

# Migrants' Remittances and Gross National Savings in Nigeria (1986-2016): An Empirical Study

AILEMEN, M.I (Ph.D)

Department of Economics, Ambrose Alli University, Ekpoma, Nigeria

OLUBOKUN, Sanmi

Department of Economics, Achievers University, Owo, Nigeria

## Abstract

Migrants' remittances in Nigeria have increased substantially over the past four decades. It is expected that such massive inflows should be impacted positively on the country's gross national savings in Nigeria. However, in spite of the growth of migrants' remittances, the impacts of these inflows on gross national savings have not been adequately investigated by researchers in Nigeria. Consequently, this study investigated the impact of migrants' remittances on gross national savings in Nigeria between 1986 and 2016. The data for the study were sourced from the Central Bank of Nigeria Statistical Bulletin and the African Development Indicators. The study employed the Fully Modified Ordinary Least Squares Method to estimate the impact. Results revealed that migrants' remittance and gross domestic product in the country have a direct and significant relationship with the level of the gross national savings in Nigeria. It was further revealed that a percent increase in the level of remittance increased the gross national savings by 85 percent. However, inflation rate, age dependency ratio and exchange rate were not statistically significant in explaining the level of gross national savings in the study period. The study concluded that migrants' remittance is robust enough to impact on national savings in Nigeria. The study therefore recommended that government should institute appropriate monetary, fiscal and trade policy measures that will effectively encourage the inflows of formal remittances into the country in order to raise the level of national saving.

**Keywords:** Remittances, Savings, Inflation, Indicators, Dependency Ratio.

## Section One:

### 1.1 Introduction:

Migrants' remittances can be defined as the transfer of goods or money by a foreign worker to an individual in his or her home country. It is an important source of foreign exchange earnings for Nigeria over the past four decades.

In Nigeria, workers' remittances by international migrants have increased substantially during the last decades, constituting the largest source of external finance for developing countries after foreign direct investment (Ojapinwa, 2014). While the figure sent to developing countries reached \$325 billion, the flows to Africa reached \$40 billion in 2010, equivalent to 2.6 percent of Africa's gross domestic product (World Bank, 2011). The reason behind this alarming statistics is that the number of migrants have been growing by leaps and bound yearly. One strong argument in favour of migration is the belief that it will aid migrants to have access to series of economic opportunities, such as gainful employment and higher standard of living that their nations cannot afford. It is not surprising therefore to see thousands of Nigerians workers with relevant skill endowments leaving their home country yearly to pursue better economic prospects in other parts of the world. The benefits that families derive from remittances largely depend on how and where they spend the remittances.

Adams (2007) in a review of findings from recent research suggests that households receiving international remittances spend less at the margin on consumption goods (like food) and more on investment goods (like education and housing). Cattaneo (2005) noted that remittances are typically spent on physical assets and in human capital, such as education and health, which can stimulate growth. Households receiving international remittances also tend to invest more in entrepreneurial activities. Therefore, remittances may stimulate the economy by boosting aggregate demand and output through increased consumption and investment expenditures of recipient households and their multiplier effects.

On macroeconomic level, remittances can create a positive impact on the economy through various channels. For instance, through remittances, corporate firms can raise enough and cheap capital to finance investment. Remittances are also used to finance several social projects including school buildings, clinics and other infrastructure.

The general understanding among various economic thinkers is that remittances can impact on the economy through savings, consumption and income distribution. One major impact of remittances is its effect on the current account of the balance of payment (BOP). Remittances help in raising national income by providing foreign exchange and raising national savings and investment as well as by providing hard currency to finance essential imports thereby curtailing any BOP crisis (Adelman and Taylor, 1990, Durand 1996, Claudia 2002).

Essentially, the growth effect of remittances in receiving economies is likely to lead to an increase in savings and subsequently investment. Migrant workers' remittances come in as a component of foreign savings and as such complement national savings.

However, in spite of the growth of remittance inflow, the level of gross national savings has not been encouraging. The Thisday newspaper, April 12, 2016, posited that Nigeria has a low Gross National Saving (GNS) when compared with most countries of the world. According to the United States Central intelligence Agency (CIA), the national saving ratio in Nigeria was estimated at 13.10 percent in 2016, placing the country in the 131<sup>st</sup> position out of 180 countries that CIA covered. This situation is quite embarrassing and demoralizing for a country that is striving to get out of recession. To this end, a lot of research has been done on migrant remittances inflow in Nigeria, but the extent and magnitudes of these inflows on Gross National Savings have not been adequately investigated by researchers in Nigeria. The few available studies on remittances such as Ojapinwa (2013) only investigated the impact of remittance on economic growth in Nigeria while Okodua (2013) examined migrant workers' remittances on private investment in Sub-Saharan African countries. Against this background, this study will attempt to look at the extent and magnitude of the impact migrant remittances on gross national savings in Nigeria.

