

## Remittances, Monetary Policy Transmission Mechanisms and Economic Performance

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### ABSTRACT

*This study empirically investigated the impact of migrant remittances through monetary policy transmission channels on the economic performance of Nigeria. Previous impact and causality analysis show varied results for migrant remittances on the economic performance of Nigeria. There remains a dearth of studies investigating the impact of remittances on growth after accounting for its transmission effects on monetary instruments. Time series data from 1962 to 2020 from the statistical bulletin of the Central Bank of Nigeria (CBN) and the World Development Indicators were used in the causal research design as well as the correlation analysis, dynamic general method of moment (GMM) and Johansen co-integration technique. The research findings indicate that remittance inflows once interacted with exchange rate exerted a positive and statistically significant impact on the economic performance of Nigeria. Remittance inflow interacted with inflation rate had a positive yet insignificant impact on the economic performance of Nigeria. Monetary policy rate maintained a positive sign with significant impact on the economy of Nigeria; while capital stock investment exerted a negative and insignificant impact on gross domestic product per capita income of Nigeria. The study finds that the interaction of migrant remittances with monetary policy instruments is economically important to the per capita growth in Nigeria in the short and long-run. The study results confirm that the Central Bank of Nigeria (CBN), should continue to facilitate reducing costs of remittances as well as opportunities for diaspora investments, because of the impacts that remittances have on economic performance through other monetary variables.*

*Keywords: Migrant remittances, monetary transmission mechanisms, interaction variables.*

## **Introduction**

Migration has become a topical issue in contemporary times throughout the global space. The global migration rates adjusted for population changes have increased gradually, yet the influxes of persons disproportionately affect certain countries more than others. The bulk of the inflows are primarily economic migrants seeking for greener pastures and responding to opportunities arising from globalization. The United Nations Department of Economic and Social Affairs (UNDESA, 2019) reported that an estimate of 272 million persons lived outside the country of their origin in 2019.

The increased acceptance of migration as a means to expand economic opportunities rather than as an alternative to trade has revealed new research areas to ascertain the implication of these movements, including returns such as emigrant remittance. Money remitted from abroad fills a number of roles: as a source of investment, consumption, welfare for the old (McCormick & Wahba, 2014; Marzovilla & Mele, 2015; Matuzevciute & Butkus, 2016). Migrant remittances are a lifeline to many households, improving health and capital accumulation (see Aboulezz, 2015, also Ratha, 2020). Migrant remittance inflows increase physical and human capital and also minimize the depth of poverty in a country (Adams & Page 2005; Acosta et al. 2008; Cox Edwards & Ureta 2003; Woodruff & Zenteno 2007; Fajnzylber & Lopez 2008; Yang 2008). Nigeria is among the top remittance receiving countries globally; the Central Bank of Nigeria (CBN, 2019) showed in its balance of payment accounts that inflows of workers' remittances to Nigeria reached USD 23.59 billion in 2018.

Migrant remittance inflows have mixed implications on the domestic macroeconomy. The positive macroeconomic implications include increasing investments, raising the volume of foreign currency, minimizing macroeconomic volatility, economic growth, productivity, inclusiveness and increasing imports. Concomitantly, scholars highlight associated macroeconomic concerns including the reduction of labour supply that precedes remittances, increasing currency exchange, minimizing export competitiveness and increasing price level in a receiving economy (Matuzevciute & Butkus, 2016). These migrant remittances influence monetary transmission mechanisms through exchange rate and inflation rate.

The value of migrant remittances in a country of origin is largely determined by the stability of the prevailing exchange rates. A rise in foreign currency values would enhance the volume and value of remittances received by households. This may put inflation pressures, by increasing money supply, on the national currency and could inversely impact upon the domestic economy. Studies such as Kim (2019) and Lartey (2016) report that remittances tend to appreciate exchange rates.

