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WHICH FORM OF FOREIGN CAPITAL INFLOWS ENHANCE ECONOMIC GROWTH? EMPIRICAL EVIDENCE IN SUB-SAHARAN AFRICA

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ABSTRACT

Empirically, results from time series and cross country studies have identified foreign capital inflows to play a pivotal role in the growth process of host countries. The goal of this paper is to examine the impact of three of the four forms of foreign capital inflows (which include foreign aid, foreign direct investment and personal remittances) on economic growth in SSA. This goal was achieved by using a panel data from 1990-2010 and the newly established pooled mean group (PMG) estimator for dynamic heterogeneous panels. The results of the study indicate that all the three forms of foreign capital inflows have positive and significant impacts on economic growth in the long run. However, personal remittances was the only short run driver of growth in SSA. The study recommends the design and implementation of good fiscal, monetary and trade policies to complement the flow of foreign aid to the country for the realization of its full impact on growth. Furthermore, the study recommends SSA countries to build strong and well-functioning domestic institutions to unlock the potential for remittances to strongly contribute to growth.

Keywords: Economic growth, Foreign capital inflows, Pooled mean group, SSA.

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Contribution/ Originality

The study contributes to the existing literature by considering three different forms of foreign capital flows. The study believes that different forms of foreign capital inflows have different effects on economic growth and as a result, the need to examine the impact of each of these forms on economic growth.

1. INTRODUCTION

Foreign Capital Inflows (FCIs) play an important role in stimulating growth especially in host countries. FCIs are a key source of finance which accelerates the speed of economic development of developing countries through the transfer of modern technology and innovations of industrialized countries to developing countries (Fambon, 2013). Even though most empirical and theoretical studies confirm a positive relationship between FCIs and economic growth, this relationship has been found to vary from one country to the other (De Mello, 1999; Lipsey, 2000) and also from one group of countries or region to the other . Also, the exact relationship between FCIs and economic

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growth sometimes depends on the form of FCI used (Fambon, 2013; Orji *et al.*, 2014). There exist several forms of FCIs namely foreign aid[1], remittances[2], FDI[3] and foreign portfolio investment[4].

This study tends to differ from other studies in the sense that it carries out a panel study on the impact of FCIs on economic growth by using three of the four main forms of FCIs namely; foreign aid, personal remittances and FDI. The reason for concentrating on these three is that, they constitute the most significant sources of FCIs in the Sub-Saharan Africa (SSA) region. The claim also that FCIs foster growth has mostly been conducted in a time series or cross sectional way with few studies concentrating on panel studies of large number of countries over a period of time with the aim of drawing on their experiences. Also, the few studies that have undertaken panel studies especially on developing countries neglect the SSA region which has been one of the largest recipients of FCIs over the past decades. From a policy perspective, knowledge on the impact of FCIs on economic growth will be key in designing and adopting friendly policies aimed at attracting more external funding into the region especially in a region where domestic investment tend to be insufficient in helping to achieve a desired level of growth. Also, unlike several empirical studies on this subject, the study employs the newly developed heterogeneous panel cointegration techniques which have rarely been used to examine the impact of FCIs on economic growth of SSA countries. Some panel studies on the subject have employed the homogenous frameworks where the cointegrating vectors are assumed to be identical for all panel units. The employment of this new technique will bring to the forefront useful insights and results that will augment the existing panel studies literatures employed using the homogenous frameworks.

In SSA, domestic private investment which should be a boost to economic growth has proven to be insufficient over the past decades. In the 1990s for instance, the ratio of investment to GDP in SSA averaged at about 17 percent of GDP which was well below the ratios attained by similar developing countries of Latin America (20-22 percent) and Asia (27-29 percent). A similar trend is also reported for the ratio of private investment to GDP in SSA as it is also well below the ratios of other developing countries. The primary reason for the low level of domestic private investment in SSA is the perception held by both domestic and foreign investors that, the risk-adjusted rate of return is low resulting from three main factors namely; macroeconomic instability, inadequate legal systems and political risk especially from armed conflicts (Hernandez-Cata, 2000). These three factors according to Hernandez-Cata (2000) have contributed greatly to the increasing rates of capital flights in the region. Also, most SSA countries continue to face difficulties in generating enough funds domestically to finance both public and private investments. These difficulties therefore has limited the ability of most governments to undertake public expenditures in infrastructure needed to increase domestic demand, create employment and to boost growth. To augment the insufficient domestic savings, foreign capital inflows seem to be the only alternative source of savings to boost the growth in the region. Foreign capital inflows are expected to not only boost growth but to also raise the standard of living of the people and visibly reduce poverty to an acceptable level (Hernandez-Cata, 2000; Diao and Breisnger, 2010).