### 1.2 Statement of the Problem

Past studies have arrived at varying conclusion over the effect which remittances had on macroeconomic performance in Nigeria over the years. Supporters of remittances believe the growth effect of remittances in receiving economies is likely to lead to an increase in savings and subsequently investment. However, critics have disputed this adding there has been no strong link between remittance and savings since most of it is only used in consumption. It is generally believed that remittance reduce the rate of domestic savings and consequently, national savings. It is such varying conclusions that give credence to this study which seeks to establish and clarify the extent at which remittance has impacted on savings. It was also discovered that despite the ever increasing size of formal remittances, there has been little effort to analyze its empirical effects on Savings in Nigeria. Consequently, this makes it imperative that the impact of remittances on Gross National Savings in Nigeria be investigated.

### 1.3 Objectives of the Study

The main objective of this study is to investigate the impact of migrant remittance on gross national savings in Nigeria. Specifically, the study will also attempt to:

- (i) examine the effects of inflation on gross national savings in Nigeria.
- (ii) investigate the impact of age dependency ratio on gross national savings in Nigeria.
- (iii) examine the impact of exchange rate on gross national savings in Nigeria.
- (iv) investigate the impact of real gross domestic product on gross national savings in Nigeria.

### 1.4 Research Hypothesis:

The study is guided by the following null hypotheses:

- (i)  $H_{01}$ : There is no significant difference between inflation and gross national savings in Nigeria.
- (ii)  $H_{02}$ : There is no significant relationship between age dependency ratio and gross national savings in Nigeria.
- (iii)  $H_{03}$  : There is no significant relationship between exchange rate and gross national savings in Nigeria.
- (v)  $H_{04}$  : There is no significant relationship between real gross domestic product on gross national savings in Nigeria.

### 1.5 Significance of the study

Being one of the developing countries, Nigeria is experiencing very low level of savings and foreign exchange earnings which results in low investments and growth. This has caused the country to experience low income per capita for many decades. Migrant remittances have played a major role in filling the saving – investment gap, by supplementing domestic savings required for investment. Additionally, the findings made in this study can provide a basis for further academic research on public financial management and policy. It is also hoped that the findings of the study will help in formulating appropriate policies and programmes that can stimulate economic expansion in Nigeria. The findings from this research will undoubtedly help to guide migrants on use of remittance and also shape public policy as regard to remittance inflows .To this end, a number of scholars such as Grabel (2009), Yang (2003), Ratha (2007) and Durand, Kandel & Massey (1996) have delved into this topic looking at various economies. Previous country specific studies have considered regression of remittance on the growth of the gross domestic product only. As such this research will seek to go beyond remittances- output growth nexus to find out the link between remittance and national savings.

### **1.6 Scope of the Study:**

The study covered the periods 1986 to 2016. This period is carefully chosen so as to capture the SAP and post SAP era as well as the period of the military and the civilian regime in the country. The study focused on the macroeconomic effects of remittance on gross national savings in Nigeria. In addition, the impacts of age dependency ratio, exchange rate, gross domestic product on gross national savings were also considered in the study.

## **SECTION TWO**

### **LITERATURE REVIEW**

#### **2.1 Conceptual Issues**

Workers remittance has been defined in diverse ways by different authors over the past four decades. For instance, Ncube and Brixiova (2014) defined remittance as unrequited, non-market financial transfers between individuals living in different countries, mostly associated with migration. Therefore migration, which involves both voluntary migrants and international refugees are the major driver of remittances inflow (Ratha, 2011). According to Kihangire and Katarikawe (2008), remittance is defined as money sent home by migrants working abroad to their home countries. Similarly, remittance has been defined as a portion of migrant workers earnings sent to their countries of origin and this could be in cash or gifts (Odozi et al. 2010; Chukwuone 2007; Quartey 2006). Moreover, IMF (1999) maintains that remittance is limited to money sent by migrant workers who have been staying in a foreign country for more than a year to his/her household in his/her country of origin and this does not include migrants that are self-employed.

