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### Remittances led growth in West Africa Monetary Zone (WAMZ)

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#### Abstract

This study explores the significance of remittances on the economic growth of six (6) WAMZ Countries within a non-linear augmented conventional neoclassical growth framework using an unbalanced panel data spanning from 1970 to 2011. The main contribution of this paper is the use of heterogenous panel cointegration method to estimate remittances-growth nexus in the WAMZ region. The paper also considers two prominent periods of policy restructuring within the member countries in order to confirm the choice of the heterogenous panel cointegration method. Our findings indicate that remittances have a positive and significant effect on the growth of WAMZ Countries. We found that a sound macroeconomic policy is sine qua non for the effective contribution of remittances to sustainable growth. Also, we found that the incessant socio-political crisis evident in the WAMZ region has crippled the effectiveness of remittances in these countries.

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## REMITTANCES LED GROWTH IN WEST AFRICA MONETARY ZONE (WAMZ)

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### *Abstract*

This study explores the aggregate significance of capital flows from international migrants on the economic growth of six (6) WAMZ Countries within the augmented conventional neoclassical growth framework using an unbalanced panel data spanning from 1970 to 2011. Our findings indicate that remittances have a positive and significant effect on the growth of WAMZ Countries where the financial systems are less developed by suggesting other possibility to finance investment and helping overcome liquidity constraints.

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## 1.0 Introduction

International remittance inflows have experienced a significant increase in developing countries over the past decades. Remittance flows globally currently exceed US\$100 billion, which is higher than the value of Official Development Assistance (ODA). Remittance flows have great potential to generate a positive impact in migrant's home region. Remittances to developing countries amount to some US\$65 billion and this amount exceed ODA of US\$55 billion (Maimbo, 2003). An IMF report (2001) has indicated that migrant remittances are increasingly becoming a more constant source of income to most developing countries with a doubling of annual remittances between 1988 and 1999. Sander (2003) also reported that remittances have proved to be the most stable flow compared with ODA and private capital flows. International migration is one of the most important factors affecting economic relations between developed and developing countries in the 21st century. At the start of the century, it was estimated that about 175 million people roughly 3% of the world population lived and worked outside the country of their birth (United Nations, 2002). The international remittances sent back home by these migrant workers have a profound impact on the developing countries of Asia, Africa, Latin America, and the Middle East. According to Global Development Finance (World Bank, 2003), official international remittances sent home by migrant workers represent the second most important source of external funding in developing countries. Despite the ever-increasing size of official international remittances, very little attention has been paid to analyzing the economic impact of these financial transfers on WAMZ countries. While a small handful of studies have include the large (and unknown) sum of remittance money which are transmitted through informal, unofficial channels. As a result of these data problems, many key questions remain unanswered.

Essentially, the empirical analyses of remittances-growth relationship have been well documented in the literature. A number of these studies have focused on country specific analyses (see for example, Agu, 2009 for Nigeria; Quartey and Blankson, 2004 and Quartey, 2006 for Ghana; Taylor, 1992; Faini, 2001; Lopez, 2005 for Mexico; Ilahi and Jafarey, 1999 for Pakistan; Adams, 2006 covering individually two countries namely Guatemala and Ghana. Some studies have as well captured a cross-section of countries. For example, Fayissa and Nsiah (2008) for 37 African countries; Fayissa and Nsiah (2010) for 18 Latin American countries; Jongwanich (2007) deal with the Asian and Pacific region; Gupta et al, (2007); Chami et al (2008) and Ekanayake et al (2008) focus on selected Developing countries.

