International Remittances and Private Domestic Investment in Nigeria: A Toda and Yamamoto Causality Approach

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Abstract: The paper investigates the causal relationship between remittances and private domestic investment in Nigeria. Annual secondary data covering the periods of 1981Q1 to 2020Q4 and were obtained from the World Development Indicators (WDI) published by the World Bank and Statistical Bulletin published by the Central Bank of Nigeria (CBN). Data collected were analyzed using Philips-Perron test unit root test and Toda and Yamamoto causality test. Results obtained indicate that remittances and private domestic investment were both integrated of order one (1) and zero (0). The Toda and Yamamoto causality test carried out revealed that there is a unidirectional causal relationship between remittances and private investment in Nigeria. The study concluded that government should not only be concerned with attracting the maximum amount of remittances into our country but also directing these remittances through formal channels to maximize the benefits for the country as a whole through private domestic investment. 

Key Words: Remittances, Private domestic investment, Toda and Yamamoto causality model.

1. INTRODUCTION

Investment expenditure is one of the key components of total expenditure in an economy. The Keynesian expenditure equation states that total expenditure is a function of aggregate investment and aggregate consumption. Unlike other components of total expenditure in an economy like consumption expenditure in food, clothing, and entertainment; investment expenditure directly contributes to capital formation which is a precondition for economic growth. Private domestic investment involves an investment made by an individual in a particular country or country of residence in form of establishing businesses such as small and medium scale enterprises. Thus, Nigeria has been considered to be one of the 20 poorest countries in the world with 70% of the population living below the poverty line and with an investment rate of barely 10% of GDP, which is below the minimum investment rate of about 30% of GDP required to reduce poverty and unemployment and put the country on the path of development through the inflow of foreign direct investment (Joseph, 2017). The Keynesians believe that interest rate is the key determinant of investment and output in the economy. A decrease in interest rate will affect aggregate investment and enhance aggregate income and output. McKinnon and Shaw (1984) view that a low or negative real rate of interest discourages savings and hence reduces the availability of loanable funds, constrains investment, and in turn lowers rate of economic growth.

This low level of investment may predominantly be as a result of low income and savings needed to finance different business plans and investment opportunities prevalent in the country, hence the need for foreign finance. An old phenomenon that is gaining increasing attention and importance in development finance as well as in international finance is the issue of migrant remittances. Yet, these international remittances by migrant workers from their employment income, particularly to developing countries, are usually overlooked in discussions on international financial flows. International Organization for Migration (2006) broadly defined remittances as the financial flows associated with migration, in other words, personal cash transfers from a migrant worker or immigrant to a relative in the country of origin. Remittances are referred to as unrequited transfer sent by migrant workers back to relatives in their countries of origin (Juthathip, 2007). Data from the World
Development Indicators (WDI) show that by 2017, remittances had outpaced Foreign Direct Investment (FDI) and official development assistance (ODA), being second only to oil as a foreign exchange earner for Nigeria as of 2017. World Bank estimates show that as of 2015, Nigeria has moved into the top five recipients of remittances in the world and received 77 and 82% of the total remittance inflow to West African countries in 2016 and 2017, respectively.

Arguably, the sum of financial remittances sent by international migrants back to their families in origin countries amounted to $581.6 billion in 2015, according to World Bank estimates; almost 75 per cent were sent to developing countries ($431.6 billion), representing more than three times the size of foreign aid received by such countries in the same year. Nigeria received $21.1 billion from the said remittances that year (the highest in Africa) compared to all developing countries in the world. In addition, remittances are the largest source of foreign capital in developing countries even more than Foreign Direct Investment (FDI). In 2018, a total of $25.08 billion was remitted by Nigerians in diaspora (PricewaterCoopers, 2019). This represents about 14% increase from 2017 and 83% of the federal government’s 2018. This was about $3 billion higher than the World Bank’s previous estimates and placed Nigeria as the highest remittance recipient in Africa and fifth highest globally, behind the likes of India, China, Philippines and Mexico in that order. African countries, like many developing countries in other continents need a substantial inflow of international remittance inflows in order to make up for the savings and foreign exchange gaps associated with a rapid rate of capital accumulation.