Similarly, Tewolde (2005) argues that remittances are financial and non-financial materials that migrants receive while working overseas and sent back to their households in their countries of origin. Ratha (2003) also defines remittances as migrants' funds transfers, which are resources that a migrant convey into or takes out of a country. Consequently, International Organization for Migration (2006) largely defines remittances as the monetary flows connected to migration, that is, cash transfers by migrants or immigrants living abroad to a relation in home countries. International Labour Organization (2000) also defines remittance as part of migrant workers' income remitted back from their employment countries to their countries of origin. The above different definitions are just to mention a few amongst the different definitions and views

The size of remittances seems to suggest that they could be of immense economic importance to developing countries. The magnitude of remittances to developing countries relative to income flows and deliberate efforts of fiscal authorities to promote more inflows give credence to this conclusion. For example, Chami, Fullenkamp and Gapen (2009) in using remittances to gross domestic product ratio showed that average workers' remittances-gross domestic product ratio for all developing countries over the period 1995-2004 was 3.6 per cent. Sirkeci (2012) reported that remittances flow to developing economies was USD75 billion in 1989, USD125 billion by mid-2000 and rose precipitously to USD350 billion in 2011. Trends in inflows of financial resources to Africa show that remittances exceeded other international inflows, like foreign direct investment (FDI) and Official Development Aid (ODA). According to Ncube and Brixiova (2013), while FDI inflows to Africa have declined after the global financial crisis, remittances rebounded already in 2010 and 2011, and exceeded FDI and ODA by almost 90 per cent, thus being the fastest growing source of foreign exchange for Africa.

#### **2.2 Empirical Literature**

The literature on remittances and other capital inflows are robust. A number of studies on remittance (Brown, 1994 & 1997; Brown and Ahlburg, 1999; Connell and Conway, 2000) show the positive impact of remittance on both savings and investment for a number of countries. Using panel data of all developing countries and 12 case countries for the period 1991-2000, Gammeltoft (2003) analyses the trends, regional variations of the remittance and other financial flows to developing countries. Buch and Kuckulenz (2004) view remittance as one of the capital flows and compare the determinants of remittance to those of private and official capital flows. By using data of 87 developing countries for the period 1970-2000, they showed that fluctuations are the highest in private capital inflows, lowest for official capital flows and remittance are in-between. In terms of individual country perspective their findings showed that the volatility of remittance is overall lower than other inflows.

In another study, Morton Jason, Panday, Priniti and Maria (2010) found a strong negative relation between remittance and domestic savings for the top twenty remittance recipient countries in terms of share of GDP for the year 2008. They just use the correlation analysis. By using OLS fixed effects and 2SLS techniques to 37 Sub-Saharan Countries over the period of 1980-2004. In the same vein, Tabuga (2007) looked into the effect of remittances (as a dummy variable) on the expenditures of Filipino households using the 2003 FIES. Based on a censored Tobit model and quintile regressions, the study found that remittances increase consumption of goods and leisure, including spending on education, housing, medical care, and durable goods.

Similarly, Tullao, Cortes, and See (2007) noted that remittances lead to higher human capital investments in education and health. Pernia (2008), using data in 2000 and 2003 and employing a remittance dummy as well,

supported these findings. His results revealed that remittances enhance household savings and spending on education and health care. A logit regression showed that the share of remittances in household income raises the likelihood of a household getting out of poverty. The study of Yang (2005) took a slightly different angle by focusing on the impact of the Asian financial crisis through exchange rate shocks. Using first difference regressions, he found that appreciation of a migrant's currency against the Philippine peso leads to increases in household remittances received from overseas. The shocks lead to greater child schooling, reduced child labor, and increased educational expenditure. Moreover, favorable exchange rate shocks also promote self employment and lead to greater entry into relatively capital-intensive enterprises by migrants' origin households.

Avila and Schlarb (2008) analyzed an empirical link between remittances and financial sector development on a micro level. The study revealed that receiving monetary remittances had a positive and significant effect on the probability of having a bank account. Therefore, this contradicted Rempel and Lobdell (1978) and Lipton (1980) argument that remittances were mainly devoted to daily consumption needs.

In a separate studies conducted by Leon-Ledesma and Piracha (2001) on 11 countries of Central and Eastern Europe and Drinkwater et al. (2003) on twenty developing countries, it was shown that remittances contribute significantly in increasing the level of savings in their home countries. According to Adelman and Taylor (1990), inward remittances are believed to have a positive impact on savings and investment. Household surveys in Pakistan indicated that in the late 1980s and early 1990s, the marginal propensity to save was higher (0.711) for income from international remittances than from domestic urban rural remittances (0.49) or rental income (0.085) (Adams, 1998). The theoretical literature predicts that on the domestic front, remittances increase household income of migrant families, improve living standards enhance savings and generally contribute to national economic growth (Azad, 2005). According to Grabel (1996), there is unambiguous evidence that once basic needs are met, remittances are used for savings, debt repayment, consumer durables, land and housing purchases, small enterprise development and agriculture, and investments in education and healthcare.

Obwona and Ddumba (1995) revealed that in Uganda, the household sector is the main source of domestic savings and one of the factors that influence the saving behavior of households is the ability to save which depends on disposable income and the household expenditure. Since remittances increase a household's disposable income, this clearly indicates that there is a positive relationship between remittances and domestic savings. This is in agreement with a study conducted by Athukorala and Sen (2003) who also found that savings rate is increased with the rate of growth of disposable income.