Conventionally, a foreign currency appreciation has the propensity to increase the value and volume of migrant remittances in a country of origin, which in turn positively influences the level of consumption, investments, and exerts pressure on the local currency (Amuedo-Dorantes & Pozo, 2004; Acosta, Lartey & Mandelman, 2007; Lopez, Molina & Bussolo, 2007; Lartey, Mandelman & Acosta, 2008). Conversely, in a period of depreciating exchange rate at origin, recipients of remittances in an origin country tend to get more local currency value. This is likely to increase their consumption rate and cause a rise in inflation, assuming all other factors are held constant. These exchange rate effects bring to the fore, that countries going through turbulences in monetary policy could be majorly remittance-recipient ones in that these inflows play a role in weakening the effective macroeconomic management policies of the Central Banks. In the view of Barajas *et al* (2016), migrant remittances contribute towards strengthening monetary transmission and enhancing economic activities, if there is already good management of macroeconomic variables. Thus, the efficacy of the influence of migrant remittances on economic performance is a function of the interaction it maintains with effective monetary policy of a country.

Natalia, Miguel, Matloob and Bryce (2006) further posited that remittances fuel inflation via appreciation of the real exchange rate, and in turn reduce labour market participation rates as receiving households opt to live off migrants' transfers rather than through working. This is so because migrant remittances are commonly spent partly on consumption and partly on investment. In the case that remittances are consumed and not saved, in the face of inflation, the level of savings, including those available for investments, can

becomes eroded by inflation; consequently having an adverse effect on economic performance in a country (Adelman and Taylor, 1992 and; Barajas, Chami, Ebeka and Oeking, 2016). Migrant remittances increase aggregate demand through an increase in consumption expenditure of the receiving households and in turn create inflationary pressure on the economy.

Proceeding on the objectives of this study, we introduce a multiplicative model in which interaction is said to occur when variables are multiplied to because they scale up the effects on an outcome variable (see for instance, Chunrong, & Norton, 2003; Bear, 2004; Brambor, Clark, & Golder, 2005). As an example the volume of remittance inflows when multiplied by an appreciating prevailing exchange rate, has the likelihood to magnify the quantum of funds in the hands of the recipients in the domestic country. The aftermath of this could be an increase in demand for durable and consumable goods as well as boost of investment in economic projects in a country. Noticeably, when the inflation rate is high, the size of funds received through migrant remittances can afford the purchase of fewer quantities in the market, while also discouraging investments, thus adversely affecting economic performance.

Marzovilla and Mele (2015); Matuzevciute and Butkus (2016) emphasized that the interaction of migrant remittances with monetary policy transmission mechanisms in driving economic performance is presumably anchored on the economic or political balances and government policy towards regulating remittance and its productive investments. In developing countries, specifically in Nigeria, studies which have investigated the impact of migrant remittances on economic performance through an interaction with monetary policy are inadequate in number.

The impact of migrant remittance inflows on the economic performance of countries is still ambiguous (Kumar et al., 2018). While migrant remittance inflows exert a positive influence on economic growth (Kumar et al., 2018; Shera and Meyer, 2017; Pradhan, Upadhyay & Upadhyaya, 2008), other studies show that a negative or no association exists between migrant remittances and economic performance (Chami, Fullenkamp & Jahjah, 2005; Feeny, Iamsiraroj & McGillivray, 2014; Lim & Simmons, 2015). Shera and Meyer (2017); Matuzevciute and Butkus (2016); and Ilu (2019) investigated the nexus between remittances and economic growth but did not use dynamic regression estimation methods. Basically, a potential problem that arises in a research involving remittances is the endogeneity of the remittance variable itself (Natalia et al., 2006). This fits within the literature on remittances as counter cyclical inflows since countries with relatively poorer economic performance have a higher probability of receiving larger volumes of remittances from abroad because migrants attempt to augment expenditures of their household members who remained at their country of origin (Natalia et al. 2006).

