Macroeconomic Drivers of Remittances and the Implication for Economic Growth in Nigeria

Johnson A. Atan[1] & Godwin Essang Esu[1]

[1]Department of Economics, Faculty of Social Sciences, University of Uyo, Uyo, Nigeria

Correspondence: Godwin Essang Esu, Department of Economics, Faculty of Social Sciences, University of Uyo, Uyo, Nigeria.

Abstract

Remittances have been one of the officially recorded sources of international flows, especially, to developing economies like Nigeria, hence the need to encourage its consistent flow as well as defining ways and means of redeploying it for an improved economy. Following this line of reasoning, an attempt was made in this study, to see whether the macroeconomic environment in the domestic economy can actually play a role in stimulating international remittance inflows. To achieve this, average remittance data were tested against that of per capita income, real exchange rate, trade openness, government expenditure, inflation rate and the demographic variable (population density), and the data were all from secondary sources (WDI and CBN Bulletin, 2017/2018). Drawing from the type of gravity model suggested by Greenwood (1975) and Borjas (1987, 1989) – as modified - for analyzing international migration, and exploring the two approaches to international remittances analysis – altruistic and investment approaches, the data were modelled and estimated. Error Correction Mechanism (ECM) was employed in estimating the model. The results indicated that the macroeconomic environment of Nigeria, plays a significant role in stimulating international remittance flows. Based on the outcome of this study, it is suggested that for consistent flow of remittances into Nigeria, especially for investment purposes, a conducive macroeconomic environment should be created and maintained, as this will not only stimulate inflows, but will aid effective redeployment of same for output growth.

Keyword: remittances, macroeconomic drivers, economic growth, Nigeria

JEL Classification: F22, F31, F41

1. Introduction

Nigeria is one of the African countries with highest remittance inflows, as the continent is considered one of the fastest-growing continents in the world. As the country grows with the continent, one of the outcomes has been the changes in net private capital inflows and they are in the form of, but not limited to, foreign direct investment (FDI) and remittances. FDI and remittances grew in a very fast lane above official aid from the post-crash1 period. The high growth and the rising FDI and remittances, together with debt relief, had been instrumental in the reduction in Nigeria's debt burden in particular and Africa's in general. Also, favorable external conditions, improved macroeconomic policies and the business environment in Nigeria, and by extension, Africa, contributed to the positive developments. The foregoing, therefore, indicates that the increased role of domestic demand together with rising remittances thus points to the likely contribution of these transfers to Nigeria's and Africa's recovery.

By definition, remittances are usually seen as unrequited, nonmarket financial transfers between individuals living in different countries, mostly associated with migration (Chami et al. 2008; Barbone et al., 2012 and others). Over the past years, remittances sent to Africa and developing countries through formal channels was on the rise, driven by increased migration and reduced transaction costs. According to AFDB et al.(2012), as cited in Ncube and Brixiova (2013), currently, remittances are the largest international flow of financial resources to Africa. They are often, 'finance of the last resort,' in low income countries and a source of financial diversification in middle income ones (Julca, 2012). As underlined by Ncube and Brixiova (2013), official figures are far from capturing the full remittance volume – unrecorded remittances, sent to the continent informally, are estimated to amount to up to 75 percent of the recorded

---

[1]Post-crash period is the recovery period from the global financial crisis of 2007/2008.

flows – above the global ratio (Freund and Spatafora, 2005; Gupta, Pattillo and Wangh, 2007 and 2009).

Though Africa has received low attention in the literature on remittances lately – probably because of its relatively small, though rising, share in global remittance recipients charts – the increased financial weight of remittances in external flows to Africa and the positive role that remittances can play in Africa's (and by implication, Nigeria's) development have brought about a keen attention to the subject in policy discuss among policymakers. Like Ncube and Brixiova (2013) have observed, investigations into the macroeconomic aspects of remittance inflow has been scanty, thereby creating a gap in the literature. But understanding determinants and impact of remittances as a source of foreign exchange and income is crucial to the efforts of bringing Nigeria and indeed Africa into the path of growth and progress.

The purpose of this paper, therefore, is to contribute to closing this knowledge gap and adds to the growing stream of literature on remittances and development by (i) highlighting the recent macroeconomic trends, properties, and determinants of remittance inflows to Nigeria, and (ii) pointing out the role that remittances can play in closing the resource gap in Nigeria. The paper is organized thus; after this introduction, section two (2) is given to discussing some relevant literature, while stylized facts on the macroeconomic drivers (determinants) of remittances flows into Nigeria, are given in section three (3). The method of study, empirical framework and analytical technique is presented in section four (4). Empirical results obtained and the related findings are presented and discussed in section five (5). Conclusion and policy recommendations are presented in section six (6).

2. Review of Relevant Literature

The continuous increase in the remittance flows to the developing countries and their potential economic effects attracted a lot of interest from the scholars worldwide. The two main theoretical approaches to remittances are "the family approach" stating that altruistic reasons determine the immigrant to send money in order to support the relatives left behind and "the portfolio approach" which considers remittances as investments made by the immigrant in his/her country of origin (Goschin, 2014). In both cases remittances should prompt economic effects, either by raising consumption (demand side) or production (supply side) and consequently enhancing economic development in receiving countries (OECD, 2006).

In the literature, empirical evidence has shown various macroeconomic effects of remittance inflows. First, some scholars have argued that the money mostly goes to poor families, they are expected to reduce inequalities in income distribution (e.g. Quibria, 1997; Adams and Page, 2003; Docquier and Rapoport, 2003). This argument has been controversial. This is because, some scholars have established that wealthier families, which are better positioned to cover the costs of emigration, are benefiting more from the remittances (Adams, 1998; Rodriguez, 1998). Secondly, remittances are considered as a source of capital and may have the capacity to fuel higher employment and economic growth in the receiving economies (Ratha, 2003; Lowell and De La Garza, 2000; León-Ledesma and Piracha, 2001). Thirdly, remittances contribute to addressing the issue of current account deficit in receiving economies (Daianu, 2001; Terry et al., 2004).

At the macroeconomic level, Chami et al (2005) tried to find out if remittances behave similar to capital flows, that is, if they correlate positively with GDP, and found significant negative influence on economic growth. This seems to indicate that the money which the emigrant sends back home represent mere "compensatory transfers" providing support to poor families during difficult times (Goschin, 2014). Consequently, the variance of remittance flows is likely to be countercyclical (Chami et al, 2005). In the same register, Jahjah et al (2003) reunites the analysis of reasons to remit and on the economic impact of remittances. They found adverse impact of remittances on GDP for a big panel of countries and explained this from the perspective of labor decrease, as remittances might reduce the work incentive for the receivers, adding to the initial loss of workforce through emigration. On the opposite, other researchers reported significant positive influence of remittance inflows on macroeconomic growth (Mundaca, 2009; Bugamelli and Paterno, 2011). Finally, minute and/or insignificant economic impact of remittances was reported by Barajas et al. (2009) and Rao and Hassan (2012).