Given the figure 1 in the appendix, the flow of remittances into WAMZ<sup>1</sup> region reduced after the world war in the 1970s in which the capital inflows coming into this region were cut short due to the wars and conflict during that period, on the other hand there was little increase in the growth of GDP in this region. The inflows remittance was growing slowly due to wars, conflict and political unrest in the WAMZ region. During the early 1980s there was an increase in the growth of GDP, this was as a result of the oil boom which was a as a result of the increase in the price of crude oil in the international markets. The inflow of remittances into this region was growing slowly until it got to early 1990s when the inflow began to rise which resulted in a huge increase in the growth of the GDP of this region. During the late 1990s, these inflows began to rise continuously due to migrants of more workers from this region to other foreign countries, this resulted to a drastic fall in GDP growth. This was due to reduction in labour force

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<sup>1</sup>The study considers six countries in the zone which are Nigeria, Ghana, Gambia, Guinea, Sierra Leone, and Liberia

which affected the output productivity in this region. Conclusively there has been a continuous increase in remittances inflows into this region which began from early 1990s till date, which has really stimulated the growth of GDP in this region.

The next section deals with the methodology employed in this paper. While analyses of results are presented in section three, section four concludes the paper.

## 2.0 Theoretical Foundation and Methodology

### 2.1 Model

The Neoclassical growth model serves as a platform on which the empirical model is formulated. Recent studies on growth models by Brock and Durlauf (2000), Kourtellos (2001) and Kalaitzidakis et al. (2001) argue that the conventional Solow (1956) cross-country linear regression model imposes strong homogeneity assumptions on the growth process. Assuming parameter homogeneity in growth regressions is equivalent to assuming that all countries have an identical Cobb-Douglas (CD) aggregate production function. This is clearly an implausible assumption as there is nothing in the empirical or theoretical growth literature to suggest that the effect of a change in a particular variable (such as the savings rate) on economic growth is the same across countries. Brock and Durlauf (2000) posited that the assumption of parameter homogeneity seems particularly inappropriate when one is studying complex heterogeneous objects such as countries. To this end, the aggregate production function is given by the CES specification<sup>2</sup>

$$Y = [\alpha K^\rho + (1 - \alpha)(AL)^\rho]^{\frac{1}{\rho}} \dots \dots \dots (1)$$

To derive the basic and extended Solow-CES equations we use the definition of  $\sigma = \frac{1}{1-\rho}$  as algebra is easier with  $\rho$  rather than  $\sigma$ . Divide through by AL to obtain the production function in its intensive form

$$y = [\alpha k^\rho + (1 - \alpha)]^{\frac{1}{\rho}} \dots \dots \dots (2)$$

$$y^* = \left[ \frac{1}{1 - \alpha} - \frac{\alpha}{1 - \alpha} \left( \frac{s}{n + g + \delta} \right)^{\frac{\sigma-1}{\sigma}} \right]^{-\frac{\sigma}{\sigma-1}} \dots \dots \dots (3)$$

Pedagogically from equation (3), define  $z = -\frac{\alpha}{1-\alpha}$  and  $(1 - z) = \frac{1}{1-\alpha}$  and rewrite  $y^*$  as

$$y^* = \left[ z \left( \frac{n + g + \delta}{s} \right)^{-\rho} + (1 - z) \right]^{\frac{1}{\rho}} \dots \dots \dots (4)$$

A second order Taylor series expansion around  $\rho = 0$  ( $\sigma = 1$ ) as in Kmenta (1967) yields

$$\ln y = z \ln \left( \frac{n + g + \delta}{s} \right) - \frac{1}{2} \rho z (1 - z) \left[ \ln \left( \frac{n + g + \delta}{s} \right) \right]^2 \dots \dots \dots (5)$$

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<sup>2</sup> See Appendix for the complete derivation of the Solow-CES production function

$$\ln\left(\frac{Y}{L}\right) = \ln A(0) + gt + \frac{\alpha}{1-\alpha} \ln\left(\frac{s}{n+g+\delta}\right) + \frac{1-\sigma-1}{2} \frac{\alpha}{(1-\alpha)^2} \left[\ln\left(\frac{s}{n+g+\delta}\right)\right]^2 \dots \dots \dots (6)$$

Also, considering another phylum of the neoclassical theory i.e. the RCK model where assumptions are almost the same (see, Fasanya, 2012), the balanced growth path is described as:

$$\dot{k} = f(k(t)) - c(t) - (n + g)k(t) \dots \dots \dots (7)$$

where  $f(k(t)) - c(t)$  represents actual investment of the Solow model i.e. the difference between output and consumption yields the actual investment while the last term on right hand side represents the break-even investment.