Although Matuzevciute and Butkus (2016); and Ilu (2019) show the impact of remittances on economic performance, they omit to empirically examine the monetary transmission channel. This study has become necessary because the impact of remittances on the Nigerian economy through its interaction with monetary policy instruments remains unsettled in the literature for developing countries. We approach this laguna with a methodological novelty in the Nigerian case, that adjusts for the effects of remittances on monetary policy instruments when measuring the consequences of remittances on economic performance. Remittance inflows pose challenges for macroeconomic policymaking, exerting upward pressure through monetary policy transmission mechanisms such as real exchange rate and inflation rate, this study aims to settle the effects on short and long-term economic performance. Following this introduction, section two covers the empirical literature on the key variables, section three presents the theoretical and methodological approach of the research, section four discusses the results of our empirical analysis and section five concludes while providing applicable recommendations.

## **2.0 Literature Review**

### **2.1 Theoretical Literature**

The remittances and economic performance literature has relied significantly on growth theories. The endogenous growth channel (Lucas 1988, Romer 1986) captures remittances as a form of investment an increase quantity or/and quality of which raises growth through physical capital, technology is embedded within. Yet the growth theory treats remittances as any other form of capital, without delving into the motivation literature, which ties remittances to business cycles and household investment decisions. Stark's (1985, 1991) *New Economics of Labour Migration* by identifying that remittances are a result of inter temporal household decision making that occurs before migration, bridges the gaps between determinants and impacts of remittances thereby becoming useful to the objectives of this study. NELM in this way explains the reason behind remittances being countercyclical since migrants owe an investment return to the household from which they emerged and repay this even more in times of economic downturn. Extending Stark and Bloom (1985) can explain the implication of additional income for consumption and investments in the hands of migrant sending households on monetary variables.

The theory views migration as a potent instrument for individuals and family members to enhance investment and diversify income sources. The NELM theory in the light of increasing remittance inflows captures a household investment decision applicable to Nigeria where it is common for households to pool resources towards send one member abroad for work with an agreement/unvoiced expectation about returns on this investment often through remittances. Consciously and unconsciously, a sort of contractual agreement is reached between a family and the individual migrant. As the migrant remittance inflows increases, it is expected that the economic well-being of family members in the home country will improve. Remittances are central to the migration decision, because migration is seen as an investment strategy (see Olarinde, 2015) and as an additional source of consumption and investment for households as well as insurance for the aged. Stark (1991) demonstrated that the key channel through which migrants improve economic performance is through human capital formation (see Olarinde, 2015 for applications to Nigeria) since the implication is that skills are built in a bid to get returns from migration, yet skill loss is below net human capital formation in the country.

The remainder of applications of Stark assumptions are in tandem with the economic growth literature, where a number of factors related to physical and human capital and technology increase output. The focus on the physical capital components of growth, especially the monetary transmission mechanisms is best elucidated through an explanation of to the Mundell-Fleming-Dornbusch principles. The Mundell-Fleming-Dornbusch type model holds that in effective and expansionary monetary policy, monetary policy variables such a remittances, exchange rate and capital accumulation lead to investment, increase in money supply and minimize inflation, indirectly and directly leads to acceleration in the levels of real output (Rafiq & Mallick, 2008). At higher interest rates money demand declines. The aftermath of this is increase in consumption rate in the economy as well as increase the volume of cash in circulation.

The building blocks to the Mundell-Fleming-Dornbusch model given as explained in Boughton (2002) rests on the assumptions that: total expenditure is a sum of private (p) and government expenditure (g). National income (y) is a sum of total expenditure (z) plus trade balance (b). Private income is subject to taxes (t) so that private income (n) is y less t; and tax payments are a function of national income  $t = t(y)$ . Remittances constitute private income so that  $r = r(n)$ . At a given stock of money (m), velocity of money (v) is derived at the rate of  $y/m$ . Private expenditure is a function of both national income and interest rate so that  $x = x(n, i)$ . Interest rate depends on velocity money supply,  $i = i(v)$ . Trade balance (b) is a function of total expenditure and exchange rate  $b = b(z, e)$  and net capital inflow (k) is a function of interest rate,  $k = k(i)$ . These principles are an established guide to the interpretation of the transmission mechanisms of monetary variables and the dynamics by which interactions with one another impact upon growth.

