problem can be handled by introducing a set of instruments; then, $(WR_{i,t})$ can be expressed in terms of these instruments $G_{i,t}$ as:

$$(WR / ING)_{i,t} = g(G_{i,t}) + u_{i,t} \qquad 13$$

Where, for simplicity, $g(G_{i,t})$ is assumed to be parametric, say $g(G_{i,t}) = b'G_{i,t}$. We chose the lagged explanatory variables as instruments. Thus, (2) can be written as:

$$\left(WR / ING\right)_{i,t} = b'z_{i,t-1} + u_{i,t} \qquad 14$$

Where $Z$ represents all the explanatory variables in equation 14. We assume that $E(\varepsilon_{i,t} / Z_{i,t-1}, u_{i,t}) = E(\varepsilon_{i,t} / u_{i,t})$. It then follows that $E(\varepsilon_{i,t} / u_{i,t}) \neq 0,$ since $E\left(\varepsilon_{i,t} / WR / ING\right) \neq 0$.

Hence, one can decompose $\varepsilon_{i,t}$ into $\xi_i(u_{i,t}) + \varepsilon_{i,t}$, where $\xi_i(u_{i,t}) = E(\varepsilon_{i,t} / u_{i,t})$ and $\varepsilon_{i,t} = \varepsilon_{i,t} - E(\varepsilon_{i,t} / u_{i,t})$. Equation 12 then becomes:

$$ING_{i,t} = \beta ING_{i,t-1} + \delta X + \xi\left(u_{i,t}\right) + \varepsilon_{i,t} \qquad 15$$

The unobservable $u_{i,t}$ was replaced by the observable $\hat{u}_{i,t} = \left(WR / ING\right)_{i,t} - \hat{\psi}' Z_{i,t-1.}$. Then equation 15 becomes:

$$ING_{i,t} = \beta ING_{i,t-1} + \psi' X + \xi\left(\hat{u}_{i,t}\right) + \varepsilon_{i^{*},t} \qquad 16$$

Where the error $\varepsilon_{i^{*},t} = \varepsilon_{i,t} + \xi_i(u_{i,t}) - \xi_i(\hat{u}_{i,t})$

One can use Arellano and Bond's (1991) two-step white period and Arellano and Bover's (1995) weighting matrix estimators to obtain consistent estimation of β and $\psi$ in the, say $\hat{\beta}$ and $\hat{\psi}$. It is, of course, the $\hat{f}\left(WR / ING\right)_{i,t}$ estimated function that we are interested in, since it captures the marginal effects of the remittance/ inclusive growth variable clean of any endogeneity.

The data set used was from the World Development Indicators (WDI). It consisted of observations for 32 sub-Saharan countries for the period 2010-2013. Table 2 of Appendix 1 represents the list of countries that are included in the sample and table 2a and b provided summary statistics on the variables used and their correlations with each other. The key independent variable was worker remittance, denoted by WR. Meanwhile, literature has highlighted three components of the balance of payments in regard to compiling statistics on remittances: workers' remittance, migrant transfer and compensation of employee. A common practice in the literature, however, has been to sum the three categories when compiling statistics on remittances. Recent examples can be found in Ratha (2003), World Bank (2005), IMF (2005), Aggarwal et al. (2006) and Kure and Nwosu (2010), among others. OECD (2006) and Ahortor and Adeuntsi (2011), among others, have also gone ahead to add other current transfers, plus additional categories in the balance of payments statistics (BOPS). The inclusion of migrant' transfers may sufficiently pollute the database with non-remittance behavioural characteristics and, consequently, render any specification and conclusion egregious. This study therefore employs workers' remittances category that closely conforms to the notion that researchers and policymakers have in mind when discussing remittance flows. The study,

however, recognises that workers' remittance data are underestimated due to the use of informal channels.