By assuming equation (6) to be linear in logs, taking logs and differencing with respect to time. We obtain an expression describing the determinants of the growth rate of GDP, where (s) represents the monetary policy instrument used by the government in the above theory. The monetary policy tool captures the rate of inflation and exchange rate. In addition, the growth rate of population is captured by (n) in the neoclassical balanced growth path in the above model while the growth rate of capital (g) can be broken down into foreign capital and domestic capital.

$$\begin{aligned} \ln(GDP)_{it} = & \alpha_0 + \alpha_1 \ln(POP_{it}) + \alpha_2 \ln(REM_{it}) + \alpha_3 \ln(DINV_{it}) + \alpha_4 \ln(REM * CPI)_{it} \\ & + \alpha_5 \ln((REM * TRD)_{it}) + \alpha_6 \ln((REM * EXR)_{it}) + \alpha_7 X_{it} + \alpha_8 (GDP(-1))_{it} \\ & + \mu_{it} \dots \dots \dots (8) \end{aligned}$$

*GDP* refers to Gross Domestic Product; *POP* refers to population; *REM* refers to Workers remittances as percentage of GDP; *DINV* refers to Domestic Investment; *CPI* refers to Consumer Price Index to describe Inflation; *TRD* refers to Trade Openness; *EXR* refers to Exchange Rate; *X* refers to some exogenous variables (control variable);  $\mu$  refers to error term.

The error correction model can be expressed as<sup>3</sup>:

$$\begin{aligned} \Delta \ln GDP_{it} = & \lambda_0 + \sum_{i=1}^j \lambda_{1i} \Delta \ln GDP_{it-i} + \sum_{i=0}^k \lambda_{2i} \Delta \ln POP_{it-i} + \sum_{i=0}^m \lambda_{3i} \Delta \ln REM_{it-i} + \\ & \sum_{i=0}^l \lambda_{4i} \Delta \ln DINV_{it-i} + \sum_{i=0}^n \lambda_{5i} \Delta \ln (REM * CPI)_{it-i} + \sum_{i=0}^p \lambda_{6i} \Delta \ln (REM * TRD)_{it-i} + \\ & \sum_{i=0}^q \lambda_{7i} \Delta \ln (REM * EXR)_{it-i} + \sum_{i=0}^q \lambda_{8i} \ln X_{it-i} + \varphi ECT_{it-1} + \varepsilon_{it} \dots \dots \dots (9) \end{aligned}$$

Where  $(REM*INF)$ ,  $(REM*TRD)$ ,  $(REM*EXR)$  are interactive variables. They are policies that are used as interaction between remittances and GDP Growth. The exogenous variables in the model are a measure of economic freedom and efficiency of the government bureaucracy<sup>4</sup>(EFR), ethno linguistic fractionalization variable<sup>5</sup> (ETHN), assassinations variable to capture civil unrest (ASSN). ECM represents the error correction term and is usually used to measure the speed of adjustment of the

<sup>3</sup>It should be noted that the variables specified in equation 10 above are logarithm term to describe growth rates.