### **2.2 Empirical Literature**

The plethora of research investigating the relationship between remittances and economic growth have circumvented examining economic performance through the interaction of remittance with monetary policy

instruments, particularly in developing countries such as Nigeria. Nevertheless, studies that concentrate on the impact of remittances on monetary policy instruments abound. In one instance, Lucas' (2005) showed that remittances accelerated investments in Morocco, Pakistan and India. In another, Glytsos (2002) modelled the direct and indirect effects of remittances on income and hence on investment in seven Mediterranean countries; findings that investment rises with remittances in six out of the seven cases. Similar positive results are reported from by Leon-Ledesma and Piracha (2004) for eleven Eastern European countries undergoing transition to capitalism in which remittances, by increasing investments, had a positive impact on productivity and employment by way of directly and indirectly effects, over the period of study 1990 to 1999.

A number of these studies measure the impact of remittances on monetary variables for Nigeria. Notably, Osigwe and Madichie (2015), showed using the Johansen co-integration technique that exchange rate as well as money supply exhibited a long run relationship with remittances in Nigeria over the period 1970 to 2013. Moreover, Osigwe and Madichie (2015) found unidirectional Granger causality from money supply to remittances only at lag one and not in the reverse, while in other lags, no evidence was observed of causality running from exchange rate to remittance. Ilu (2019) who concentrated on the impact of remittances inflows on exchange rate stability at origin over the periods 1990 to 2018, using the autoregressive distributed lag (ARDL), found a positively and significant relationship with exchange rate, implying that remittances engender the depreciation of exchange rate. Adenutsi and Ahoror (2008) through a vector autoregressive (VAR) model using quarterly data between 1983 and 2004 for monetary aggregates, exchange rates and interest rates showing that these positively impacted on remittance inflows; while domestic price levels negatively affected remittance inflows. The impulse functions of the Adenutsi and Ahoror (2008) research point out that remittance inflows responded to its own shocks but not to shocks as a result of monetary aggregates, exchange rates, interest rate and the price level and these remittance inflow positively drives itself in the first quarter.

The impact of remittances on growth is mixed. Among empirical analysis showing a positive effect on economic growth are Faini (2002) and Ratha (2003). The impact analysis of remittances on national growth among seven countries by Faini (2002) concentrated on a standard set of explanatory variables; among which policy stand is notable. Faini (2002) interpreted the results of the positive remittance coefficient on the policy stance as indicative that a sound policy environment, which also encourages the accumulation of productive assets by households would enable a full materialization of the impacts of remittances. Sound policy in Faini's (2002) view engendered economic stability, incentivized agricultural production, and facilitated the accumulation of social and productive capital. Similar conclusions on channels of impacts of remittances were reached by Ratha (2003) whose focus on governance levels showed that remittance inflows between 1996 to 2000 reached mean values of 0.5 per cent of GDP for those countries in which corruption exceeded the median level; against 1.9 per cent for economies where corruption was below the median values - implying that the level of income generated from remittances was subject to the corruption situation in the receiving country. This mixed effect is reported for a large pool of countries as investigated by Matuzeviciute and Butkus (2016) for the years 1990 to 2014 in a sample of one hundred and sixteen countries using the pooled least squares and fixed effects estimation methods on the panel time series data. The Matuzeviciute and Butkus (2016) findings revealed that although migrant remittances had a long-run impact on economic growth, the level of the impact is a function of the countries' economic development and quantum of remittances inflows in the economy.

Other studies reported insignificant or non-positive effects of remittances on economic growth (Ang, 2006; IMF, 2005). Among these, IMF (2005) covering 101 developing countries over the period 1970 to 2003 showed that remittances were not statistically associated with increases in per capita output, or with other

variables viz. education or investment rates. IMF (2005) described their results as inconclusive given measurement difficulties associated with the countercyclical nature of remittances. Similarly, Ang (2006) established that remittances had a negative effect on economic growth in the Philippines, when disaggregated by regional administrative levels; although the same study, at the national level reported that remittances influenced economic growth positively and significantly – leading to their conclusion that remittances had a mixed outcome on growth within the same country and for the same variables, depending on the administrative unit of analysis, while the overall effect was non-positive. Ang (2006) deduced that for remittances to become a more foundational source of output and economic development it must provide value addition to the production process as well as to investments.