The rest of the study is organized as follows; Section 2 discusses some relevant literatures on the relationship between economic growth and FCIs. Section 3 discusses the analytical framework and estimation technique whereas Section 4 presents the empirical results. Section 5 concludes the study with policy recommendations.

[1]Foreign aid refers to various terminologies like Official Development Assistance (ODA), grant, loan, technical and economic assistance.

[2]Remittances are mainly in the form of funds sent by non-resident to their household (resident) in the home country.

[3]FDI inflows is the sum of equity capital, earnings reinvestment, as well as other short and long terms capital.

[4]Foreign portfolio investment is a supplementary sort of foreign capital inflow which deals with the entry of funds into a country where foreigners make purchases in the country's stock and bond markets.

2. LITERATURE REVIEW

Even though most of the empirical studies on the relationship between FCIs and economic growth among various countries and regions is positive, the relationship between the two are still inconclusive. In the following section, a review of some studies is presented with specific focus on the link between the following: FDI and growth; Remittances and growth; Foreign aid and growth.

2.1. FDI and Growth

FDI has been identified in the empirical literature especially in the neoclassical and endogenous growth models as a major factor that promotes growth. Studies using the endogenous growth models conclude that FDI promotes growth. One of such studies is Blomstrom *et al.* (1996) which argues that FDI can promote growth through capital formulation and technological transfer. De Mello (1997) extends the link between FDI and growth by asserting that, FDI promotes growth by increasing the level of knowledge through in-service training and acquisition of skills. On a broader scale, endogenous growth models provide three main channels through which FDI contributes to growth. Firstly, FDI tends to increase capital accumulation in recipient countries through the introduction of new technologies (Blomstrom *et al.*, 1996). Secondly, FDI tends to increase the levels of skills and knowledge in recipient countries through the training of workers and managers on the jobs (De Mello, 1996). Lastly, FDI helps overcome barriers to entry and reduce market power of existing firms by boosting competition among the industries of the recipient countries.

Some of the studies on the relationship between FDI and growth also have the neoclassical growth models as the basis. One of such studies is Chowdhury and Mavrotas (2005) which identifies the four principal channels through which FDI promotes growth namely: (i) the determinants of growth; (ii) the determinants of FDI; (iii) the role of multinational firms in host countries; and (iv) the direction of causality between the two variables.

Using a time series data for the period 1975-2006 for Ireland and employing the Autoregressive Distributed Lag Model (ARDL), Kim and Bang (2008) found a long term relationship between FDI and economic growth. The long and short run results indicated a statistically positive significant relationship between FDI and economic growth over the study period. Employing an Engel-Granger two-step methodology as well as the Dynamic Ordinary Least Squares (DOLS), Insah (2013) found the elasticity of economic growth with respect to FDI to be positive and also significant at 1% level of significance. The study used a time series data for Ghana during the period 1980-2010 to investigate the dynamic relationship between economic growth and FDI inflows. Orji *et al.* (2014) examined the impact of all the four different forms of FCIs on output growth of the West African Monetary Zone (WAMZ) comprising of Ghana, Nigeria, Sierra Leone and Gambia over the period 1981-2010. Using the Seemingly Unrelated Regression Estimation (SURE), the study found FDI to positively contribute more to output growth in Nigeria and Gambia.

Even though some studies such as De Mello (1997) confirm the positive association between FDI and growth, these studies also argue that this positive association can only occur under a certain number of conditions such as existing trade regimes, financial market regulations and banking systems, degree of openness of their economies as well as the levels of human capital in the host countries. De Mello (1997) and OECD (2002) for instance argues that the impact of FDI on growth tends to depend on the economic and technological conditions that exist in the host countries. These studies especially De Mello (1997) and OECD (2002)[5] further stress that, developing countries in particular must achieve a certain level of education and infrastructure development before they can fully enjoy the benefits of FDI on growth. Lastly, it should also be noted that even though the relationship between FDI and

[5]OECD (2002). is a journal which supports the positive association between FDI and economic growth. This study found 11 studies out of 14 studies that FDI positively influences economic growth.

economic growth in most empirical studies is positive, studies such as Carkovic and Levine (2005) and Gorg and Greenaway (2004) which were carried out at the firm level found otherwise.