<sup>4</sup>The institutional quality developed by Knack and Kefer, 1995

<sup>5</sup> Developed by Easterly and Levine (1996)

growth function to its steady state when there is disequilibrium. Where  $\varphi$  the coefficient of error correction model (ECM), ECM is defined as:

$$ECM = LN(GDP) - (\alpha_0 + \alpha_1 LN(POP_{it}) + \alpha_2 LN(REM_{it}) + \alpha_3 LN(DINV_{it}) + \alpha_4 LN(REM * CPI)_{it} + \alpha_5 LN((REM * TRD)_{it}) + \alpha_6 LN((REM * EXR)_{it}) + \alpha_7 LN(X_{it})) \dots \dots \dots (10)$$

## 2.2 Estimation Techniques

The analyses in this paper are carried out in three phases. First, we conduct Panel unit roots using the prominent tests namely Levin, Lin and Chu Test, Im, Pesaran and Shin Test, ADF Fisher Chi Square Test and PP Fisher Chi Square Test. Second, we perform Panel cointegration tests using the theoretically validated tests namely Residual-Based DF and ADF Tests (Kao Tests) and Johansen Fisher Panel Cointegration Test. In order to develop strong, robust and reliable models that capture the relationship between remittances and economic growth, the research work adopts the mean-group estimator (heterogenous panel estimation). The method of heterogenous panel technique is extensively used in regression analysis primarily because it allows for both the long-run and short run estimation. However, this paper only report the short run estimates.

## 2.3 Data

The studies referred above estimated the impact of remittances on economic growth in WAMZ countries. The data for the WAMZ countries will be from 1970 to 2011. Data utilized for estimation are obtained from the World Development Indicators (WDI) Database.

## 3.0 Results

### 3.1 Descriptive Statistics

The summary of the statistics used in this empirical study is presented in table 1 (see appendix). As may be observed from the Table, TRD has the lowest average of 0.61 and the average of remittances inflows (REM) has the highest mean value of 702.36 whereas the mean values of GDPGR, POPGR, CPI, EXR, and EFR are 3.48, 227.40, 20.058, 129.17, and 21.11 respectively. The analysis was also fortified by the values of the skewness and kurtosis of all the variables involved in the models. The skewness is a measure of the tail shape of the histogram. The bench mark for symmetrical distribution i.e. for the skewness is how close the variable is to zero while in the case of kurtosis, when it is three is called mesokurtic but values lower than that is called platykurtic and above is referred to as leptokurtic. GDPGR, POPGR, REM, DINV, CPI, EXR, are leptokurtic because their values are greater than three, in which the values are 9.054, 129.91, 28.66, 4.89, 13.65 and 75.16 while both TRD and EFR are platykurtic in nature because their values are less than the bench mark of three. The Jarque-Bera is used to measure the normality of the variable used in estimation, it is used to verify whether the error term is normally distributed.

### **3.2 Panel Unit Root Test Result**

The unit root tests carried out take cognizance of the characteristics of the data used. Thus, this exercise was carried out through Levin -Lin-Chu test (LLC), Im, Pesaran Shin test (IPS), Philip-Perron (PP) and Fisher Augmented Dickey Fuller (ADF) test. The results in table 2a and 2b (in the appendix) show that all the variables both (endogenous and exogenous) are stationary at their first difference with individual effects and individual linear trend.

### **3.3 Co-integration Analysis Result and Interpretation**

In determining the number of co-integrating vectors, the Kao residual based test and the Johansen Fisher test using the more recent critical values of Mackinnon-Haug-Michelis (1999) were applied. The assumption of no deterministic trend and restricted constant was for all the variables. The choice was tested using (AIC) and Schwartz Information Criterion (SIC). The result for both trace test and maximum Eigen value for unrestricted co-integration rank test are presented in table 3 (see appendix). For the WAMZ countries we have a cointegrating relationship among variables used.

### **3.4 Model Estimation Issues and Discussion of Result**

The result of the cointegrating test reveals more than one cointegrating vectors exist among the variables of interest. This means that we can estimate the Error Correction Model. An Error Correction Model is designed. The ECM has cointegration relations built into specification so that it restricts the long-run behaviour of the endogenous variables to converge to their cointegrating relationships while allowing for short-run adjustment dynamics. The use of the methodology of cointegration and ECM add more quality, flexibility and versatility to the econometric modelling of dynamic systems and the integration of short-run dynamics with the long-run equilibrium. The Error Correction Models were evaluated using the conventional diagnostic tests and the Akaike Information Criterion (AIC) was adopted in choosing the appropriate lag length. The model with the lowest (AIC) was adopted. The results are of the cointegrating relationship amongst the variables within the ECT framework are presented in table 4 in the appendix