Marzovilla and Mele (2015) who examined migrant remittances, economic growth and exchange rate regime in Morocco through the VAR estimation method to analyze the time series data inform this study's investigation of monetary transmission mechanisms through which remittances impact upon growth. The Marzovilla and Mele (2015) research findings indicated that migrant remittances are a major driver of the economic growth in Morocco. The empirical review has shown that Matuzevciute and Butkus (2016); Ilu (2019) including those studies covering Nigeria fell short of examining the interaction between migrant remittances and monetary policy instruments on economic performance. This mentioned shortcoming in previous studies on Nigeria combined with the observation in several of the presented results that the effect of remittances on growth varies by transmission mechanism, prompted this paper.

### **3.0 Data and Methodology**

#### **3.1 Data**

This study set out to examine the interaction effect of remittance inflows with monetary instruments on the economic performance of Nigeria employing the causal-research design. Two context variables help endogenise migrant remittances on monetary instruments by interacting the former with exchange rate and interest rate separately. These serve to elucidate direct and indirect feedback but also to ameliorate some of the correlation problems between variables such as exchange rate and interest rate. Time series data for the period 1962 to 2020 were retrieved from the World Development Indicators (WDI, 2020).

#### **3.2 Theoretical Framework**

The examination of the nexus between remittances and economic performance is framed within the new economics labour migration (NELM) theory of Stark's (1991) and Stark and Bloom (1985). In the application of the NELM to this study, households, which are the decision making units in Stark's model, choose a representative to leave the origin country with the intention to work, generate income and then remit the earned income later into the same home country. The NELM identifies remittances as economic capital needed for migration, remittances as a return on capital investment reflects how those costs are netted out once the migrant starts to remit funds to the source country. There is a cost function generated for remittances, where the cost of remittances  $c$  depends on the household savings combined with additional sources of funds,  $k$ . Starks's household decision making process is representative of the Nigerian migration experience in which resources are pooled to send one family member abroad. The investment in a household member comes with an agreement/unvoiced expectation to provide returns often through remitting in cash and kind back to his origin.

$$c(\text{REM}) = k(\text{REM}) \quad (1)$$

This study only considers the financial returns to remittances,  $f$  for the sake of simplicity, since remittances in kind as well as social remittances are not observable in time series for the period we examine. Although the data on official remittances is acknowledged to be grossly inadequate in capturing money remitted through informal channels, we assume the time trend in official remittances are reflective and that all workers who choose to remit are captured.

To capture the relationship more distinctly between remittances and monetary variables an application of the Mundell-Fleming-Dornbusch type model is introduced. The paper posits that in effective and

expansionary monetary policy, monetary variables such as remittances, exchange rate and capital accumulation lead to investment, increase in money supply and minimize inflation, indirectly and directly leads to acceleration in the levels of real output á la Rafiq & Mallick (2008).

$$REM, MS, EXR \equiv \uparrow INV, \uparrow MS \uparrow INF \tag{2}$$

$$\text{After specifying a standard growth function } Y = (AK^\alpha, L^{1-\alpha}) \tag{3}$$

In accordance with Stark and Bloom (1991) we assume investments depend on remittances so that:

$$INV = f(REM) \text{ and } K = f(INV) \tag{4}$$

After relaxing Stark’s assumptions of imperfect markets in order to be able to account for the reality that the data presents, the paper introduces an extended growth model to capture the impact of a number of monetary variables on economic performance

$$Y = \beta_{ot} + \partial_1 + X_{it}\beta + \varepsilon_{it} \tag{5}$$

Where  $X_{it}$  represents a vector of independent variables comprising of remittances, exchange rate, inflation, monetary policy rate and investment.

To these the study adds principles of the Mundell-Fleming-Dornbusch model to explain interactions between monetary variables. The principles suggests that remittances can scale up the impacts of both exchange rate and inflation rate on the economy.

$$Y = \beta_{ot} + \partial_1 + X_{it}Y_{jt}\beta + \varepsilon_{it} \tag{6}$$

And Y represents a set of interacted variables limited to a number j

In this model remittances received have the propensity to increase money supply in the domestic economy; and engender buying of durable and consumable goods significantly. The cash can be used to buy both local consumables and imports. In practical terms the Nigerian exchange rate regime over the period was a hybrid between floating and fixed systems. Should the tendency to invest a proportion of the remitted funds rise, this positively influences inflation rate directly and/or indirectly in the economy.