2.2. Remittances and Growth

Katushi *et al.* (2012) outlines three ways in which remittances impact growth. The first way is through its impact on the rate of capital accumulation. The study asserts that remittances increase the rate of accumulation of both physical and human capital thereby lowering the cost of capital in the recipient country. The second way is through its impact on labour force growth. Whereas remittances have a positive impact on the rate of capital accumulation, remittances receipts have a negative impact on labour force participation. This relationship happens as workers substitute remittance income for labour income. The third and last way is through its impact on total factor productivity growth. The effect of remittances on total factor productivity may be negative or positive depending on the person making the investment decision. In the case of formal capital inflow, the impact of remittances on growth via total factor productivity will be positive if the investment decision is made by a skilled domestic financial intermediary as compared to recipient making the decision on behalf of the remitter.

Remittances have also been identified as one of the key capital flows that do not only benefit the recipients' households but also the recipients' country. Notwithstanding that, empirical results on the relationship between growth and remittances have produced mixed results. Studies that confirm a positive relationship between growth and remittances assert that remittances; contribute to poverty reduction in recipients' countries by increasing cash flows and also helps in reducing the current account deficit as well as external debt of the recipients' country; increases the rate of accumulation of both physical and human capital (Adams, 2006; Iqbal and Satter, 2008; Vargas-Silva *et al.*, 2009)[6]. There is also empirical evidence that remittances lead to positive economic growth through their positive impact on investment. To test the hypothesis that remittances have a positive relationship with employment and productivity through its impact on investment, Leon-Ledesma and Piracha (2004) conducted a study on eleven transition economies. The study confirmed the view that remittances have a positive impact on productivity via its positive impact on investment.

However, studies that confirms a negative relationship between growth and remittances argue that remittances tend to degrade long run growth by; creating labor substitution and "Dutch disease' effects, influencing inflation, appreciating the real exchange rate and reducing the labour market participation rates by substituting remittance income for labour income (Chami *et al.*, 2003; Barajas *et al.*, 2009).

2.3. Foreign aid and Growth

The empirical findings on the link between foreign aid and growth are generally mixed depending on whether it is a panel study, cross sectional study or a country specific study[7]. Studies that confirms a positive relationship between foreign aid and growth argue that foreign aid stimulates economic growth by: supplementing domestic sources of finance such as savings; increasing physical and human capital investment; increasing the capacity to import capital goods and technology (Hansen and Tarp, 2000; Dalgaard *et al.*, 2004; Karras, 2006). However, other empirical studies found a negative relationship between growth and foreign aid (Burnside and Dollar, 2000; Brautigam and Knack, 2004). Studies such as Mosley and Horrell (1987) and Jensen and Paldam (2003) found no relationship between foreign aid and growth. Papanek (1973) disaggregated foreign capital inflows into foreign aid,

[6]For a comprehensive review of literatures on remittances, see Rapoport and Docquier (2005).

[7]For a comprehensive review of theoretical and empirical literatures on foreign aid and growth, see McGillivray, Fenny, Hermes and Lensink (2006).

foreign private investment and all other foreign inflows[8]. Using a cross section data of 34 countries in the 1950s and 52 countries in the 1960s, foreign aid was found to have a statistically significant positive impact on growth. Moreover, the study found the effect of foreign aid on economic growth to be stronger than other factors. Other studies have also moved from cross country studies to time series specific country studies in examining the relationship between economic growth and foreign aid. Fambon (2013) employed the ARDL framework on a time series data for Cameroun over the period 1980-2008. Even though the study found a positive relationship between foreign aid and economic growth, this relationship was not statistically significant.

3. METHODOLOGY

3.1. Analytical Framework

Following the work of Fambon (2013) the study uses an aggregate production function (Y_{it}) which integrates Personal Remittances (PR), FDI, Foreign Aid (FA) and other control variables in the model. This framework is based on the endogenous growth model where the aggregate production function is in a Cobb-Douglas form given as;

$$Y_{it} = A_{it} K_{it}^{\alpha} L_{it}^{\beta} e^{\varepsilon_{it}} \quad \ldots\ldots (1)$$

Where Y_t represents the output of the economy measured by real GDP at time t; A_t represents the level of technology at time t (productivity factor); K_t represents the level of capital stock at time t; L_t represents the labour stock at time t; ε_t represents the error term; *i* is the country; *t* is the time and e is a base of natural logs. The impacts of PR, FDI and FA may be captured through the A_t component of the production function. We therefore assume that A_t is a function of PR, FDI and FA. This can then be represented as;

$$A_{it} = f(PR_{it}, FDI_{it}, FA_{it}) = PR_{it}^{\delta} FDI_{it}^{\mu} FA_{it}^{\psi} \quad \ldots\ldots (2)$$