In addition, this analysis controls for financial depth (credit to private sector and broad money supply). Financial depth gauges the size of financial intermediaries relative to the economy, and measures the extent to which financial intermediaries channel savings into investment, monitor firms, influence corporate governance and undertake risk management. Literature has suggested to date a number of important determinants for financial development. Following Levine, Loayza and Beck (2000), this study used credit to private sector - GDP ratio (CPS/GDP) to capture the role of financial development. This was because of Argenor and Montiel's (2008) argument that: (1) equity markets continue to be small or nonexistent in many SSA countries, and (2) financial markets in the vast majority of these economies continue to be dominated by a single type of institution— commercial banks; thus, the menu of assets available to private savers is limited to commercial banks. Generally, the relationship between income and population growth is expected to remain highly strong and positive in an enabling environment but detrimental to economic growth in fragile economies.

**Sources of data and method of estimation**

Annual data on HDI for the period 1980-2013 were provided by the UNDP human development report. Data for life expectancy at birth (total years), duration of primary and secondary education (years), and GNI per capita (PPP, current international rate ($) were from the World Development Indicators (WDI) database (World Bank, 2014).

Dynamic panel data method of analysis was adopted in the study. One of the advantages of this method of analysis is that it allows researchers to better understand the dynamics of adjustment (Blundell et al., 1992; Baltagi, 1998). For a dynamic panel data model, the existence of endogenous regressors, as well as the lagged dependent variable, makes OLS estimates inconsistent. Dynamic panel instrumental variable (IV) or generalized method moments (GMM) approaches can address the issue of endogeneity by removing unobserved fixed effects walk (Arellano and Bover, 1995). Arellano and Bond (1998), therefore, proposed a first differenced generalized method of moments (GMM) procedure that is more efficient than the Anderson and Hsiao (1982) estimator. The problem with the Arellano and Bond estimator is that the lagged levels are poor instruments for first differences, since the variables are close to a random walk (Arellano and Bover, 1995; Blundell and Bond, 1998). Arellano and Bover (1995) and Blundell

and Bond (1998) thus proposed the use of orthogonal deviations, which handle very important modelling concerning: fixed effects, potential endogeneity of regression, simultaneity bias, and reverse causality while avoiding dynamic panel bias (Blundell, 2005). Although the Blundell and Bond estimator has one and two-step variants, this study made use of the two step, because it is more robust and asymptotically efficient than the one step (Blundell, 2005).

## Results

Instruments validity tests were conducted to show and confirm that the instruments employed for the dynamic GMM were not weak. In all regressions, the study controlled for growth rate of credit to private individuals as a measure of financial development: growth rate of worker remittance, inflation rate, growth of trade openness, growth rate of foreign direct investment and gross capital expenditure. Across all estimations, it was found that past realisation of inclusive growth impacted positively and significantly on its contemporaneous levels. Comparing PLS, Arrelano and Bond, and Blundel and Bond estimates for robustness check (tables 2, columns 2, 3 and 4) respectively, it was found that the coefficients for the inclusive growth dynamics and its past realisations were all positive with greater significance. Comparing the three estimates for FDI yielded similar negative result. This analysis controlled for some of the important variables that feature in a policy environment where worker remittance could be conducive to inclusive growth.

Moreover, financial development had positive effect on inclusive growth, but the effect was not significant in panel least square. The finding from GMM shows that there existed positive direct effects of worker remittance on inclusive growth, as observed by other scholars. Aggarwal et al. (2006), for example, argue that remittance may increase the depth and breadth of domestic financial markets and lead to an increase in the degree of efficiency of the financial intermediation process by lowering costs and excessive profits associated with monopolistic or cartelized markets. Consequently, improved efficiency may lead to lower mark-up rates in banking, lower cost of investment, and higher growth rates (cf. Levine, Loayza and Beck, 2000; Argenor and Montiel, 2008). This is consistent with the Africa Development Bank's (2012) finding that any means of assessing inclusive growth with a view to guiding development policies must incorporate basic infrastructure, and social and financial services (Ramos, Ranieri and Lammens, 2013).