### 3.3 Model Specification

The dynamic and Johansen and Juselius co-integration regression stochastic models used for the study are stated as:

#### Dynamic (General Method of Moment) Regression Estimation Model

$$Y_t = \beta_{ot} + \beta_1 Y_{t-1} + \beta_2 REM_t * EXR_t + \beta_3 REM_t * INFR_t + \beta_4 MPR_t + \beta_5 INV_t + \varepsilon_t \tag{7}$$

#### Johansen and Juselius Co-integration Regression Estimation Model

$$\Delta Y_t = \delta_1 Y_{t-1} + \dots + \delta_k \Delta Y_{t-k+1} + \Pi Y_{t-k} \varphi + \varepsilon_t \tag{8}$$

*Y* measures Gross domestic product per capita; REM\*EXR represents remittances inflows interacted with exchange rate; REM\*INFR is remittances inflows interacted with inflation rate; *INV* is investment, proxied using capital stock and MPR is the monetary policy rate;  $\varepsilon$  is the stochastic error term acting as a surrogate in the models. The coefficient  $\beta_0$  represents the intercept; while *t* is the period of study.

The a priori expectation is that the estimation coefficients  $\beta_1 > 0, \beta_2 > 0, \beta_3 > 0, \beta_5 > 0, \beta_6 > 0$ , have a positive relationship with economic performance.

**Table1: Measurement of Variables**

Types of Variable	Variables	Operationalization and Source
Dependent Variable	Gross Domestic product growth per person	This is real GDP growth in purchasing power parity in billions of Naira as indicated in the world development indicator.
Independent Variables	Monetary Policy Rate	This is the stipulated monetary policy rate of the Central Bank of Nigeria.
	Capital Stock (Investment)	Measured using value of gross fixed capital in billions of naira values as indicated in the World development indicators.
	Inflation rate	Measured using annual percentage change in consumer price index. The core inflation rate of the Central Bank of Nigeria is used.
	Remittance	Measured using foreign remittances received in naira equivalent as reported by the World Development Indicators.
	Exchange Rate	Measured using the real exchange rate of the CBN.

Source: Researchers' Compilation, 2021

### 3.4 Estimation Procedures

This study employed the General Method of Moment (GMM) and co-integration as estimation procedures in analyzing the time series data. The aim of using the general method of moment (GMM) was to ascertain the endogeneity effect of the variables, while the co-integration estimation method was employed to determine the long-run relationship between the dependent and independent variables.

### 4.0 Results and Discussion

All empirical results are presented in this sub-section starting with the analysis and interpretation of diagnostic test results, correlation analysis, and general method of moments (GMM) as well as co-integration technique result respectively.

#### 4.1 Presentation of Unit Root Test Result

Tables 2 reports the ADF unit root results which show that at level, gross domestic product per capita (Y) and remittance inflows interacted with exchange rate (REM\*EXR) were stationary. Remittance inflows interacted with inflation rate (REM\*INFR), investment (INV), that is capital stock and interest spread (INTRS) were not stationery at 5% significant level in the data used.

**Table 2: Augmented-Dickey Fuller (ADF) UNIT Root Test Results at Levels**

Variables	ADF test statistic	t-critical value	Remark
Y	-4.704122	-2.912631	Stationary
REM*EXR	-4.825587	-2.923780	Stationery
REM*INFR	-6.998632	---2.916566	Stationary at first difference
INV	-6.562778	-2.913549	Stationary at first difference
MPR	-7.918955	-2.913549	Stationary at first difference

Source: Augmented-Dickey Fuller (ADF) unit root test results computed by researchers using E-views 8.0 version

At first difference 5% level of significance, the results showed there is no unit root. Meanwhile, the guideline to accept or reject the null hypothesis (Ho) is that the Mackinnon approximate probability value (p-value) for z(t) must be less than 5 percent, otherwise, the null hypothesis is rejected. The unit root test results at first difference suggest absence of spuriousness in the time series data.