Equation (3) below is obtained by combining equations (1) and (2);

$$Y_{it} = K_{it}^{\alpha} L_{it}^{\phi} PR_{it}^{\delta} FDI_{it}^{\mu} FA_{it}^{\psi} e^{\varepsilon_{it}} \quad \ldots\ldots (3)$$

where α, ϕ, δ, μ and ψ are the constant elasticity coefficients of output relative to K, L, PR, FDI and FA.
Taking natural logs of equation (3) gives;

$$InY_{it} = \alpha InK_{it} + \phi InL_{it} + \delta InPR_{it} + \mu InFDI_{it} + \psi InFA_{it} + \varepsilon_{it} \quad \ldots\ldots (4)$$

For estimation purposes, Equation (4) can be rewritten as;

$$InY_{it} = \omega + \alpha InK_{it} + \phi InL_{it} + \delta InPR_{it} + \mu InFDI_{it} + \psi InFA_{it} + \varepsilon_{it} \quad \ldots\ldots (5)$$

Where all the variables are defined as previously; ω is the constant term, and ε_t is the disturbance term assumed to be independently and normally distributed with zero mean and constant variance.

[8]Other foreign inflows include net private transfers, net short term borrowing, other capital (net) and errors and omissions in the balance of payments.

The choice of these variables are justified by a plethora of empirical studies (Kim and Bang, 2008; Fambon, 2013). Y_t is proxy by real GDP; K_t is proxied by the share of gross domestic investment in GDP; L_t is proxied by the total labour force of the country; PR_t is defined as the personal remittances (current $US) received by residents; FDI_t is Foreign Direct Investment, net inflows as a percentage of GDP; FA_t is proxied by the Net Official Development Assistance (ODA) received (constant 2010 $US).

In terms of a priori expectations, the literature predicts a positive relationship between L_t, K_t, PR_t, FDI_t and real GDP. Even though the relationship between FA_t and real GDP in the literature can either be positive or negative, the study expect the coefficient of FA_t to be positive.

3.2. Data

The study relied on a panel data set on 45 SSA countries[9] spanning from 1990-2010. The data was obtained solely from the World Development Indicators. Countries were selected solely based on the availability of data, particularly based on the data on economic growth, foreign aid, remittances and FDI.

Table-1. Summary Statistics of variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Y	942	953.0944	1517.318	54.50519	8787.766
FDI	930	4.093525	11.42647	-82.89210	145.2020
FA	941	5.99E+08	7.59E+08	-18660000	1.24E+10
PR	709	2.65E+08	1.65E+09	0.0000	1.98E+10
K	880	19.94305	10.42434	1.525176	113.5779
L	924	5809808	7994936	117052.9	50280307

Source: Author's Estimations using WDI Data, 2012.

The total number of observations for each of the variables used in this study are reported in the second column of Table 1 which clearly indicates the maximum and minimum number of observations to be 942 and 709 respectively. The mean real GDP per capita for the 45 sampled countries over the study period is US$953.0944 confirming the low income levels of many countries in the sub Saharan African region. FDI averaged 4.093525 percent within the study period with the maximum and minimum FDI recorded at 145.2020 and -82.89210 respectively. The standard deviation confirms there exist not so much variability in the FDI of these countries. On the other hand, the standard deviations of foreign aid and personal remittances confirm there exist a significant variability in these countries as the standard deviation figures show a wide variability in these sampled countries.

[9] Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroun, Cape Verde, Central African Republic, Chad, Comoros, Congo Republic, Cote d'Ivoire, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Republic Democratic of Congo, Rwanda, Senegal, Seychelles, Sierra Leone, South Africa, Sudan, Swaziland, Tanzania, Togo, Uganda, Zambia, Zimbabwe.

3.3. Estimation Technique

To investigate the existence of a long run equilibrium relationship between economic growth and the regressors, the study would employ the newly established pooled mean group (PMG) estimator for dynamic heterogeneous panels developed by Pesaran and Shin (1999). This is a panel version of the Auto regressive distributed Lag (ARDL) Bounds testing approach. With a large time series (T) and cross sectional units (N), the usual practice is to employ the Mean Group (MG) estimator which estimates N separate regressions and further computes the coefficient means or to employ the dynamic fixed-effects (DFE) which pools the data and assumes equal slope coefficients and error variances. The PMG is seen as an intermediate procedure between the MG estimator and DFE because it involves averaging (representing the MG estimator) and pooling (representing the DFE). The PMG estimator allows the short run coefficients and the error variances to differ across groups but the long run coefficients are constrained to be identical.