Bou (2010) revealed that 41% of the households that were interviewed in the survey indicated that the recipient households were better off compared to non-recipient households. Within these households, 63% attributed the better conditions to improvements in the standard of living due to remittances. In addition, the results revealed that for all categories of expenditures, recipient households registered higher mean expenditures. The difference between the recipient and non-recipient households' expenditure was found to be statistically significant. This indicates that the important role of remittances is smoothing household consumption. However this does not obviate the fact that remittances may at the same time also boost household savings. In particular, remittances may free up resources for greater savings from other sources of household income (Kapur, 2003).

Balde (2010) investigated the macroeconomic impact of remittances on savings and investment in Sub-Saharan Africa (SSA). He analyzed comparatively the effectiveness of remittances and foreign aid (official development assistance) in promoting savings and investment. He used a respective sample of 37 and 34 SSA countries over the period 1980- 2004. Using OLS and instrumental variables (2SLS) estimation methods, he found the coefficients of remittances to be 6 to 7 times higher than those of foreign aid and that a 10% increase in remittances increases savings by 7% while the same 10% increase in foreign aid increases savings and investment by respectively 1.6 % and 1%. This showed that remittances are not entirely spent on basic consumption needs; but are also either saved or invested.

Azam and Shakeel (2012) analyzed the impact of foreign capital inflows on household saving of Pakistan. Multiple regressions was applied to predict the relationship between foreign capital inflows and household savings. The foreign capital inflows considered here were foreign direct investment, remittance and foreign aid. The study used the data for the period of 1981-2010. The obtained results showed that foreign direct investment, remittances are having positive and significant impact on household saving but foreign aid is having negative and insignificant impact on household saving. Thus, for a developing country like Pakistan to increase its savings, then it should give importance to foreign direct investment and remittance.

Fernando and Eva (2008) investigated the microeconomic linkages between remittances and financial sector development. Using a detailed household survey for Moldova with propensity score matching (PSM) and instrumental variable (IV) estimation technique, we find that remittance-receiving families have a higher probability of having a bank account or high savings than non-receiving ones. For instance, it shows that households that receive remittances have higher shares of bank accounts (5.4% and 10.9% for the rural and urban area) or high savings (17.1% and 19.3%, respectively) than on bank accounts in Moldova.

Furthermore, Khan and Hye (2010) used the auto regressive distributed lag cointegration technique on



annual time series data for the years 1988 to 2008 to examine the relationship between the financial sector reforms and household savings in Pakistan. Empirical findings indicated that the financial liberalization index negatively created an impact on the household savings in the short-run. However, per capita income, agriculture sector, gross domestic product and remittances positively affected the household savings in the short-run, while the real deposit rate negatively affected the household savings in the end. It is important for the country to increase per-capita income, growth of agricultural sector and remittance that would contribute in enhancing household savings.

In his own contribution, Arif (2009) analyzed the social and economic impacts of remittances on households. Data for this were obtained from Household Survey on Overseas Migrants and Remittances. Several factors were considered and they include migration process and its cost, methods used in money transfer. Results concluded that remittances are having positive significant impact on the savings of the migrants in their own home.

Paolo, Giuliano and Ruiz-Arranz (2005) examined the relationship between remittance and economic growth. They used cross-country data on remittances for 73 developing countries from 1975-2002. They carried out regression analysis in order to focus on a country's capacity to use remittances and its effectiveness. They found the marginal impact of remittances on growth to decrease with the level of financial development. They argue remittances ease credit constraints in developing countries that do not have well-functioning financial markets, thus playing an important role in providing the initial start-up capital for productive investments.

Ziesemer (2008) using a dynamic panel data for about thirty years in two samples of countries with per capita income above and below \$1200 estimate analyzed the impact of worker remittances on savings, taxes, and public expenditures on education, all as a share of GDP. The study found out that taxes are reduced but remittances caused higher savings and an increase in expenditure on education. Horioka and Hagiwara (2011) tried to find out the determinants and long-term projections of saving rates in developing Asia. They presented data on trends over time in domestic saving rates in twelve economies in developing Asia during the 1966-2007 period and conducted an econometric analysis of the determinants of the trends. The variables considered were age structure of the population (especially the age dependency ratio), income levels, and the level of financial sector development. The results showed that both income levels and financial sector development were positive and significant while the age dependency ratio was negative.

Bwire (2007) analysed the determinants of national savings in Uganda in which he used time series data for the period 1975-2006 which was taken from the International Finance Statistics published by the International Monetary Fund. The Ordinary Least squares estimation was used and the Augmented Dickey Fuller (ADF) unit root testing procedure was applied to test for stationarity of the time series data used. The variables considered for this research included past national savings levels, inflation rate, real exchange rate, and financial intermediation ratio and per capita income. The result showed that policies that promote financial sector development and macroeconomic stability in general must become a cornerstone of the efforts geared towards the promotion of national savings culture.