Table 1. Remittances in Nigeria from 2009 to 2019

<table>
<thead>
<tr>
<th>Year</th>
<th>International Migrant Remittances</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>$18.3bn</td>
</tr>
<tr>
<td>2010</td>
<td>$19.7bn</td>
</tr>
<tr>
<td>2011</td>
<td>$20.6bn</td>
</tr>
<tr>
<td>2012</td>
<td>$20.5bn</td>
</tr>
<tr>
<td>2013</td>
<td>$20.9bn</td>
</tr>
<tr>
<td>2014</td>
<td>$20.8bn</td>
</tr>
<tr>
<td>2015</td>
<td>$21.1bn</td>
</tr>
<tr>
<td>2016</td>
<td>$19.8bn</td>
</tr>
<tr>
<td>2017</td>
<td>$22.0bn</td>
</tr>
<tr>
<td>2018</td>
<td>$25.08bn</td>
</tr>
<tr>
<td>2019</td>
<td>$23.81bn</td>
</tr>
</tbody>
</table>

Source: World Bank’s Development Indicators (2020)

In spite of the upward surge in the amount of remittances to Nigeria, there are number of factors that impede their flow. The first is transaction costs. Presently, the cost of sending money to Nigeria is very high. On the average, to send $200 to and from a country in the region costs almost $19 in the first quarter of 2018. In Africa, transaction cost as of the first quarter of 2018 is 11.18%. Sub-Saharan Africa’s remittance price in the first quarter of 2017 is 9.81% as against South Asia’s 5.40% which remains the cheapest receiving region. Intra-African transaction cost is about 15%. The high cost is mainly contributed by the exclusive arrangements between banks and international money transfer institutions as well as stringent regulations related to money laundering and terrorist financing (World Bank, 2011).

It is however theoretically plausible that decreasing rate of investment in the country of origin could induce migrants to increase remittances to finance investment opportunities. Migrants overseas might want to exploit the investment opportunities in their home country and make abnormal profit before other firms will come into the industry, this might induce them to increase the amount of money remitted to their family at home which is solely for investment purposes. Bangladesh and Pakistan, two of the leading recipients of remittances (in absolute terms), seem to provide some anecdotal evidence in this respect. In Bangladesh, emigrant workers that have an intention to return home invest 75% of their income in importing machineries and equipment needed for establishment of industries so as to maximize profit of an untapped market; while in Pakistan, the government bank issues certificates in return for foreign currency payments. These certificates carry an interest rate that is approximately two percent above the Euro-deposit rate, and they are redeemable in foreign or domestic currency at a premium of eight to fifteen percent above the official exchange rate.
Furthermore, when deposited in banks and other institutions or used in purchase of treasury certificates, remittances provide a readily available source of investment capital. Just like the Classical Developmentalist Optimism theory of 1982, O’Neill (2001) observed that it is the high rate of remittances that increases investment in India.

Some studies suggest that remittances are primarily used for consumption purposes while other studies are of the view that remittances are used for investment rather than for consumption. Many of these studies used cross-country data where the behavioural pattern of remittances was analyzed by combining data from several countries. The result of this approach was that country specific dynamics were lost in the process. In Nigeria, researchers are silent about the impact of remittances on investment. Since, the relationship between remittance inflows and investment have been overlooked over the years, this study intends to fill this gap.

Furthermore, those studies merely established correlations which do not necessarily imply causation. Many arguments underlie remittance-investment nexus. Some scholars are of the view that it is the low level of investment that attracts migrants to remit part of their earnings to their country of origin in order to maximize or exploit the benefits of start-up firms where multinational enterprises are lacking. The motive of remitting money in most less developed countries is to exploit untapped investment opportunities in the home country. Sequel to this, they believe that it is the low level of investment in the country of origin that attracts the inflow of remittances to the country of origin. Others believe that the incessant flow of remittance is the rationale behind the increase in the rate of investment; hence this study will attempt to resolve this conflict among researchers by empirically investigating the direction of causality between remittance inflows and investment in Nigeria.

The significance of real gross private domestic investment cannot be exaggerated. This is because it is an important stimulant to economic growth and development which creates a multiplier effect on other macroeconomic indicators like industrial output, gross domestic product, unemployment rate, labour force participation rate. Presently, Nigeria like most other developing countries is tending towards relying much on international remittances for her growth and development.

This study therefore seeks to empirically test the causal relationship between remittances and private domestic investment in Nigeria by attempting to resolve these shortcomings in the existing literature.

2. LITERATURE REVIEW

This study reviews few theories and other empirical studies related to remittances and private domestic investment.

2.1. Theoretical Review

Several theories have attempted to explain investment and ho capital stock accelerate the rate of investment. Among these theories are the Flexible Accelerator Theory and Modern Portfolio Theory (MPT).