The cointegration analysis in panel data setting is similar to the way cointegration analysis is carried out in time series data setting by first; testing for the presence of a long run relationship between the variables (testing for cointegration); estimating the long run coefficients of the variables and lastly; estimating the short run coefficients of the variables. The ARDL approach was used because of its advantages such as the involvement of just a single equation set-up making it easier and simpler to interpret compared to other conventional techniques such as the Engel Granger two-step residual-based procedure, Johansen system-based reduced rank regression approach and variable addition by Park (1990) etc., which involves several equation set-up. According to Afzal *et al.* (2010) the ARDL Approach produces unbiased and efficient estimates because it is able to avoid the problems of serial correlation and endogeneity. This approach can be applied to a mixture of I (0) and I (1) regressors.

The ARDL approach is first carried out by estimating Unrestricted Error Correction Model (UECM) in equation (6) using the OLS.

$$\Delta In(Y)_{it} = \beta + \sum_{j=0}^{a}\lambda_{1j}\Delta In(Y)_{t-j} + \sum_{j=0}^{b}\lambda_{2j}\Delta InK_{t-j} + \sum_{j=0}^{c}\lambda_{3j}\Delta InL_{t-j} + \sum_{j=0}^{d}\lambda_{4j}PR_{t-j}$$

$$+\sum_{j=0}^{e}\lambda_{5j}\Delta InFA_{t-j} + \sum_{j=0}^{f}\lambda_{6j}\Delta InFDI_{t-j} \quad \text{.....(6)}$$

where Δ is a difference operator, *a, b, c, d, e, f, g* represent the lag length on the regression variables and ε_t is the error term assumed to be white noise. The parameters, λ_{nj} for n=1, 2, ..., 6 represent the short run dynamics of the EKC model whereas the parameters for the long run relationships are given by the δ s. The study employs the Schwartz Bayesian Information Criterion (SIC) to determine the optimal lag length.

3.3.1. Estimation of the Long-Run Relationship

Estimation of the long-run relationship between the variables is premise on the existence of a cointegrating relationship between the non-stationary variables. The UECM examines the long run relationships between the variables and in doing so, the F test is used to test for the joint significance of the coefficients of the lagged level variables. The Bound test developed by Pesaran and Shin (1999) is the Wald test for the lagged level variables. Hence, we test the null hypothesis of non-cointegrating equation by performing a joint significance test on the lagged level variables. The null and alternative hypotheses for testing for the cointegration are given as:

$$H_o : \delta_1 = \delta_2 = \delta_3 = \delta_4 = \delta_5 = 0$$

$$H_1 : \delta_1 \neq \delta_2 \neq \delta_3 \neq \delta_4 \neq \delta_5 \neq 0$$

According to Pesaran and Shin (1999) upper and lower critical values are chosen based on the order of integration of the explanatory variables. The upper critical values are based on the assumption that the explanatory variables are integrated of order one whereas the lower critical values are based on the assumption that the explanatory variables are integrated of order zero. Under the conventionally used level of significance such as 10%, 5% and 1%, we reject the null hypothesis of no cointegrating equation if the F-statistic exceeds the upper critical value. We also fail to reject the null hypothesis of no cointegrating equation if the F-statistic falls below the lower critical value.

Pesaran and Shin (1999) suggest a (maximum-likelihood) pooled mean group (PMG) estimator for dynamic heterogeneous panels which fits an ARDL model to the data. This can further be specified as an error correction equation to enhance economic interpretation.

An Error Correction Model (ECM) of an ARDL (*p, q, q… q)* specification can be considered as shown in equation (7) below;

$$\Delta(Y)_{it} = \varphi(Y)_{i,t-1} + \alpha' X_{i,t-1} + \sum_{j=1}^{p-1} \lambda_{i,j} \Delta(Y)_{i,t-j} + \sum_{j=0}^{q-1} \delta_{ij} \Delta X_{i,t-j} + \mu_i + \varepsilon_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (7)$$

where X is a vector of explanatory variables; α' contains the long run dynamics; φ is the error correction term, and δ_{ij} contains the short run dynamics.

4. RESULTS AND DISCUSSION

This section presents the results and discussions of the estimated relationship between economic growth, foreign aid, FDI and personal remittances in SSA. Economic theory suggest that time series data especially macroeconomic variables that span over a long period of time often tend to exhibit some mean reverting behavior, hence the need to undertake stationarity tests, to ascertain the panel unit root properties of the series.