Studies on Eastern Europe also produced mixed results. Some found support for the positive influence of remittances on investments' size (Léon-Ledesma and Piracha, 2001) and further on long-term macroeconomic growth (Léon-Ledesma and Piracha, 2004), while for a panel of 12 Central and Eastern European countries, Gjini (2013) found a small negative impact of remittances on economic growth. The direct impact of remittances on economic growth is a question of the share allotted to productive investments. As a result, therefore, a substantial part of the literature on remittances explores their alternative destinations and the underlying factors. It is largely accepted that most of the money goes to household consumption, health care and housing (OECD, 2006), although the savings propensity seems to be higher for remittances compared to domestic money (Goschin, 2014). The household's decision to invest is determined by the money that remain available after the basic needs are satisfied, but it also depends on the broader economic environment, especially the financial market, interest rates, tax policy, etc. (Puri and Ritzema, 1999).

Even if remittances are not invested, remittance-based consumption can also trigger economic growth via bigger employment and production (Goschin, 2014). This indirect effect, identified in the literature as "multiplier effect", has been shown to produce two to three additional units of GDP for each unit of remittance inflow (Ratha, 2003). Increased demand due to remittances may sometimes produce negative macroeconomic effects, such as inflation. For instance, Adams (1991) found a high increase in land prices due to remittances. In sum, as reported in the literature, significant remittance inflows in a country seem to have important, mostly positive, macroeconomic effects, compensating for the workforce loss through emigration. Moreover, studies on Nigeria regarding remittances have all so shown mixed outcomes, both for direct and indirect impact of remittances on the economy, both for and against positive influences. Some studies have found a positive and the long run impact of remittances on the growth of the Nigerian economy (e.g. Odionye and Emerole, 2015; Nyeadi, et al., 2014; Adarkwa, 2015; Afaha, 2013), while others have found the opposite (e.g. Oluwafemi and Ayandibu, 2014; Chami et al., 2005; Spatafora, 2005; Barajas et al., 2009), however, Nyeadi et al. (2014) and Adarkwa, 2015 had also argued for a mixed outcome, attributing the negative scenario, to mismanagement of the inflows.

A tour of the literature throughs up one fact: the scarcity of research on what actually drives the flow of remittances into the recipient economy (Nigeria). What role does the recipient economy like Nigeria play in triggering the inward flows of remittances? A few researchers have attempted an answer to this question, but for the generality of Africa and other developing regions (e.g. Brixiova and Ncube (2013). However, to our knowledge, no research work has tried answering this question except for the work of Olowa and Awoyemi (2012), that sort answers in terms of rural migration and remittances in Nigeria. This gap is the motivation for this study.

3. Macroeconomic Drivers of Remittances in Nigeria: Stylized Facts

The basic features and relative effectiveness of remittances in the growth process of any economy can be x-rayed through its trend, properties and macroeconomic interactions, hence our assessment. Among the different categories of international flows of financial resources, remittances are of a very unique essence. This is, may be, for its relative stability, volume and other unique characteristics. For instance, prior to the 2007/08 global financial crisis, there existed a wide gap in the inflows between foreign direct investment (FDI) and remittances to Nigeria. In 1990, while remittances stood at US$10m, FDI stood at US$588m, a glaringly huge gap, indicating a relative macroeconomic stability at that time, that could lure FDIs. This is buttressed by the relative stability in inflation rate and GDP growth in that decade. On the average, inflation stabilized at the rate of 9.3 percent, while GDP grew at the rate of 12.8 percent in that decade. Official development assistance (ODA) received in that period was also far higher than remittances by US$245.1m. It stood at US$255.1m. the possible macroeconomic drivers and other indicators are presented in Table 1 below.

Table 1. Macroeconomic Drivers and Other Indicators

Macroeconomic Indicators (US$'million)	**1990**	**2000**	**2010**	**2016**
Gross Domestic Product (GDP) Growth (%)	12.8	5.3	7.8	-1.6
Inflation Rate	9.3	35.2	103.8	9.5
Foreign Direct Investment (FDI)	588	1,140	6,026	4,438
Remittances	10	1,392	19,745	19,636
Net Official Development Assistance (ODA)	255.1	173.8	2,052.4	2,500.7
External Debt Stocks	33,458	32,374	15,434	31,151
Revenue excluding grants (% of GDP)	-	12.0	5.6	5.0
Poverty headcount ratio*	57.1	58.4	53.5	-
Population growth	2.6	2.5	2.7	2.6

Source: World Development Indicators, 2018. *poverty headcount ratio at $1.90 a day (2011 PPP) (% of population)

Though FDI inflows to Nigeria had risen since the post-crash era, remittances have shown relative stability and persistent progress above FDI and ODA. In 2000 and 2010, FDI grew from US$588m in 1990 to US$1,140m and US$6,026 in 2000 and 2010 respectively, though it plummeted in 2016 to US$4,438m, a difference of US$1,588m. On the average, ODA has also experienced progress over the decades, in terms of its flows to Nigeria. For the four decades under review, ODA grew from US$255.1m in 1990 to US$173.8m, US$2,052.4 and US$2,500.7, for 2000, 2010 and 2016 respectively. However, the wide-margin increase in remittances, speaks volume of its importance for economic progress in the Nigerian economy. Remittances have been stable and increasing since 2000. They increased from US$1,392m in 2000 to US$19,745m in 2010 and US$19,636m in 2016 respectively. Figure 1 below shows the growth of the external flows into Nigeria.
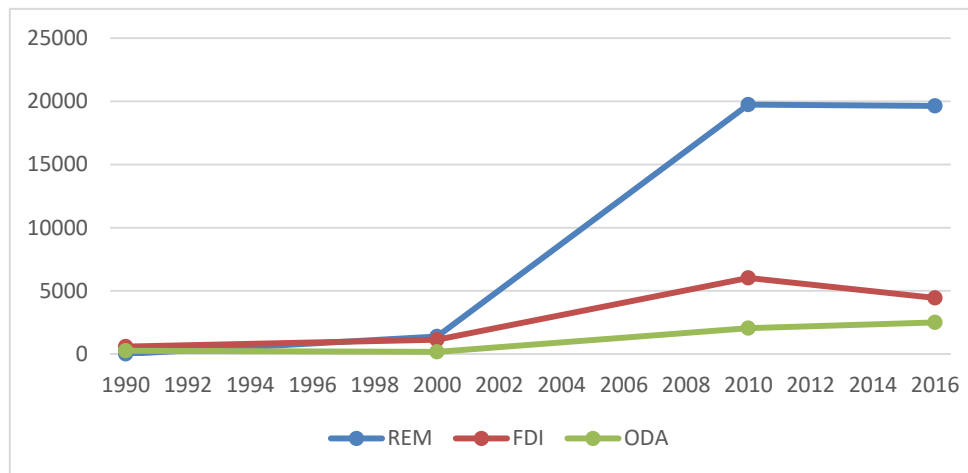
Figure 1. Remittances, FDI and ODA (Mln in US$)