#### 4.2 Correlation Analysis

**Table 3: Correlation Matrix Result**

	Y	REM*EXR	REM*INFR	INV	MPR
Y	1.000				
REM*EXR	0.019	1.000			
REM*INFR	-0.094	0.567	1.000		
INV	-0.044	0.690	0.458	1.000	
MPR	0.029	0.506	0.537	0.525	1.000

Source: Computed by researchers using E-view 8.0 version



Table 3 reports the Pearson coefficients correlation of remittance inflows accounting for the monetary policy transmission mechanisms on the economic performance of Nigeria. It can be observed that Y and REM\*EXR are positively correlated ( $r = 0.019$ ). Remittance inflows interacted with inflation is negatively correlated ( $r = -0.094$ ) with Y. This relationship is suggestive that remittance inflows interacted with inflation adversely affects economic activities or decreases economic performance in Nigeria. Capital stock investment (INV) is negatively associated with gross domestic product per capita ( $r = -0.044$ ). It suggests that capital stock an indication of fixed capital accumulation negatively influences the economic performance and growth of Nigeria. Monetary policy rate is observed to maintain a positive correlation with Y ( $r = 0.029$ ). It implies that monetary policy rate has been a favourable variable in enhancing the economic performance of Nigeria, consequently the well-being of the citizens in the period under consideration. The correlation coefficients do not in any way show signs of multicollinearity and all the variables reinforce in a mutual perspective. Equally important is that the degree of correlation between the monetary variables is string at over 0.5 for each. This shows that the monetary variables interact closely with one another as expected from theory and validated the choice of the GMM methodology. Thus the correlation analysis acts as a diagnostic tool as well.

#### 4.3 Remittance inflows monetary instruments and economic performance

The results of the Generalised Method of Moments dynamic regression analysis presented below show no autocorrelation problems since the Durbin-Watson statistics are within range. The adjusted R-squared, at 66 per cent, shows that the model significantly represents the relationship between the monetary variables and economic growth.

**Table 4: General Method of Moment (GMM) Dynamic Regression Result**

L.Y	1.118*
	[0.001]
REM*EXR	0.001*
	[0.005]
REM*INFR	0.067***
	[0.090]
INV	-0.075*
	[0.004]
MPR	0.253
	[0.463]
CONSTANT	-3.334
	[0.390]
Observations	58
No. of instruments	5
R-Squared	0.76
Adjusted R-Square	0.66
Durbin-Watson Statistics	2.007
J-statistics	0.000

**Source:** Authors' Computation, from E-view 8.0 version

*T-statistics are reported in editorial parenthesis, \*, \*\* and \*\*\* indicate significance at 1%, 5% and 10% levels of confidence*

Table 4 shows that one period lag of gross domestic product per capita income is positive (1.118) and significant in the reference period. The coefficients of remittance inflows interacted with exchange rate (REM\*EXR) is positive (0.001) and statistically significant on gross domestic product per capita income. It suggests that as migrant remittances increases under a favourable exchange rate, the economy of Nigeria is bound to grow and performs well. The result portends that an appreciation in domestic exchange rate induces migrants to send remittances to their origin economy, fitting within the studies finding remittances

as countercyclical. These remittances if properly channeled into productivity economic activities are capable of improving economic performance in Nigeria, *ceteris paribus*. This is possible, if the migrant remittances under an appreciable exchange rate are plunged into productive economic investments, given a good government policy that encourages it. The finding is also an indication that a favourable exchange rate induces migrant remittances inflows towards driving the economic growth and performance of Nigeria. These finding align with the research results of Adams and Page (2005); Acosta et al. (2008); Cox Edwards and Ureta (2003); Woodruff and Zenteno (2007); Fajnzylber and Lopez (2008); Yang (2008); Aboulez (2015); Marzovilla and Mele (2015); Matuzevciute and Butkus (2016) respectively.