In another study, Mwega, Ngola and Mwangi (1990) undertook a research on the factors determining savings in Africa. The objective of this paper was to test, within Kenya's institutional framework whether an upward adjustment in real deposit rates significantly increases the private sector's financial and nonfinancial savings per McKinnon-Shaw hypothesis. The results fail to support and instead found that the private saving rate and the real demand for money are non-significantly responsive to a deposit rate of interest.

Uremadu (2007) investigated the core leading determinants of financial savings in Nigeria from 1980 to 2001. The Ordinary Least Square estimation technique was used for the analysis. The variables considered in his research include gross domestic product, total institutional savings, value of imports and exports, external debts, inflation rates and interest rates, broad money supply (M2) and GDP per capita. The result showed that M2, GDP per capita and interest rates were positive and significant while the rest were negative.

Horioka and Wan (2006) analyzed the determinants of the household saving rate in China using a life cycle model and panel data on Chinese provinces for the period from 1995-2004 using China's household survey data. The findings showed that China's households' savings rate has been high and rising and the main determinants are the lagged saving rate, the income growth rate, the real interest rate, and the inflation rate. However, the variables relating to the age structure of the population have the expected impact on the households' saving rate in the least cases.

## **Section Three**

### **3.0 Research Methods**

#### **3.1 Theoretical Framework**

The study used the two gap model propounded by Chenery and Strout(1966) as the theoretical framework. The essential feature of the two gap model is the importance of savings and foreign exchange, either in the form of export, foreign aid or borrowing. According to this model, if the economy is an open one, savings can be

supplemented by external assistance.

From national income accounting, we can establish that:

$$\text{Income}(Y) = \text{Consumption}(C) + \text{Import}(M) + \text{Savings}(S) \quad \text{-----(1)}$$

and  $\text{Output}(O) = \text{Consumption}(C) + \text{Export}(X) + \text{Investment}(I) \quad \text{-----(2)}$

Since income = output, it follows that:

$$I - S = M - X \quad (3)$$

The left hand side of the equation (3) is the saving investment gap while the right hand side is the foreign exchange gap. This gap can be filled by introducing remittances and the real exchange rate.

### 3.2 Model Specification

This study adapts a model similar to that of Khalil and Haider (2013). According to them, gross national saving is a function of Average Tariff Rate, Exchange rate, urban population rate, gross national product and inflation rate. Hence:

$$\text{GNS} = f(\text{ATR}, \text{UPR}, \text{GNP}, \text{EXR}, \text{INF}) \quad \text{-----} \quad (4)$$

Where:

GNS = Gross National Savings

ATR = Average Tariff rate (proxy for the index of openness)

UPR = Urban Population growth rate

GNP = Gross National product

EXR = Real Exchange Rate

INF = Inflation rate.

However, there are other several variables that determine Gross National savings in Nigeria. The exchange rate, age dependency ratio and remittance inflows are some other important variables that determines the Gross National Savings. In order to grasp the relevance of the objective proposed in this study, we incorporate some of these other variables to reflect the exigencies of the Nigerian economy and modifies our model as follows:

$$\text{GNS} = f(\text{REM}, \text{GDP}, \text{EXR}, \text{INF}, \text{ADR}) \quad \text{-----} \quad (5)$$

Where:

GNS = Gross National Saving

REM = Remittance inflows

GDP = Gross Domestic Products

EXR = Real Exchange rate

INF = Inflation rate

ADR = Age Dependency ratio

Equation (5) can be re-written in a linear stochastic form as follows:

$$\text{GNS} = \alpha_0 + \alpha_1 \text{REM} + \alpha_2 \text{GDP} + \alpha_3 \text{EXR} + \alpha_4 \text{INF} + \alpha_5 \text{ADR} + \mu_t \quad \text{----} \quad (6)$$

The *a priori* sign of the variables are:  $\alpha_1 > 0$ ;  $\alpha_2 > 0$ ;  $\alpha_3 < 0$ ;  $\alpha_4 < 0$  and  $\alpha_5 < 0$

Where:

$\alpha_0$  = intercept

$\alpha_1$  = coefficient of Remittance inflow

$\alpha_2$  = coefficient of Gross Domestic Product

$\alpha_3$  = Coefficient of Exchange rate

$\alpha_4$  = Coefficient of Inflation

$\alpha_5$  = Coefficient of Age dependency ratio

$\mu_t$  = Stochastic error term.