Source: Author's plot based on the private remittance (received), net official development assistance and official aid (received)   and foreign direct investment (net inflows) data from the World Bank WDI database. Data is converted from current US dollars into   constant 2005 US dollars (in millions) by using the US GDP deflator..

From Figure1 above, it can be clearly seen that remittances have emerged as one of the most veritable source of foreign exchange flows into Nigeria. Its fast and stable growth has made for it less volatility characteristic, thereby enhancing reliability on it as a source of financial flows into Nigeria. As revealed by Ncube and Brixiova (2013), using world bank data, Nigeria and Egypt had the lion's share of remittance inflows in Africa, about 60 percent of the total flows to Africa, and they featured prominently in the global space between the top ten remittance recipients in the world.

As seen in Table 1 above, one unique connection stands out between remittances and inflation. It is clear that a large chunk of remittances flows directly into households, which goes in as direct consumption expenditure and partly as direct savings (Gupta et al., 2007).   While this contributes to poverty reduction (Adams and Page, 2005)[2], the impact on building sustainable livelihoods cannot be said for sure, since households often allocate only marginal amounts of savings or investment in human and productive capital. This increase means that purchasing power will aid a rise in inflation rate, especially in an inflation-prone (volatile) economy like that of Nigeria. More, therefore, needs to be done so that remittances can contribute effectively to inclusive growth and development.

However, the fluctuations in external debt stocks as the volume of remittances increases is a pointer to the fact that remittances – as part of forex inflows – play a positive role in aiding trade balances, since Nigeria is largely a consumer nation.

4. Research Methods

4.1 Model and Variables

The drivers of official international remittances can be examined by employing the type of gravity model suggested by Greenwood (1975) and Borjas (1987, 1989) – as modified[3] - for analyzing international migration. In a generalized term, such a model can be expressed as:

$$R = \sum_{ij=1}^{n} \gamma_i \, \delta_j \qquad (i = 1, \ldots \ldots, N; j = 1, \ldots \ldots N) \quad \_ \qquad (1)$$

where R is the flow of international remittances into developing countries (Nigeria in this case), γ_i is the vector of estimation parameters and δ_j is the vector of macro-variables in the model. These variables include per capita income for Nigeria and other economic, demographic and financial variables which may also influence the receipt of international remittances. From an economic standpoint, it is useful to enter a per capita income variable into the model to see if the propensity to receive remittances rises with the level of the country's income. This would mean that, developing countries with relatively very low income level may be unable to produce many international migrants and so receive less international remittances, while developing countries with very high levels of income may lack the incentive to produce migrants and receive remittances. This also seems to underline the possibility that level of income inequality may affect the receipt of international remittances. The perception here is that countries with higher levels of

---

[2]Adams and Page (2005) found that a 10 percent increase in remittances from abroad per capita will lead to a 3.5 percent decline in the share of people living in poverty.

[3]Modification of the model is that of the authors.

income inequality may produce more migrants and receive more official international remittances.

Similarly, the level of poverty in a country may affect the receipt of international remittances. Controlling for the level of income and income inequality, countries with higher rates of poverty may have more people who are willing to go work abroad and remit money back home (Adams, 2007). Unfortunately, however, poverty variable will not be estimated in this model, basically, because of scarcity of the relevant data. In the case of demographic variables, human capital theory generally holds that the more educated people are, the more their tendencies to migrate (Becker, 1993; Harris and Todaro). It is therefore likely that countries with more educated people might also receive more remittances. For this reason, we would have included the share of Nigeria's population that has completed secondary education as a variable measuring in emigration tendencies in the model, but for want of data. However, population density has been included as a demographic variable in the model. The inclusion of the control is predicated on the fact that, the size of the population per land mass vis-à-vis resource distribution is expected to reflect the tendency for migration that will result in remittance inflows.

The relative effects of this variable could be dynamic. If the size is large, but productive, then it will mean increased output and that will add to the viability of the domestic economy, hence discouraging emigration. This, however, will depend on a conducive economic cum social environment, that will encourage productivity. Based on this, the impact of the variable in driving remittance inflows could be positive or negative. Also, financial variables – such as exchange rate – may also have an effect on remittances. The thinking is that migrants might likely remit to countries with good economic management status (especially if it is for investment purposes), as measured by exchange rate stability and high international credit rating. But for want of data, the only exchange rate has been included in the analysis.

Other macroeconomic variables such as, total government expenditure and trade openness, have been added to the model. Government expenditure is expected to stimulate growth and pull a stabilizing string in the economy, like reducing unemployment and/or boosting income distribution generally. This could, on one hand, attract remittances, as a result of stability, at least for investment purposes if not for altruistic reasons. On the other hand, it might distort the incentive for migration, since the economy, being relatively stable, may have implication for creating an enabling environment for potential migrants to thrive within. This may affect the remittance inflow negatively. Also, the openness variable (net trade) controls for growth in the economy relative to its interaction with other economies from which remittances inflow originates. The level of openness may affect inflows of remittances positively or negatively. Combining all of these variables, the empirical version of the model can be specified in agreement with Cameron (1994) and Ehrlich (1996), and as applied by Odionye and Emerole (2015), that suggested that a log- linear form of an equation is more likely to find evidence of a deterrent effect than a linear form, we therefore log-linearized equation 2) as:

$$lnR = \gamma_1 + \gamma_2 lnGDPPC + \gamma_3 lnPOPED + \gamma_4 lnGTEX + \gamma_5 lnEXR + \gamma_6 OPN + \gamma_7 INF + \sigma_t \qquad (2)$$

where $lnGDPPC$ is the natural log of GDP per capita in Nigeria, and this measures the income structure of the country. $lnPOPED$ is the volume of potential migrants captured by the natural log population density, while $lnGTEX$ captures the level of growth stimulation by the government (as proxied by the natural log of total government expenditure). $lnEXR$ measures the level of financial stability and microeconomic management of the country (as captured by the natural log of the real effective exchange rate); OPN is one of the controls, reflecting the health of the economy, in terms of its interaction with other economies. It is proxied by the net trade of the country. Finally, INF is the inflation rate in the country, included in the model as one of the macroeconomic drivers. It is expected to dissuade international remittance inflow, especially when it is persistently high, as that reflects economic instability. However, this is may only hold if the remittances are investment-linked, and not for altruistic purposes. σ_t, however, measures the stochastic error term in the model. The data used in this study are annual time series data from the Central Bank of Nigeria Statistical bulletin, 2018 and World Bank's World Development Indicators, 2018. However, the data for stylized facts were gotten from IMF data base.