A 1% increase in domestic investment increases inclusive growth by 3.37% based on the Blundell and Bond estimate. This is similar to the first difference

result that shows 0.0367% increase based on Arrellano and Bond estimate, which was only significant at 10% level. Result from the panel least square was, however, negative and insignificant. Surprisingly, inflation variable was positively signed and significant in all the GMM estimators. One possible explanation for the GMM results is the central bankers' and policymakers' argument that positive but gentle inflation is required for future profitability of investment and growth inclusiveness.

**Table 1: Estimated empirical results**

| *Dependent Variable: ING* | | | |
|---|---|---|---|
| | *Panel LS* | *Arellano and Bond* | *Blundell and Bond* |
| *Regressors* | *1* | *2* | *3* |
| ING(-1) | - | 0.8647 | 0.5724 |
| | - | 0.0322 | 0.0061 |
| | - | 0.0000 | 0.0000 |
| WR | -1.3444 | 0.9803 | 0.0072 |
| | 1.6470 | 0.9459 | 0.0385 |
| | 0.4179 | 0.3028 | 0.0709 |
| GCEG | -4.7393 | 7.4268 | 0.1966 |
| | 3.5458 | 7.9740 | 0.0387 |
| | 0.1847 | 0.3579 | 0.0000 |
| INF | 0.0009 | 0.0717 | 0.0853 |
| | 0.0950 | 0.0385 | 0.0066 |
| | 0.9927 | 0.0709 | 0.0000 |
| FD | 20.5636 | 0.5355 | 0.5233 |
| | 4.9008 | 0.2165 | 0.0709 |
| | 0.0001 | 0.0138 | 0.0000 |
| OPEN | 27.3594 | 1.6411 | 7.0416 |
| | 17.2446 | 1.7234 | 23.2960 |
| | 0.1161 | 0.3473 | 0.7651 |
| I | -21.8644 | 0.0367 | 3.6720 |
| | 14.4062 | 0.0819 | 0.3572 |
| | 0.1326 | 0.0953 | 0.0000 |
| FDI | 0.1261 | 0.0181 | -0.2495 |
| | 0.3129 | 0.8299 | 0.0970 |
| | 0.6878 | 0.3579 | 0.0105 |
| Observation | 128 | 128 | 128 |
| No of Countries | 32 | 32 | 32 |
| Instrument Rank | - | 12 | 12 |

*Note*: Computed from E-View 7.0. The numbers in bold significant at 5 percent level and in bold indicate significant at 10 percent level

Trade openness index had a positive relationship with inclusive growth in all estimates, but this was not significant. This implies that SSA had not really

benefited from globalization. In column one of table 1, the panel least square estimates show that worker remittance did not have a significantly positive impact on inclusive growth. The findings on worker remittance are very interesting, based on the dissimilarity from the three methods considered. While the results from the panel least square showed a negative insignificant relationship between worker remittance and inclusive growth, that of Arellano and Bond difference GMM showed a positive but insignificant relationship. The results of Blundell and Bond were also not different from zero, in terms of significance. Comparing Arellano and Bond and Blundell and Bond estimates for worker remittance and inclusive growth, it was found that the coefficients for the Blundell and Bond GMM instrumented worker remittances were best robust. For example, while those of Arellano and Bond just showed a positive relationship, Blundell and Bond estimates suggested that a 10% increase in worker remittance will lead to an increase of 0.0072%. The reasons for these outliers in the three results could be the static nature of the panel least square, which is at variance with the dynamic panel GMM of Arellano and Bond and Blundell and Bond. Arellano and Bond (1991), cited in Baltagi (1998), argued that many economic relationships are dynamic in nature and that applying panel least square or fixed effects estimator may render the estimates biased and inconsistent (Anderson and Hsiao, 1982; Baltagi, 1998). Also, the dissimilarity between Arellano and Bond, on the one hand, and Blundell and Bond estimates, on the other, might be because of the poorness of the lagged levels employed as poor instruments for first differences, since the variables are close to a random walk (Arellano and Bover, 1995; Blundell and Bond, 1998).