4.1. Panel Unit Root Tests Results

This study employs five different panel unit root tests namely; Levin-Lin-Chu's (LLC) t^*, Breitung's t, Hadri's Z, Im-Pesaran-Shin's (IPS) W, and ADF-Fisher χ^2 tests. LLC, Breitung and Hadri's unit root tests are based on the assumption of common unit root process that the autocorrelation coefficients of the variables been tested across cross-sections are identical. On the other hand, the IPS and ADF-Fisher χ^2 tests are based on the assumption of individual unit root process that the autocorrelation coefficients of the variables been tested across cross-sections vary. One of the advantages of using panel-based unit toot tests is the fact that, because panel data pools both cross-sections and time series, panel-based unit toot tests improves extremely the tests' finite sample power as compared to the conventional unit root tests for time series. This advantage is confirmed by studies such as Im *et al.* (2003) and Levine *et al.* (2002) in which the study found a tremendous improvement in the power of unit root tests when using panel data.

The test results from tables 2 show evidence of non-stationary in most of the variables at levels used in this study. The Breitung's t test and the Hadri's Z test provide strong evidence of non-stationarity in all the variables. The

IPS test indicates that with the exception of FDI and labour force, all the other variables are not stationary. Stationary tests are then carried out at first difference for variables that were not stationary at levels with the results shown in table 3.

Table-2. Panel unit root test results (at levels)

Tests assuming a common unit root process				Tests assuming individual unit root process	
Series Name	**LLC t^*-stat:**	**Breitung t-stat:**	**Hadri Z-stat**	**IPS W-t-bar stat:**	**ADF-Fisher X^2**
	H_0: Unit root	H_0: Unit root	H_0: No Unit root	H_0: Unit root	H_0: Unit root
INY	1.84248 [0.9673]	5.19447 [1.0000]	10.4455 [0.0000]	-1.31897 [0.0936]	124.139 [0.0100]
FDI	-5.38885 [0.0000]	-0.64889 [0.2582]	8.86600 [0.0000]	-4.71310 [0.0000]	176.219 [0.0000]
INFA	-0.61953 [0.2678]	1.97516 [0.9759]	12.8587 [0.0000]	3.11424 [0.9991]	54.9201 [0.9987]
INPR	-1.05773 [0.1451]	0.01011 [0.5040]	14.5376 [0.0000]	0.69132 [0.7553]	65.3081 [0.6365]
INK	-2.97585 [0.0015]	-0.64330 [0.2600]	10.9173 [0.0000]	-1.43813 [0.0752]	103.635 [0.1221]
INL	-20.0039 [0.0000]	0.30504 [0.6198]	11.4893 [0.0000]	-11.6539 [0.0000]	281.541 [0.0000]

Source: Authors' Estimations using Eviews 9.

Table-3. Panel unit root test results (at first difference)

Tests assuming a common unit root process				Tests assuming individual unit root process	
Series Name	**LLC t^*-stat:**	**Breitung t-stat:**	**Hadri Z-stat**	**IPS W-t-bar stat:**	**ADF-Fisher X^2**
	H_0: Unit root	H_0: Unit root	H_0: No Unit root	H_0: Unit root	H_0: Unit root
INY	-9.20641 [0.0000]	-5.74873 [0.0000]	9.43259 [0.0000]	-7.46118 [0.0000]	211.593 [0.0000]
INPR	-5.83571 [0.0000]	-5.65030 [0.0000]	17.6260 [0.0000]	-5.38502 [0.0000]	154.980 [0.0000]
INK	-7.72152 [0.0000]	-9.27191 [0.0000]	10.0198 [0.0000]	-9.90390 [0.0000]	272.123 [0.0000]
INFA	-8.45835 [0.0000]	-7.49662 [0.0000]	10.4203 [0.0000]	-11.2196 [0.0000]	287.360 [0.0000]

Source: Authors' Estimations using Eviews 9.

4.2. Panel Cointegration Results

Table 4 presents two variants of panel cointegration in this study namely the Pedroni cointegration test and the Kao's residual cointegration test. A cointegration found among the variables will imply an existence of a long run relationship between the variables. The Pedroni and Kao cointegration tests automatically set the lag length using the Schwartz Bayesian Information Criterion (SIC). The Pedroni and Kao cointegration tests are based on long run residuals resulting from estimating long run static regression. Hence, the null hypothesis of no cointegration is tested with the results shown in table 4.

The results from the Pedroni cointegration test if the assumption of common autoregressive coefficients holds do not provide any support for the existence of cointegration among the variables. However, when we assume between-dimensions (individual autoregressive coefficients), the results show some evidence of cointegration among the variables as depicted by the rejection of the null hypothesis of no cointegration at 1% level of significance of Group PP and Group ADF. The existence of cointegration using the assumption of between-dimensions (individual

autoregressive coefficients) in the Pedroni test is confirmed by the Kao's test which also rejects the null hypothesis of no cointegration at 1% level of significance.