4.2 Analytical/Estimation Technique

Econometric approach is employed in this work in estimating the relationship between the variables specified in the model above. The Ordinary Least Square (OLS) technique was used in obtaining the numerical estimates of the coefficients with the aid of a computer software (e-views 9). As is standard in the literature, the OLS method was chosen because of its property of being a best linear unbiased estimator (BLUE). In order to avoid the misleading characteristics of time series macroeconomic variables which, in most cases, are non-stationary in regression analysis, we examined the time series properties of all the variables under investigation using the Augmented Dickey-Fuller (ADF) unit root tests. Also, the Johansen Cointegration test technique was employed to ascertain whether the variables are cointegrated, that is, if there is the long run equilibrium relationship among the variables. The third stage methodology we employed was the error correction mechanism, using the Error Correction Model (ECM). This approach agrees with Egwaikhide (2012) and Esu and Udonwa (2015). Following the above, the ADF test involves running the following ADF test regression regression with constant:

$$\Delta\varphi_t = \rho_1 + \rho_2 + \pi\varphi_{t-1} + \sum_{i=1}^{m}\mu\varphi_i\,\Delta\varphi_{t-i} + \alpha_t \tag{3}$$

Where Δ is the first difference operator, φ_t represents the relevant variables under investigation and α_t is the error term. The optimal period of lag is selected large enough (using the Akaike information criterion) to condense the residual α_t, ensuring no autocorrelation – that is, reducing white noise as much as possible). The ADF equation is specified with constant and trend, in the opinion of Gujarati (2009). The null hypothesis is that the time series has a unit root ($H\_0: \pi = 0$) and the alternate is that the time series is trend stationary ($H\_1: \pi < 0$). The null hypothesis of non-stationarity is rejected if the computed Dickey-Fuller statistic is greater than critical Dickey-Fuller value.

However, due to the likelihood of structural changes that might have occurred in the period under

investigation, the ADF test might be biased in identifying integrated data. This shortcoming, as Akpan (2011) and Esu and Udonwa (2015) assert, is overcome by the PP test developed by Perron (1997). According to Herzer, et al (2004) (cited in Akpan, 2011), this test evaluates the time series properties in the presence of structural changes at unknown points in time and, thus, endogenises this structural break. The equation is specified thus;

$$t_\sigma^* = t_\sigma\left[\frac{\delta_0}{\pi_0}\right]^{1/2} - \frac{k(\pi^0 - \delta^0)[se(\hat{\sigma})]}{2\pi_0^{\frac{1}{2}}s} \tag{4}$$

Where $\hat{\sigma}$ is the estimate, and t_σ is the t – ratio of σ, $se(\hat{\sigma})$ is the coefficient standard error, and s is the standard error of the equation. Also, δ_0 is a consistent estimate of the variance, while π_0 is the residual spectrum at frequency zero. However, If the variables are nonstationary at level form and integrated of the same order, this implies evidence of cointegration in the model. The cointegration equation is stated as:

$$[\theta_m R_t = \alpha_1 + \sum_{i=2}^{\rho}\alpha_i\,\theta_m Z_t - [\,\theta_m R_t - \sum_{i=1}^{n}\beta X_{t-i} + v_{2t}]] \tag{5}$$

Where

$$[\theta_m logR_t - \sum_{i=1}^{n}\beta X_{t-i}]$$

is the linear combination of the non co integrated vectors, X is a vector of the non co integration

variables. The individual influence of the co integrated variables can only be separated by an error correction mechanism through an error correction model as shown below. The Error Correction Model Equation is given as:

$$[\theta_m R_t = \alpha_1 + \sum_{i=2}^{\rho}\alpha_i\,\theta_m Z_t - (\lambda ECM_{t-i} + v_{6t})] \tag{6}$$

Where $-\lambda ECM$ is the error correction mechanism, $-\lambda$ is the magnitude of error corrected each period specified in it's a priori form, so as to restore $\theta_m logGDPPC_t$ to equilibrium.

5. Presentation of Results and Discussion of Findings

5.1 Data Diagnostic Test Results

5.1.1 Unit Root Results

The data diagnostic test results for properties of the data used in this study is presented in tables 2 and 3. Others are presented in the appendices. The results of the unit root test, from the two test statistic, show that most of the variables were stationary at first difference, at 1%, 5% and 10% level of significance. However, total government expenditure was not stationary even at second difference in the case of ADF test, but was stationary at second difference in the case of PP test. Also, inflation and trade openness were stationary both at level and first difference in PP test, and only at first difference for openness in the case of ADF. The outcomes are evaluated in terms of their P-values[4]. This result informed our decision to check for the existence of cointegration among the variables. The results of the Johansen Cointegration test are as presented in Table 3 below.

Table 2. Unit Root Test Results

Variable (in logs)	ADF Level	ADF 1st Diff.	PP Level	PP 1st Diff.	Decision
Remittances	-2.03(0)	-6.40(0)*	-2.03(2)	-6.54(5)*	I(1)
GDP per capita	0.03(0)	-4.71(0)*	-0.28(3)	-4.89(2)*	I(1)
Real Exchange Rate	-1.83(0)	-4.11(0)**	-2.02(3)	-4.10(16)**	I(1)
Total Govt. Expenditure	2.00(5)	-8.53(1)*	1.41(4)	-6.36(4)*	I(1)
Population Density	-0.04(3)	-0.92(3)	3.81(3)	-3.07(3)***	I(2)
Inflation	-2.90(0)***	-5.58(0)*	-2.82(4)***	-10.89(34)*	I(0)/I(1)
Trade Openness	-1.78(8)	-4.96(1)*	-2.66(1)***	-6.38(8)*	I(0)/I(1)

---

[4]The P. value represents the exact level of significance of the variable. It is the exact value at which the null hypothesis is rejected. See Gujarati (2009).