Remittance inflows interacted with inflation rate (REM\*INFR) return a coefficient value on gross domestic product per capita income (GDPPCI) that is positive (0.090). It can be inferred that a low rate of inflation, given high remittance inflows, impacts positively on the performance of the Nigerian economy, although it is only significant at 10% level of confidence. It alludes to the strength of remittances in the face of inflation pressures.

Monetary policy rate has a positive sign (0.253) with significant statistical p-value of 0.004 in the period under reference. The result indicates that monetary policy contributes to the performance of the Nigerian economy. This may be connected with impressive monetary policy result of successive regimes of government over time in Nigeria.

Capital stock (investment) exerted a negative (-0.075) and statistically insignificant impact on gross domestic product per capita income of Nigeria in the period examined. It connotes that a slight percent fall in migrant remittance assuming a decrease in exchange rate, would discourage investments, and affects economic activities, consequently the performance of economy of Nigeria. This latter finding is partly in consonance with the research outcome of Matuzevciute and Butkus (2016).

Regressions are validated at most at  $\alpha = 0.05$  except for remittances interacted with inflation which is validated at  $\alpha = 0.10$ .

#### 4.4 Johansen Co-integration Test Results

**Table 5: Co-integration Analysis – Unrestricted Co-integration Rank Test (Trace and Max-Eigen values)**

Hypothesis	Test statistics	Critical value at 5%	Maximum Eigenvalue	Critical values at 5%
R = 0	124.0842	69.8188	64.2327	33.8768
R ≤ 1	58.8414	47.8561	29.1485	27.5843
R ≤ 2	30.6929	29.7970	-	-

Source: Researchers’ Computation from E-views 8.0

The Johansen co-integration result in table 5 indicates that there exists at least (3) co-integration equations under the trace statistics value and two (2) maximum Eigen value statistics at 5% significant level. It suggests that there is a long-run relationship between remittances inflows interacted with monetary policy instruments and the economic performance of Nigeria. The research finding agrees with the study of Matuzevciute and Butkus (2016) establishing a long-run relationship between migrant remittances economic growth, considering the development level of recipient country. The findings contributes to the body of knowledge interacting monetary policy variables with remittances using a model that captures the Nigerian conditions.

## **5.0 Conclusion and Policy Recommendations**

### **5.1 Conclusion**

The study concludes that the interaction of migrant remittances monetary policy instruments such as real exchange rate and inflation rate contribute importantly to the of economic performance in Nigeria, including in the long-run. The economic significance while small in magnitude shows that under proper monetary conditions remittances can improve economic growth through the monetary transmission mechanism.

### **5.2 Policy Implications**

This study's findings portends some policy implications to the Nigerian government.

- i. First, it is imperative for the Federal Government of Nigeria through the Central Bank of Nigeria (CBN) to devise a policy framework to embrace remittances as a monetary and fiscal policy instrument in fostering economic activities; explicitly including the remittances in monetary policy initiatives to support fiscal budgets and enhance national development.
- ii. Second, the findings indicate that initiatives to reduce the cost of remittances from abroad as well as encourage the diaspora to contribute to various investments in the country are beneficial to Nigeria.
- iii. Third, the Federal Government of Nigeria has previously successfully raised diaspora bonds and can continue to harness the remittances window as an internal borrowing source to cushion budget deficit, finance capital investments with the aim of mitigating liquidity challenges; and in this way strive to maintain macro-economic stability in Nigeria.

### **5.3 Policy Recommendations**

This study put forwards the following recommendations:

- i. Future research extending the impact of migrant remittance inflows interacted with monetary policy instruments on economic performance of countries in Africa, including regions such as ECOWAS, COMESA and so forth.
- ii. There remains a gap in applying more advanced estimation methods to examine the impact of remittance inflows interacted with other macroeconomic variables on an economy across-countries or in other polar zone/jurisdiction.
- iii. Future research investigating the implications of remittances interacted with savings; corruption on economic growth. The outcome of such a research will be useful to the government in fashioning out effective policy on the regulation of remittances, in development policy initiatives as well as remittances as productive investments in the country.

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