#### 3.2.1 A priori Expectations

In theoretical terms, we expect a mixed result between migrant remittances and gross national savings. Remittances may enhance or reduce the savings, depending upon the circumstances. If recipients of foreign remittances have consumption - oriented habits, then remittances may be used for consumption purposes such that it may not enhance savings. On the other hand, if recipients of foreign remittances have investment oriented behaviours, then it may increase savings' level in the economy. Hence, the sign of the coefficient of foreign remittances may be positive or negative. In addition, we expect a positive and direct relationship between the gross domestic product and gross national savings in Nigeria. For instance, an increase in the level of gross domestic product in Nigeria will lead to more national income and consequently, more savings. However, an inverse relationship is expected between inflation and gross national saving. From consumers' perspective, when prices of commodities increase, people have to spend more on buying which decreases the rate of domestic savings which, in turn, directly influences the gross national savings.

In the same vein, gross national savings and exchange rate are expected to be inversely related. For instance, an increase in the Naira- Dollar exchange rate will have deleterious effects on the level of gross national savings. Finally, age dependency ratio and gross national savings are expected to be inversely related. An increase in the

age dependency ratio implies a decrease in the active or working population. This will undoubtedly lower national output and consequently, gross national savings.

### 3.3 Type and sources of data

Secondary data were used for this study. The data were obtained from the Central Bank of Nigeria Statistical Bulletin (2015), African Development Indicators, Journals and Thisday Newspapers(Online version). The data collected are: gross national savings, personal remittances, inflation rate, exchange rate, gross national product and age dependency ratio.

### 3.4 Analytical Technique

In this research, our empirical investigation consists of four main steps. First, the Augment Dickey Fuller (ADF) test was used to test if the data series used for the selected variables were stationary or not. Next, the Johansen test of coin-integration test was employed to test for the existence of a long run relationship among the variables. The study further employed Error Correction Mechanism (ECM) to bridge the gap between the short and the long run dynamics in a unified manner. Finally, the fully modified Ordinary Least Square (FMOLS) technique was employed majorly as our analytical tool. The FMOLS method was originally introduced and developed by Philips and Hansen (1990). In order to achieve asymptotic efficiency, this technique modifies the least squares to account for serial correlation effects and test for the endogeneity in the regressors that result from the existence of co-integrating relationship.

## Section 4

### 4.1 Tests for Stationarity of the Model

In order to test for the stationarity of the time series data used in this study, the Augmented Dickey Fuller (ADF) Unit Root Test is used because of its superiority over the Dickey - Fuller (DF). The ADF test decision rule is that the ADF test statistic must be negative, and that it must be greater than or equal to any of its critical values in absolute term before one can accept stationarity. In this study, 5% critical value is used. The result of the unit root test is presented in table 4.1 below:

**Table 4.1: Test for Unit Root at Level**

Variable	ADF Statistic at level	ADF Statistic at First Difference	5% Critical Value	Level	Remarks
<b>GNS</b>	-2.6613	-5.4348	-2.9639	I(1)	S
<b>REM</b>	-0.0859	-4.1759	-2.9677	I(1)	S
<b>GDP</b>	-4.4109	-	-2.9677	I(0)	S
<b>INF</b>	-4.1748	-	-2.9980	I(0)	S
<b>ADR</b>	-6.1747	-	-2.9677	I(0)	S
<b>EXR</b>	-0.1023	-4.7760	-2.9677	I(1)	S

**Source:** Author's regression output (2017).

The results in Table 4.1 indicate that only three variables are stationary at level. This can be seen by comparing the test statistics (in absolute terms) of both the ADF test statistic with the critical values (also in absolute terms) at the 5% level of significance. The result shows that the gross domestic product, inflation rate and age dependency ratio are stationary at level. However, the gross national savings, migrant remittance and exchange rate were all stationary at first difference. This implies that there is a short run relationship among the six variables selected for the study.

### 4.2 Johansen Cointegration Test.

The Johansen unrestricted cointegration test is used in this study. The statistic is used to testing whether a long run relationship exists among the variables. If it can be established, that at least one cointegration vector exists among the variables under investigation, then a long term equilibrium relationship exists between them. The trace test statistics and the maximum Eigen value are used. The result of the Johansen cointegration test is shown in Table 3 below:

**Table 4.2: Cointegration Table**  
 Unrestricted Cointegration Rank Test (Trace)

Hypothesised No. of CE(s)	Eigenvalue	Trace Statistics	0.05 Critical Value	Prob **
None *	0.832794	130.4143	95.75366	0.0000
At most 1 *	0.712345	80.33557	69.81889	0.0057
At most 2	0.565516	45.44780	47.85613	0.0827
At most 3	0.336422	22.10713	29.79707	0.2926
At most 4	0.215736	10.62407	15.49471	0.2357
At most 5	0.127526	3.819819	3.841466	0.0506

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesised No. of CE(s)	Eigen value	Trace Statistics	0.05 Critical Value	Prob **
None *	0.832794	50.07872	40.07757	0.0027
At most 1	0.712345	34.88777	33.87687	0.0378
At most 2	0.565516	23.34067	27.58434	0.1594
At most 3	0.336422	11.48306	21.13162	0.5991
At most 4	0.215736	6.804255	14.26460	0.5126
At most 5	0.127526	3.819819	3.841466	0.0506

**Source:** Authors regression output (2017)

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level.