Note:*,**,***, denotes significance at the 1%, 5% and 10% levels respectively. The values in bracket values in bracket () for the ADF test indicate the optical lag selected by the SIC within a maximum lag of 9. For the PP tests, the spectral estimation is based on the Bartlett Kernel Method and the values in bracket () indicate the bandwidth selection using the Newey-West approach. All estimations assume a constant term,

From the table, it is evident that at least four cointegrating equations were found, indicating evidence of cointegration in the model. This outcome underlined our rejection of the null hypothesis – of no cointegration – using the trace and max-eigen statistic.

As clearly reflected in Table 3, the results suggest the existence of (long run) equilibrium relationship among the variables, pointing further to the fact that a short run dynamics, under the error correction framework, are required. Again, as is conventional in econometrics literature, the existence of a long run relationship gives the grounds for evaluating the short run distortions embodied in the equilibrium relationship. Furthermore, it is economically sensible to be conscious of the fact that, for any equilibrium relationship, there could be short run disequilibrium.

5.1.2 Cointegration Results

Table 3. Johansen Hypothesized Co-integrating Relations

Null Hypothesis	Alternative Hypothesis	Eigen value	Trace Statistic	Critical Value (5%)	Max-Eigen Statistic	Critical Value
R = 0*	R = 1	0.917	221.81	125.61	87.32	46.23
R ≤ 1*	R = 2	0.771	134.48	95.75	51.72	40.07
R ≤ 2*	R = 3	0.698	82.76	69.81	41.96	33.87
R ≤ 3*	R = 4	0.331	50.79	47.85	35.10	27.58
R ≤ 4	R = 5	0.294	26.69	29.79	12.21	21.13
R ≤ 5	R = 6	0.271	14.47	15.49	11.10	14.26
R ≤ 6	R = 7	0.091	3.37	3.84	3.37	3.84

Note: * denotes rejection of the null hypothesis at 5% level of significance. Estimation assumes a linear deterministic trend.

In order to examine the short-run dynamics in the model, we reparamatized equation (2), in the light of the error correction model (ECM) stated in equation (6), and the result of the consequent estimation is presented in Table 4. This model helps to show the distortions in long run equilibrium relations caused by shocks in the model as well as the duration required for such disequilibrium to be corrected. Technically, it indicates the time taken for short run disequilibrium to adjust back to long-run equilibrium. The result of the short-run dynamics presented in Table 4 provides clues that some basic macroeconomic variables could actually serve as drivers to remittance inflows into the Nigerian economy. In general, the ECM term conforms to theoretical sign and that significantly. This expresses the fact that the speed of adjustment is sufficiently accelerated. The Adjusted R-squared indicates that 90 percent variation in real remittances (R) inflows into Nigeria is jointly explained by the modelled variables. It suggests that the model adequately explains the catalytic role of the modelled macro-variables in Nigeria's remittance inflows, in the light of the measured relationship.

The F-statistic indicates the overall significance of the model, pointing to the fact that it is a good fit. Though Durbin-Watson (D-W) statistic has not really established, to some extent, the absence of partial serial correlation in the model, the Jarque-Berra (J.B) F-statistic holds a statistically significant situation, implying that the estimated residuals are normally distributed. In addition, Breusch-Godfrey LM test suggests that there is no serial correlation in the residuals; hence, we uphold the null hypothesis of no serial correlation in the model. However, the regression specification (RESET) test indicates a case of omitted variables. This could be largely attributed to the inconsistent and outright unavailability of data to directly measure or proxy most of Nigerian macroeconomic variables. However, the CUSUM and CUSUM square in figures 2 and 3 shows a stable model.

5.2 Model Estimation Results

Table 4. Main Model Estimation Results

Variable (in logs)	Dependent Variable: ΔREM	
	Coefficient	Standard Error
Constant	1.802(0.00674)*	4.247
ΔGDP Per Capita	-1.540(0.001)*	0.427
ΔTotal Govt. Exp.	1.659(0.003)*	0.524
ΔPopulation	-12.588(0.001)*	3.470
ΔReal Exchange Rate	1.037(0.003)*	0.322
ΔTrade Openness†	6.6889(0.039)**	7.676
ΔInflation Rate†	0.006(0.390)	0.006
ECM(-1)	-0.586(0.002)*	0.179
R^2	*0.920*	
Adj. R^2	*0.904*	
F – Statistic	*57.920(0.000)*	
D-W Statistic	*1.951*	
B-G LM Test F(2,26)	*5.038(0.014)*	
B-P-G Test F(7,28)	*1.806(0.125)*	
RESET Test F(1,27)	*10.099(0.003)*	
J-B Stat.	3.442(0.178)	
Wald Test F(4,28)	1.346(0.000)	

Note: † denotes that Openness and Inflation rate are not logged. * and ** denote significance at 1%

and 5% level   respectively. P-values are in parenthesis.

An assessment of the behaviors of the estimates from Table 4 above, throughs up obvious reflections. The per capita income, measured by GDP per capita indicates a negative and significant elasticity[5]. The sign met the theoretical expectation. The coefficient of GDP per capita – indicating the income variation in the model - (-1.54) shows that a percentage fall in per capita income, will fuel the tendency for emigration, which will result in remittance inflows, to the tune of 1.54 percent (in absolute terms). This evidence agrees with Adams (2007), who argues that countries with relatively low income tend to attract more international remittance inflows than countries with high/stable income or countries with very low income. The implication of this is a trade-off between a stable-income economy and a possible case of increased remittance inflows as a result of emigration, as response to income shortfall/instability. However, the twist is that a steady inflows of remittances, both for investment and altruistic purposes, will eventually bring about improvement in per capita income.
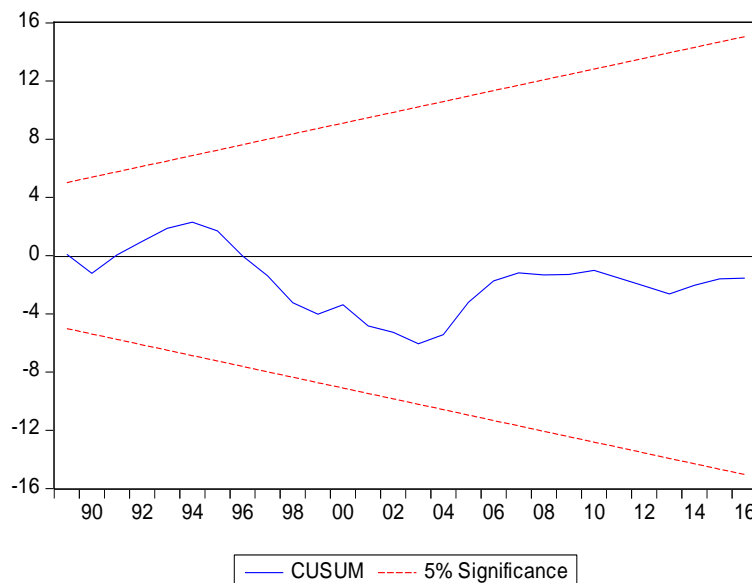