In all, based on the Arellano and Bond and Blundell and Bond estimates, dollar for naira, the income remitted by migrants from abroad both had positive relationship with inclusive growth, but Blundell and Bond estimates were seemingly and fairly robust. As argued by Mehlum et al. (2006) and Fosu (2011), worker remittance would be more effective if it were more systematically conditioned on good policy. An enabling environment would include a progressive financial system development that effectively channels foreign finances for productive investment and employment growth, which is the main instrument of inclusive growth. There should be a better balance in the financial, educational, agricultural, industrial and services sectors so that all segments of the population can participate in the growth process. A balanced development between the real sector and financial sector can facilitate not only more voluminous foreign income (which is driven by development opportunities) but also development and the reduction of poverty and inequality. An enabling

environment should also encompass a financial system that offers wider access to people and an efficient regulatory system.

## Conclusion and Recommendation

This study investigated the robustness of worker remittance-inclusive growth connection in SSA. Based on the Solow growth model, the theoretical section modelled inclusive growth as a different kind of growth which incorporates life expectancy, literacy rate and income level. Comparing panel least square, Arellano and Bond and Blundell and Bond estimates for worker remittance and inclusive growth, it was found that the coefficients for Blundell and Bond GMM instrumented worker remittances were the best. The reasons for this could be the static nature of the panel least square, which is at variance with the dynamic panel GMM of Arellano and Bond and Blundell and Bond. Also, the dissimilarity between Arellano and Bond, on the one hand, and Blundell and Bond estimates, on the other, might be because of the poorness of the lagged levels employed as poor instruments for first differences, since the variables are close to a random walk, as explained by Arellano and Bover (1995) and Blundell and Bond (1998). Using the growth rate of adjusted HDI to proxy inclusive growth, the study concludes that worker remittance-inclusive growth connection was not robust. This implies that worker remittances were not directly linked with improved education, life expectancy and health in SSA. As inclusive growth envisages providing equal opportunity for people everywhere to contribute to the growth process and reap its benefits, relevant policies need to be designed according to the unique characteristics of each local society by government to ensure worker remittance inclusiveness in SSA.

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**Table 2: Country list, 32 SSA country-samples**

| |
|---|
| Angola; Botswana; Cameroon; Cape Verde; Congo Rep; Cote de'Ivore; Djibouti; Equatorial Guinea; Gabon; Mauritius; Namibia; Nigeria; Senegal; Seychelles; Sudan; South Africa, Swaziland; Benin; Burkina Faso; Burundi; Central African Republic; Chad; Congo Dem. Rep; Eritrea; Ethiopia; Ghana; Gambia; Guinea; Kenya; Lesotho; Liberia; Madagascar; Malawi; Mali; Mozambique; Niger; Sierra Leone, Mauritania; Togo; Uganda; Zambia and Zimbabwe. |

Source: Authors'

**2012 Remittance Flows to Africa**

**Global market**

| **$529bn** | **$62bn** | **2012 12%** |
|---|---|---|
| Estimated Size of global remittances flows | Estimated size of remittance flows to Africa | Africa constitutes up to 12% of total global flows |

**Top 5 Sources ($ billion)**

| **$8.4** | **$6.5** | **$5.3** | **$5.2** | **$3.8** |
|---|---|---|---|---|
| United States | | Saudi Arabia | France | United Kingdom |
| | | Jordan | | |

**Top 10 African recipients ($ billion)**

| | | | |
|---|---|---|---|
| Nigeria | $20.6 | Senegal | $1.4 |
| Egypt | $20.5 | Kenya | $1.2 |
| Morocco | $6.9 | Sudan | $1.1 |
| Tunisia | $2.2 | South Africa | $1.1 |
| Algeria | $1.8 | Uganda | $0.98 |

**Cost of Sending $200 to Africa**

The average cost of sending remittances to Africa is 12%. Globally, sending remittances cost an average of 9%. In Nigeria, where most migrants send money home from abroad, the fee is 10%. The five most costly corridors are all intra-Africa and rates are as high as 25% (World Bank, 2013).