\* denotes rejection of the hypothesis at the 0.05 level.

\*\*MacKinnon-Haug-Michelis (1999) p-values.

The result of the cointegration test for this study is presented in Table 4.2. The Johansen cointegration test revealed that at least two cointegration vector exist when the trace statistic is compared with the critical value at 5 percent level of significance. The Max-Eigen value was also compared with the 5 percent critical value and the result shows that at least two cointegration vector exist among the variables of interest. The test statistic indicates that the hypothesis of no cointegration among the variables can be rejected. This implies that a long run relationship exist among the gross national savings , remittance inflows, gross domestic product, inflation , age dependency ratio and exchange rate.

Next, the error correction mechanism was presented to correct any disequilibrium between the short run and the long run equilibrium relationship among the selected variables. The error correction mechanism was presented in Table 4.3 below:

**Table 4.3: The Error Correction Mechanism Table**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.100925	1.419555	-0.071096	0.9440
D(REM)	1.100042	0.628910	1.749126	0.0942
D(GDP)	0.494698	0.159732	3.097045	0.0053
D(INF)	-0.042720	0.064324	-0.664134	0.5135
D(ADR)	0.063518	2.951862	0.021518	0.9830
D(EXR)	-0.011932	0.077779	-0.153416	0.8795
RESID01(-1)	-0.600790	0.206391	-2.910930	0.0081
R-squared		0.468333	Mean dependent var	0.736207
Adjusted R-squared		0.323332	S.D. dependent var	6.933284
S.E of regression		5.703306	Akaike info criterion	6.526474
Sum Squared resid		715.6094	Schwarz criterion	6.856511
Log likelihood		-87.63388	Hannan-Quinn criter	6.629838
F-Statistics		3.229877	Durbin-Watson stat	1.727692
Prob(F-Statistic)		0. 019792		

**Source:** Authors regression output (2017)

An examination of the results from the parsimonious error correction model in table 4.3 showed the R squared is 0.46833 which implies that about 47 percent variation in the level of gross national savings are being accounted for by variations in remittances, gross domestic product, inflation and age dependency ratio. The probability level for the F Statistic is 0.0197 which is highly significant at 5 percent level of significance showed



that the model is stable. In addition, the Durbin Watson Statistic stood at 1.7276 which shows that the model is not completely free from the problem of serial correlation. However, the coefficient of error correction mechanism (-0.6007) is correctly signed, and significant at the 5 percent level of significance. The coefficient of the error correction term indicates an adjustment of about 60 percent from the actual changes in the previous years. Thus, the model will rightly act to correct any deviation from a long run equilibrium relation between the gross national savings and the repressors (migrant Remittance, gross domestic product, inflation, exchange rate, age dependency ratio).

Finally, the estimates of the fully modified least squares are reported in table 4.4 below:

**Table 4.4: Fully modified Least Square regression result**

Dependent Variable: GNS				
Method: Fully Modified Least Squares (FMOLS)				
Date: 06/04/17 Time: 10:46				
Sample (adjusted): 1987 2015				
Included observations: 29 after adjustments				
Cointegrating equation deterministics: C				
Long-run covariance estimate (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)				
Variable	Coefficient	Std. Error	t-Statistics	Prob.
REM	0.856648	0.278105	3.080306	0.0053
GDP	0.541517	0.202171	2.678509	0.0134
INF	-0.081018	0.080618	-1.004956	0.3254
ADR	-1.6613575	1.072109	-1.505047	0.1459
EXR	0.089829	0.053914	-1.666162	0.1092
C	167.9706	96.64950	1.737936	0.0956
R- Squared	0.614175	Mean Dependent variable	25.80759	
Adjusted R squared	0.530300	SD. Dependent var	9.129446	
S.E of regression	6.256832	Sum squared resid	900.4027	
Long run variance	44.38452			

**Source:** Authors regression output (2017)

Table 4.4 reported the fully modified least square multiple regression results. According to the result, migrant remittance inflows have positive coefficient and it is significant at the 5 percent level. The results suggest that there is a direct relationship between gross national savings and remittances in Nigeria in the study period. The result further indicates that a percent incremental change in migrant remittance inflows increases the volume of gross national savings in Nigeria by about 85 percent. This result is consistent with our *a priori* proposition.

In addition, the level of gross domestic product has a direct relationship with the gross national savings in the study period. This implies the gross national savings is a function of output growth in the country. A percent increase in the level of gross domestic product increases the level of savings by 54 percent.