Figure 2. Cumulative Sum of Residuals

Another variable for assessment is the economy-stimulating efforts of government, measured by government aggregate consumption expenditure (total government expenditure). The coefficient of that variable was 1.659, and was

---

[5]The coefficients are presented as elasticities since the variables were estimated in log forms

significant at the 5 percent level of significance. The implication of this is that, a percentage expansion in government expenditure – which will mean stimulation of the economy – will attract remittance inflows to the tune of about 1.66 percent, especially for investment reasons. When the economy is sufficiently stimulated, investible funds flow through and one of the sources is remittances. Family members abroad can contract their relatives to invest in them, while they remit to them from abroad. The literature is littered with scholars, who have drawn similar conclusions on some panel analysis of nations. Examples include Ebeke (2010); Odionye et al, (2015); Ncube and Brixiova (2013).

The next is the population. The elasticity of the population variable included the model, stood at (-12.588); it was negatively signed. This meets a priori expectation, because the outcome was expected to be positive or negative. This is because, increased population without a stable economy will certainly induce emigration in search of greener pasture, and that means increased remittance flows. Such flows are, most times, altruistic bias. On the other hand, if the economy is stable, the increase in population and the increase in the educated part of that population will be utilized for more output expansion, and this will attract remittance flows, mostly, for investment purposes. The result, therefore, indicates that 1 percent increase in population will bring about a 12.59 percent increase in remittance inflows (in absolute terms), but it could also mean an initial drop in the same amount, in the case of a stable and progressive economy. In the of the drops, however, the existing emigrants are expected to gather for the shortfall in the long-run.
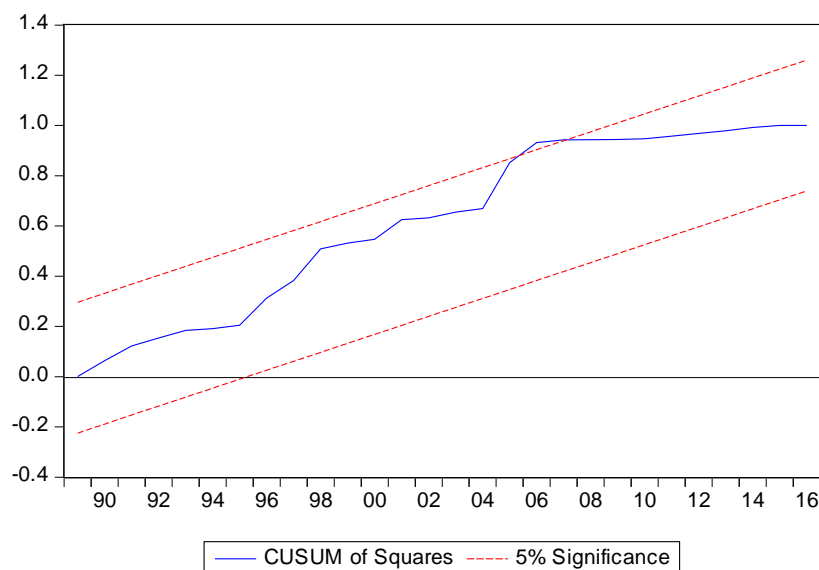

Figure 3. Cumulative Sum of Squared Residual

Exchange rate moved in line with the theoretical expectation. It indicated that a percentage level of stability in exchange rates in the Nigerian economy (financial stability), will improve remittance flows by about 1.04 percent. This means that inflows of remittances for both investment and altruistic purposes will be enhanced. The statistical significance, buttressed the fact that if the country can earnestly work on achieving a stable exchange rate, then the effect will certainly be amplified, both in boosting remittance inflows and the entire wellbeing of the economy.

As would be expected, openness was positive and significant, though at 10 percent level. It shows that if the Nigerian economy is 1 percent more open (more interactive with other economies), it will induce more remittances inflows of about 6.69 percent into Nigeria. Inflation was one of the microeconomic variables employed in this study. The theoretical expectation was a negative or positive parameter. However, the variable, in this case was positively signed. This is instructive in that, it reveals the fact that in the face of inflation, a lot of macroeconomic interface play out. The positive sign, though not statistically significant - with infinitesimal coefficient - show that a percentage rise in inflation rate, will bring about a very minute and insignificant increase in the flows of international remittances. This flow may be mostly altruistic, since it is not a plausible economic decision to invest in a highly volatile. The effect of inflation, though, far-reaching, may not be noticeable, since it role in driving remittance inflows is mostly (in this case) household-driven. This is explainable in everyday life experiences. In the face of inflation, where purchasing power comes under attack, individuals and families abroad, remit to their families in the domestic economy, to boost their purchasing power, so as to quell the scotching shots of an inflationary system.

6. Conclusion and Policy Issues

One fundamental fact, in this study is the fact that it has been able to establish that some macroeconomic factors of a domestic economy may play a significant role in enhancing remittances mobilization and inflows. Nigeria that we studied have handed, overwhelming evidence for this argument. The study showed that a relatively-improved-income

country and the high-income country will tend to reduce the tendency for growth in remittance flows, since, there may be low incentives for emigration. This was reflected in the sign of the income (GDP per capita) variable. The implication of this is that, in the short run, there may be a tradeoff of one of the macroeconomic improvements to sustain the other, but in the long run, they will possibly operate effectively, not as a tradeoff, but as complements. That is, in the short run, the primary incentive to migrate may be the volatile income status of the economy, where people move out to see how they can earn additional income to sustain their families back home. At that level, their push is basically altruistic, however, overtime, as the economy improves and relative stability occurs, the incentives to go out falls and those already outside remit for purposes more than altruistic. Other variables, including the controls, as well as their implication for remittance flows, have been discussed in the previous section. The implication of these interactions for output growth has also been underlined in the discussion presented in this paper.

However, for those possibilities underlined to be fast-tract, the government and other relevant stakeholders may wish to give attention to policy measures that will enhance a stable macroeconomic environment, which include improved output/per capita income, stable exchange rate and efficiently managed inflation rate, amongst others. This will not only underscore enhanced remittance flows, but will foster effective use of same for more economic improvement and the general wellbeing of the people.