Table-4. Panel Cointegration test results

Pedroni cointegration test				
[a]***Common AR coefficients (within dimension)***				
	Statistic	**p-value**	**Weighted Statistic**	**p-value**
Panel v	-1.259475	0.8961	-0.702347	0.7588
Panel rho	0.209871	0.5831	0.167814	0.5666
Panel PP	-3.855908	0.0001	-3.745304	0.0001
Panel ADF	-3.642250	0.0001	-3.595750	0.0002
[a]*Individual AR coefficients(between dimension)*				
Group rho	0.727842	0.7666		
Group PP	-4.577807***	0.0000		
Group ADF	-4.452460***	0.0000		
[b]Kao residual cointegration test				
Test Statistic= -3.017585 (0.0013)				

Source: Author's Estimation using Eviews 7. *** indicates significance at 1% level of significance.

4.3. Estimation and Interpretation of Long-Run and Short-Run Relationships

The short and long-run estimates based on PMG estimation are reported in each column of Table 5. The table also presents four alternative models. In models 1-3, the study includes only one of the FCIs at a time in addition to the control variables. In contrast, the study includes all three FCIs at the same time in the fourth model.

Table-5. Short and Long-run estimation results (PMG Estimation Results)

	Model 1	**Model 2**	**Model 3**	**Model 4**		
Convergence coefficients	-0.0258*** (0.0203)	-0.0814*** (0.0313)	-0.0849** (0.0137)	-0.0790*** (0.0300)		
Long-run coefficients						
FDI		0.0085*** (0.0018)		0.0093*** (0.0019)		
INFA	0.3245*** (0.0358)			0.0204*** (0.0145)		
INK	0.4129*** (0.0549)	0.3396*** (0.0267)	0.3743*** (0.000)	0.3629*** (0.0288)		
INL	1.5239*** (0.1344)	0.25001*** (0.0385)	0.2305*** (0.0000)	0.1265*** (0.0413)		
INPR			0.0212*** (0.0000)	0.0615*** (0.0668)		
Short-run coefficients						
ΔFDI		-0.0019 (0.0018)		-0.0011 (0.0016)		
ΔINFA	-0.0075 (0.0074)			0.0033 (0.0055)		
ΔINK	0.0350 (0.0218)	0.0242 (0.0240)	0.0022 (0.3224)	0.0226 (0.0218)		
ΔINL	-2.0107* (1.203)	-1.3428 (1.1257)	-1.5360 (0.2154)	-1.3224 (1.0914)		
ΔINPR			0.0342** (0.3221)	1.0581** (1.777)		
No. of Countries	45	45	45	45		
No. of observation	945	945	945	945		

Source: Authors Estimation using Eviews 9. *, **, *** indicates significance at 10%, 5% and 1% level of significance. All equations include a constant country-specific term. Values in ( ) are standard errors. All variables are in their natural logarithmic forms except FDI variables which is in its natural form. FDI was maintained in its natural form because taking natural logarithm leads to 82 observations being lost.

4.3.1. Long-Run Elasticities

The results of the four models for long run generally show consistency in terms of the signs and statistical significance. It should also be noted that all coefficients with the exception of FDI are interpreted as elasticities. All the three FCIs were found to be long run drivers of economic growth in all the four models. Moreover, all the signs of the coefficient of all FCI variables were consistent in all four models.

Personal remittances, FDI and foreign aid all have their expected theoretical signs in the long run. Specifically, a one percent increase in FDI increases growth by 0.85 pecent and 0.93 percent in models two and four respectively and vice versa all other variables constant. This result is consistent with other findings from other developing countries such as Fambon (2013); Insah (2013) and Raza *et al*. (2011). The share of FDI in GDP of the sampled SSA countries confirms the less impact of FDI on growth. The average FDI as a share of GDP in the sampled countries is 4.09 percent implying that FDI is not a major contributor of growth in SSA over the sampled period even though FDI was found to growth enhancing. Also, one of the reasons accounting for the less impact of FDI on growth could be attributed to lack of infrastructure and volatile regulation in most SSA countries in harnessing the full potential of the effect of FDI on growth. As expected, the long run personal remittances elasticity of growth is also positive, inelastic and significant at 5 percent level of significance implying that all other variables constant, a 1 percent increase in personal remittances will lead to a 0.0212 and 0.0615 percent increase in growth all other variables constant as shown in models 3 and 4 respectively. This result is in consonance with other studies such as Vargas-Silva *et al*. (2009) and Iqbal and Satter (2008). In recent decades, remittances to SSA have increased steadily and estimated to have reached about $32 billion and $32.9 billion in 2013 and 2014 respectively (World Bank). Remittances to SSA increased from $3.2billion in 1995 to 21.5 billion dollar in 2010 indicating a 571.88 percent increase. This increase in remittances over the past years have had positive and significant impact on health, education, consumption and investment pattern and also affected aggregate financial development of SSA countries which have seen a positive impact on growth.