However, inflation rate has a negative sign as expected but is not significant in explaining gross national savings in Nigeria. This result suggests an inverse relationship between the level of inflation and gross national savings in Nigeria. It shows that the incessant increase in the price of goods and services has damaging effects on the national savings in the period under study. It shows that a percent increase in inflationary level reduces the capacity of the country to save by 8 percent. Thus other things being equal, unnecessary price hike may have contributed to low national savings in Nigeria.

In addition, age dependency ratio and exchange rate are inversely related to the gross national savings. An increase in the level of the age dependency ratio by 1 percent will reduce gross national savings by 166 percent. Similarly, a percent increase in exchange rate will reduce the gross national savings level by 8 percent. This result is consistent with the findings of Horioka and Hagiwara(2011) who argued that the age structure of the population(especially the dependency ratio) had an inverse relationship with long term National Savings in China.

#### 4.3 The Statistical Significance of the Parameters Estimates.

The statistical significance of the parameter estimates is verified using the R-squared ( $R^2$ ), t test, standard error test, and the Long run variance:

The value of the R-squared ( $R^2$ ) for the model is fairly high and is pegged at 61 percent. This implies that about 61 percent variations in the gross national savings are being explained by the variations in migrants' remittances, gross domestic product, inflation rate, age dependency rate and exchange rate over the observed years. The remaining 39 percent variation is explained by other determining variables outside the model. In

addition, the t statistic calculated for remittance is 3.0803. Given that the degree of freedom is 24 after adjustment, the table value of the t statistic is 2.8435. Since the t calculated is greater than the t tabulated in absolute value, we reject the null hypothesis and accept the alternative hypothesis that there is a significant relationship between gross national savings and migrant remittances in Nigeria. Furthermore, the t statistic calculated for GDP is 2.6785. This is greater in absolute value than the tabulated value which stood at 2.3521. This implies that gross domestic product is statistically significant in explaining gross national savings in the study period. However, the t statistic for the inflation rate, age dependency rate and exchange rate are respectively -1.004, -1.505 and -1.666. These figures were less than their tabulated t statistic which stood 0.992, 0.985 and 0.9571 respectively. The implication of this result is that inflation rate, age dependency rate and exchange rate are not statistically significant in explaining gross national savings in the study period.

To further confirm the statistical significance of the parameter estimates and variable used in the study, we employed the standard error test. For the model, the standard error test revealed that two of the parameter estimates were statistically significant when compared its standard error with halve of each coefficient of the variables. For instance, the standard error for remittances which stood at 0.2781 is less than half the coefficient of the variable which is 0.4283. This shows that migrant remittances are statistically significant in explaining Gross national savings in Nigeria. Also, the gross domestic product is also statistically significant when the standard error test was performed on the variable. The standard error for the gross domestic product stood at 0.2021. This figure is less than half the coefficient of the variable which is 0.2707. However, the age dependency ratio is not statistically significant at the 5 percent significant level. The result indicated that the standard error at level was 1.0721 while half coefficient of the variable was /-0.8067/. The reason for the non significance of this variable can be attributed to the incessant increase in the number of reported child labour in Nigeria. Lastly, exchange rate did not also pass the standard error test at 5 percent. However, exchange rate is statistically significant at 10 percent significant level. The long run variance for the model stood at 44.3845. This is greater than the recommended Bartlett Kernel bandwidth of 4.0 which implies that the model is free from the problem of heteroskedasticity.

## Section Five

### 5.1 Conclusion and Policy Implications:

The study investigated the impact of migrants' remittances on gross national savings in Nigeria between 1986 and 2016. The unit root test and the co-integration tests were conducted on the time series data selected for the study. The results of the unit root test confirmed that gross domestic products, inflation rate and age dependency ratio were stationary at level while gross national savings, migrant remittance and exchange rate were all stationary at first difference. In addition, the Johansen cointegration test revealed a long run equilibrium relationship among gross national savings, inflation, gross domestic product, migrant remittance, exchange rate and age dependency ratio. The empirical result of the modified fully least square method also showed that migrant remittance and gross domestic product in the country have a direct and significant relationship with the level of the gross national savings in Nigeria. However, inflation rate, age dependency ratio and exchange rate were not statistically significant in explaining the level of gross national savings in the study period.

The main thrust of the research is that migrant remittances is a stable and predictable source of foreign capital and major stimulant of national savings in Nigeria if given the desired attention. The conclusion, therefore, is that migrant remittances are robust enough to determine the level of gross national savings in Nigeria. To this end, there is the need for the Federal Government to properly monitor the inflows of migrant remittances into the country, particularly through formal channels. Also, sound macroeconomic policies that will boost the gross domestic product and consequently raised the level of national saving must be put in place by the federal government.

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