References

Adams, R. H. (1991). The Effects of International Remittances on Poverty, Inequality and Development inRural Egypt, Research Report No. 96, International Food Policy Research Institute.

Adams, R. H. (2007). International Remittances and the Household: Analysis and Review of Global Evidence. World Bank Policy Research Working Paper 4116, February. https://doi.org/10.1596/1813-9450-4116

Adams, R. H., & Page, J. (2003). International Migration, Remittances and Poverty in Developing Countries, Policy Research Working Paper No. 3179, World Bank Poverty Reduction Group, Washington, DC.

Adams, R. J. R., & Page, J. (2005). Do International Migration and Remittances Reduce Poverty in Developing Countries? *World Development*, *33*(10), 1645–1669. https://doi.org/10.1016/j.worlddev.2005.05.004

Afaha, J. S. (2013). Migration, Remittance, and Development in Origin Countries: Evidence from Nigeria. *African Population Studies*, *27*(1). https://doi.org/10.11564/27-1-7

African Development Bank, Organization for Economic Cooperation, United Nations Development Program and Economic Commission for Africa. (2013). African Economic Outlook 2013, AfDB: Tunis, OECD: Paris, UNDP: New York and ECA: Paris.

Akpan,U. F. (2011), Cointegration, Causality and Wagner's Hypothesis: Time Series Evidence for Nigeria, 1970 – 2008, *Journal of Economic Research,* (16), 59-84.

Barajas, A., Chami, R., Fullenkamp, C., Gapen, M., & Montiel P. (2009). Do workers' remittances promote economic growth? Working Paper, WP/09/153, Washington DC: International Monetary Fund.

Barbone, L., Pietka, K. K., & Topinska, I. (2012). The Impact of Remittances on Poland's Economy. CASE Network E-Brief, No. 12/2012.

Becker, G. (1993). Human Capital. Chicago: University of Chicago Press. https://doi.org/10.7208/chicago/9780226041223.001.0001

Borjas, G. (1987). Self-Selection and the Earnings of Immigrants. *American Economic Review*, *77*, 531-553. https://doi.org/10.3386/w2248

Borjas, G. (1989). Economic Theory and International Migration. *International Migration Review*, *23*, 457-485. https://doi.org/10.2307/2546424

Bugamelli, M., & Paterno, F., (2011). Output Growth Volatility and Remittances, *Economica*, London School of Economics and Political Science, *78*(311), 480-500.

Cameron, S. A. (1994) Review of the Econometric Evidence on the effects of Capital Punishment. *Journal of Socio-Economic*, 23, 197-214. https://doi.org/10.1016/1053-5357(94)90027-2

Chami, R., Barajas, A., Cosimano, T., Fullenkamp, T., Gapne, M., & Montiel, M. (2008). Macroeconomic Consequences of Remittances, IMF Occasional Paper No. 259, IMF: Washington DC.

Chami, R., Fullenkamp, C., & Jahjah, S., (2005). Are Immigrant Remittance Flows a Source of Capital for Development? *IMF Staff Papers, 52*(1), 55-81. http://www.highbeam.com/doc/1G1-133132978.html.

Daianu, D. (2001). Balance of Payments Financing in Romania – The Role of Remittances, Romanian Center for Economic Policies, Bucharest.

Docquier, F., & Rapoport, H. (2003). Remittances and Inequality: A Dynamic Migration Model, IZA Discussion Paper No. 808, Institute for the Study of Labor, Bonn.

Ehrlich, I. (1996) The Deterrent Effect of Capital Punishment. *American Economic Perspertive*, *10*, 43-69. https://doi.org/10.1257/jep.10.1.43

Freund, C., & Spatafora, N. (2005). Remittances: Transaction Costs, Determinants and Informal Flows. World Bank Policy Research Paper No. 3704, World Bank: Washington DC.

Gjini, A. (2013). The Role of Remittances on Economic Growth: An Empirical Investigation of 12 CEE Countries, *International Business & Economics Research Journal, 12*(2), 193-203, available at: http://journals.cluteonline.com/index.php/IBER/article/view/7631/7697.

Goschin, Z. (2014). Remittances as an Economic Development Factor: Empirical Evidence from the CEE Countries. *Procedia Economics and Finance*, *10*, 54 – 60. https://doi.org/10.1016/S2212-5671(14)00277-9

Greenwood, M. (1975). Research on National Migration to the United States: A Survey. *Journal of Economic Literature*, *13*, 397-433.

Gujarati, D. N. (2009), Basic Econometrics, 5th ed. McGraw-Hill Companies, Inc. New York

Gupta, S., Pattillo, C., & Wagh, S. (2009). Impact of Remittances on Poverty and Financial Development in Sub-Saharan Africa. *World Development*, *31*(1), 104–115. https://doi.org/10.1016/j.worlddev.2008.05.007

Gupta, S., Pattillo, C., & Wangh, S. (2007). Making Remittances Work for Africa. *Finance & Development*, *44*(2), www.imf.org/external/pubs/ft/fandd/2007/06/gupta.htm.

Harris, J., & Michael, T. (1970). Migration, Unemployment and Development: A Two Sector Analysis. *American Economic Reviews*, *60*, 126-142.

Jahjah, S., Chami, R., & Fullenkamp, C., (2003). Are Immigrant Remittance Flows a Source of Capital for Development?. IMF Working Paper 03/189, Washington: *International Monetary Fund*, available at: http://www.imf.org/external/pubs/cat/longres.aspx?sk=16801.

Julca, A. (2012). Can Remittances Support Development Finance in Developing Countries? Background paper for UN World Economic and Social Survey 2012, UN: New York.

León, L. M., & Piracha, M. (2001). International Migration and the Role of Remittances in Eastern Europe. Studies in Economics, No. 0113, Department of Economics, University of Kent.

Lowell, B. L., De La Garza, R. O. (2000). The Developmental Role of Remittances in US Latino Communities and in Latin American Countries. A Final Project Report, Inter-American Dialogue.

Mundaca, G. (2009). Remittances, Financial market development, and economic growth: The case of *Latin America and the Caribbean, Review of Development Economics*, *13*(2), 288–303. https://doi.org/10.1111/j.1467-9361.2008.00487.x

Ncube, M., & Brixiovia, Z. (2013), Remittances and The Macroeconomic Impact: Evidence from Africa. African Development Bank Group, Working Paper series 188, November.