The study also found foreign aid to be positive, inelastic and statistically significant at 1 percent level of significance. Specifically, a 1 percent increase in foreign aid will lead to a 0.3245 percent and 0.0204 percent increase in growth all other variables constant as shown in models 1 and 4 respectively. The Organization for Economic Co-operation and Development (OECD) primary statistics show that SSA countries receive the most ODA than most regions in the world. Even though foreign aid to SSA has been stable over the past few years, it still remains an important component of growth in SSA.

4.3.2. Short-Run Elasticities

Knowledge of the long-run impacts of FCIs on growth of SSA also requires the short-run impacts. As a result, the study proceed to estimate the associated short-run impacts of FCIs on growth as shown in Table 5. The results indicate that only remittances is a short run driver of growth in SSA as shown in models 3 and 4 of Table 5. The impact of remittances on growth is positive and statistically significant at 5 percent level of significance. A 1 percent increase in remittances causes an increase in growth by 0.0342 and 1.0581 percent holding all other variables constant in models 3 and 4 respectively. This is not surprising as remittances to SSA have become a key growth enhancing factor over the past years. Remittances to SSA is crucial to most SSA economies not only in the long run but in the short run as well. The World Bank figures show that for instance, in the year 2010, remittances to SSA was $51.8billion as compared to the Official Development Assistance (ODA) to SSA which stood at $43 billion implying that remittances outweigh western aid. According to a survey conducted by the World Bank in 2011, remittances to SSA are spent on education, health care, buying land, building houses, starting business or improving farms. Countries' economic growth can be directly affected by these remittances in the short run through increased consumption and investment. Furthermore, increased spending on health, education and nutrition as a result of

remittances to SSA can greatly contribute to the well-being and productivity of people and households. The importance of remittances to SSA growth in recent years is further supported by the increasing share of remittances in GDP as remittances to some SSA countries account for as much as 20 percent of GDP. For instance, in 2014, remittances accounted for 11 percent of GDP in Senegal, 20 percent of GDP in both Gambia and Liberia, 8 percent in both Mali and Togo (World Bank, 2014). Jan Singh *et al.* (2009) reports that a number of African countries are among the largest recipients of remittances relative to GDP and that for some of these countries, remittances represent a key source of foreign exchange.

In all the four models, the error correction terms as expected are consistently, negative and statistically significant at 1 percent level of significance. The negative and statistically significant term of the error term confirms the conclusion of cointegration between the variables. The error correction terms of -0.0258, -0.0814, -0.0849 and -0.0790 suggests that when economic growth of SSA countries is above or below its equilibrium level, it adjusts by almost 2.58 percent, 8.14 percent, 8.49 percent and 7.9 percent in models 1, 2, 3 and 4 respectively.

5. CONCLUSION AND RECOMMENDATIONS

This study aimed at examining empirically the relationship between economic growth and three of the four forms of foreign capital inflows namely; foreign direct investment, personal remittances and foreign aid in 45 SSA countries. This goal was achieved by using a panel data from 1990-2010 and the newly established pooled mean group (PMG) estimator for dynamic heterogeneous panels developed by Pesaran and Shin (1999). All the three forms of foreign capital inflows used in this study positively affect economic growth in SSA in the long run. However, personal remittances was found to be the only driver of economic growth in the short run in SSA over the study period. The study therefore recommend the need for FDI to be targeted into sectors where SSA countries have a comparative advantage for their economies to experience a wider coverage of FDI impact on growth. Furthermore, there is the need for governments of SSA countries to design and implement sound fiscal and monetary policies aimed at macroeconomic stability in order to create and improve an enabling environment to attract more domestic and foreign investors. There is also the need for government bodies and NGOs to assist in educating remittance recipients to adopting savings culture and not to see remittances as a substitute for their labour income. Lastly, the study recommends SSA countries to build strong and well-functioning domestic institutions to unlock the potential for remittances to strongly contribute to growth.

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