Given the result of the cointegration test among variables in the equation, dynamic error correction model is considered appropriate for the analysis. This analysis on the effect of remittances on economic growth in WAMZ region is represented in the appendix. In terms of the signs and magnitude of the coefficients which signify the effect of Remittances on economic growth in WAMZ region, it was observed from the model that remittances inflows (REM) coefficient, domestic investment (DINV), interaction between remittances inflows and prices (REM\*CPI), interaction between remittances inflow and trade openness (REM\*TRD), interaction between remittances inflow and exchange rate (REM\*EXR), had signs contrary to A priori theoretical expectation. The coefficient of population growth was observed to be positive but not significant in all the three scenarios; the coefficient of remittances inflow was observed to be positive and significant in all cases, the coefficient of the interaction between remittances and prices was observed to be negative and significant, the coefficient of domestic investment was observed to be positive but not significant, while the coefficient interaction between remittances and trade openness was observed to be negative and significant, the coefficient of the interaction between remittances and economic freedom was observed to be negative and significant. Thus, in the short run, the economic growth responds more actively to increase in remittances than other variables. The remittances elasticity coefficient of growth is about 0.05. This implies that a percent increase in remittances will lead to 0.05 percent increases in the growth rate. Though Trade openness is supposed to assist the flow of capital from other countries of the world into the WAMZ region, but a negative relationship showed by the study indicates that most of

these countries are open but lack strong financial institution, thereby affecting the relevance of remittances inflow into the WAMZ region

Exchange rate (EXR) is also positive, though does not conform to the a priori theoretical expectations due to the fact that WAMZ region does not have a common currency which necessarily affect the countries members in the exchange rate pattern. The Economic freedom confirms the fact that host countries in this region are faced with wars and economic conflict such as the war in Liberia, the Boko haram issues of Nigeria, political imbalances that happened in Ghana and a lot more degenerate the level of growth in the region.

This estimation provides the short run coefficients on one hand and on the other hand, it gives the speed of adjustment of the growth function to its long run or steady state level in the event of distortions. The result of the model reveals that the error correction term is significant and negative except for the Pre SAP era. This lends further support to our earlier result that the estimated variables are cointegrated. Considering the full sample, the coefficient of the error correction term of about (-0.273) implies that about 27.3% of the adjustment towards equilibrium takes place in the first year. However, after the introduction of the Structural Adjustment Programme (SAP), the adjustment towards the equilibrium takes place in the first year the economy in the region about 15 percent. Therefore, during the Post SAP era it will take almost 7 years for the growth function to adjust fully to transitory shock or distortions. Overall, the speed of adjustment of remittances-growth nexus in WAMZ is quite slow in responding to transitory distortions.

#### **4.0 Conclusion and Policy Implications**

This study explores the aggregate significance of capital flows from international migrants on the economic growth of six (6) WAMZ Countries within the non-linear augmented conventional neoclassical growth framework using heterogenous panel cointegration method from 1970 to 2011. Two sub sample periods of Pre SAP and Post SAP era were used to confirm the choice of the heterogenous panel cointegration method. Our findings indicate that remittances have a positive and significant effect on the growth of WAMZ Countries in both the full sample and sub samples period. We found that a sound macroeconomic policy is sine qua non for the effective contribution of remittances to sustainable growth except for Pre SAP era. Also, we found that the incessant socio-political crisis evident in the WAMZ region has crippled the effectiveness of remittances in these countries.

Above all, decision makers in the government and financial sector should devise appropriate incentive measures to encourage the remittance recipient families to deposit them in financial institutions, which would contribute to accumulation of higher domestic savings and greater resource mobilization and policy scheme should be emphasized towards how remittances will be used for productive activities.

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