Nyeadi, J. D., Yidana, N., & Imoro, M. (2014). Remittances and Economic Growth Nexus: Empirical Evidence from Nigeria, Senegal and togo. *International Journal of Academic Research in Business and Social Sciences, 4*(10). http://dx.doi.org/10.6007/IJARBSS/v4-i9/ 1215

Odionye, J. C., & Emerole, O. B. (2015). The Impact of International Remittances on the Nigerian Economy. *British Journal of Economics, Management & Trade, 7*(1), 1-9. https://doi.org/10.9734/BJEMT/2015/13290

OECD. (2006). International Migrant Remittances and their Role in Development. *International Migration Outlook*, SOPEMI, available at: http://www.oecd.org/els/mig/38840502.pdf

Olowa, O. W., & Awoyemi, T. T. (2012). Determinants of Migration and Remittances in Rural Nigeria. *Journal of Development and Agricultural Economics*, *4*(7), 191 – 198. https://doi.org/10.5897/JDAE11.053

Oluwafemi, A., & Ayandibu, A. O. (2014). Impact of Remittances on Development in Nigeria: Challenges and Prospects. *Journal of Sociology and Anthropology*, *5*(3), 311 – 318. https://doi.org/10.1080/09766634.2014.11885635

Puri, S., & Ritzema, T. (1999). Migrant Worker Remittances, Micro-Finance and the Informa Economy: Prospects and Issues, Working Paper No. 21,Social Finance Unit, International Labour Organization, Geneva.

Quibria, M. G. (1997). International Migration, Remittances and Income Distribution in Source Country: A Synthesis. *Bulletin of Economic Research*, *491*, 29-46. https://doi.org/10.1111/1467-8586.00025

Rao, B. B., & Hassan, G. M. (2012). Are the direct and indirect growth effects of remittances significant? *The World Economy*, 35(3), 351–372. https://doi.org/10.1111/j.1467-9701.2011.01399.x

Ratha, D. (2003). Worker's Remittances: An Important and Stable Source of External Development Finance. *Global Developing Finance*, World Bank, 157-175

Ratha, D. (2012). Outlook for migration and remittances 2012-14, Tenth Coordination Meeting on International Migration World Bank, New York, February 9, 2012, available at: http://www.un.org/esa/population/meetings/tenthcoord2012/V.%20Dilip%20Ratha%20-%20Remittances%20and%20their%20costs.pdf

Spatafora, N. (2005). Worker Remittances and Economic Development. World Economic Outlook, 69-84.

Terry, D. F., Jiminez, O. F., & Wilson, S. R. (2004). Beyond Small change: Migrants, Remittances and Economic Development. Inter-American Development Bank and Baltimore, Johns Hopkins University Press.
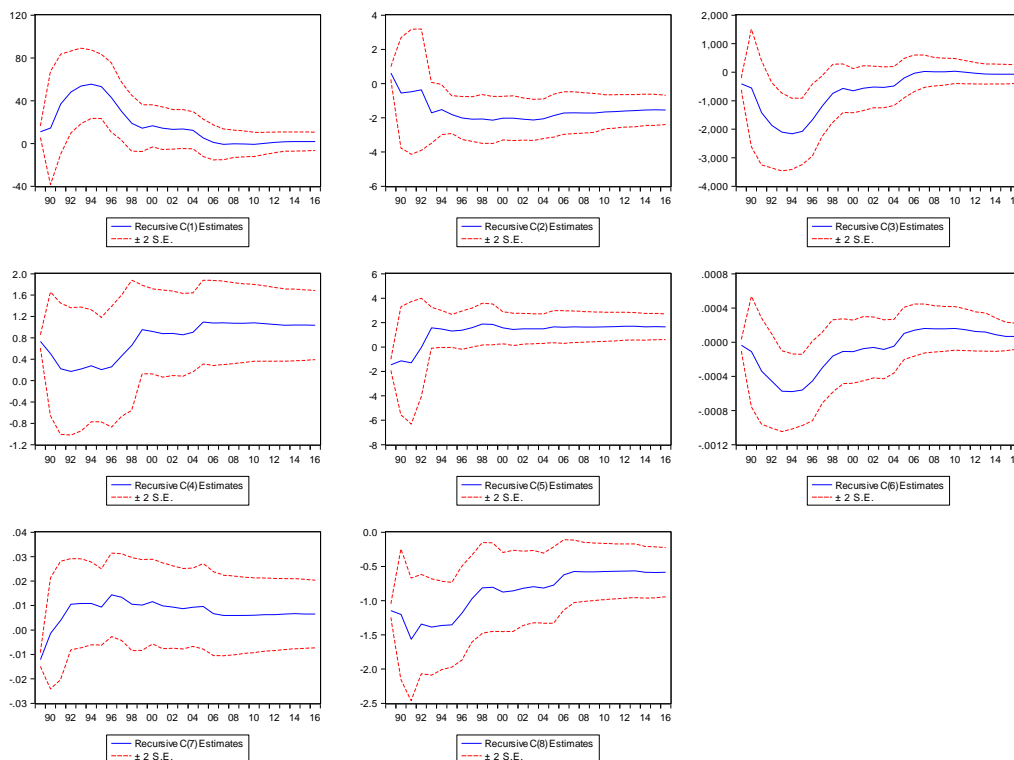
Appendix 1

Table 5. Descriptive Statistics and Correlation Matrix

Variable	REM	GDPPC	GTEX	EXR	POPED	OPN	INF
Mean	3.443	1.341	1484.417	154.811	132.893	1408.468	19.342
Median	2.814	4.641	487.110	99.272	127.788	231.500	12.217
Maximum	13.042	5.681	5185.320	532.545	204.211	5822.600	72.835
Minimum	0.008	1.581	9.640	49.071	80.657	-2230.90	5.382
Std. Dev.	3.643	1.681	1841.798	122.173	36.670	2101.235	17.514
Skewness	1.134	1.456	0.993	1.623	0.350	0.772	1.7073
Kurtosis	3.541	3.583	1.954	4.780	2.400	2.252	4.680
J-B	8.393	13.612	6.639	21.138	2.443	4.544	22.331
Prob.	(0.015)	(0.001)	(0.036)	(0.000)	(0.294)	(0.103)	(0.000)
REM	1.000						
GDPPC	0.490	1.000					
GTEX	0.521	0.920	1.000				
EXR	-0.354	-0.125	-0.319	1.000			
POPED	0.635	0.794	0.940	-0.490	1.000		
OPN	0.572	0.603	0.509	-0.210	0.452	1.000	
INF	-0.193	-0.407	-0.346	-0.159	-0.294	-0.302	1.000

Appendix 2

Figure 4: Recursive Estimates of the Variables

Appendix 3

Figure 5: Influence Statistics