**The Flexible Accelerator Theory:** This is also called Capital Stock Adjustment model. This theory of flexible accelerator has been developed in various forms by Chenery, Goodwin, Koyck and Junankar but the most accepted approach is by Koyck in his work “Distributed Lags and Investment” in 1954. The flexible accelerator theory removes one of the major weaknesses of the simple accelerator principle that the capital stock is optimally adjusted without any time lag. In the flexible accelerator, there are lags in the adjustment process between the level of output and the level of capital stock. It holds that the larger the gap between the existing capital stock and the desired capital stock, the greater a firm’s rate of investment. The hypothesis is that firms plan to close a fraction of the gap between the desired capital stock, K* and the actual capital stock, K in each period (Jhingan, 2004). This gives rise to a net investment equation of the form of:

\[ I = K^* - K = \Delta K \]

so \[ I = \Delta K = k \Delta Y_t \]

where I is net investment, \( \Delta k \) is a change in capital stock, \( \Delta Y_t \) is the change in the current output level where k is the capital-output ratio.
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The flexible accelerator model has been attributed as the best theory or model used in analyzing remittance-investment nexus by Okeke, Utomi and Ezenekwe (2019). Flexible Accelerator model added that the lag of previous investments affects the present investment. The lag might be bureaucratic delays, bottlenecks in acquiring loans, financial constraints, ease of accessibility of credit, e.t.c. hence helped in overcoming the weakness of the fixed accelerator model. Moreover, the theory highlighted the effects of lags in the capital stock adjustment. Here, the inflow in remittances cannot immediately bring about increase in the national output through investment, but have to adjust in order to bring about the expected increase. Hence, the theory is more realistic as compared to fixed accelerator model of investment.

Modern Portfolio Theory (MPT): This theory was pioneered by Henry Markowitz in his paper “Portfolio Selection”, published in 1952 by the Journal of Finance. Modern Portfolio theory is a theory on how risk-averse investors can construct portfolios to optimize or maximize, emphasizing that risk is an inherent part of higher reward. MPT is formalization and extension of diversification in investing, the idea that owning different kinds of financial assets is less risky than owning only one type. Its key insight is that an asset’s risk and return should not be assessed by itself, but by how it contributes to a portfolio’s overall risk and return. It’s also called the Mean-Variance analysis. In this theory, remittances are viewed as a strategy by an emigrant worker to diversify his other savings. Accordingly, the decision to remit is based on the risk return differential of assets in both the host and recipient country. As such, the main determinants of the decision to remit include interest rate, and black-market exchange rate premium among others. Apart from these economic determinants, the desire to invest may also be driven by the desire of the emigrant worker to return back home with dignity in the event that the emigrant worker chooses to return home (OECD, 2006). Since the desire to remit is purely motivated by investment opportunities, the correlation between remittances and GDP tends to be positive. Similarly, according to this theory, the correlation between remittances and private investment is positive since remittances are principally spent on investment activities.

2.2. Empirical Review

Private sector is argued to be engine of economic growth in a country. However, most developing countries are tied to the nut of excessive debt such that financing the private sector to achieve targeted level of economic growth remained a mirage. In Nigeria, Chinanuife, Eze and Nwodo (2018) noted that even with increasing level of public debt, level of private sector investment remained low. Therefore, in order to boost the activities of the private sector, remittance especially international remittances have been argued as a means of augmenting the shortage of capital for investment in developing countries. On this, Okeke, Utomi, and Ezenekwe (2019) investigated the impact of international remittances on private investment in Nigeria. Ordinary least square was used to analyze time series data sourced from World Development indicators. The result revealed that remittances increase the rate of private investment in Nigeria and that previous investment is a determinant of current investment.

Moreover, Okeke (2021) analyzed the effect of international remittances on unemployment in Nigeria using Two-stage least squares econometric model (2SLS), and found that international remittances affect unemployment negatively in Nigeria.

Similarly, Ezike and Ogboi (2017) analyzed household inward remittances and Productive Investment in Nigeria: A Multidimensional Analysis. Generalized Method of Moments (GMM) estimator was used to analyze time series data sourced from World Development indicators (WDI) 2015 edition. Variables employed include productive investment, remittances, private sector credit, lending rate, inflation rate, imports, GDP, real exchange rate, trade openness, and final consumption expenditure. The study therefore concluded that inward remittances discourage productive investment and boost consumption of imported goods. This could be attributed to the seeming resource transfer to consumption of imports arising from price differentials between locally manufactured goods to foreign imports.

However, investigating the impact of remittances on Kenya private investment and how financial sector development influences the effect of remittances on private investment, Cherono (2013) found a positive and statistically significant relationship between remittances and investment in Kenya. Moreover, the coefficient on the interaction coefficient between remittances and financial sector...
development was found to be positive and statistically significant. This result suggests that remittances can complement the allocation of capital by credit markets to private investment activities in Kenya.

In another study by Ojapinwa and Odekunle (2013), he investigated the link between remittances and fixed capital formation in Nigeria. The paper was particularly interested in establishing how a country’s capacity to utilize remittances was influenced by financial sector development. The study used time series data between 1977 and 2010 and employed the Dynamic Ordinary Least Squares model to study the subject. This model allowed the study to control for endogeneity occasioned by the use of a lag in the independent variables. The study found a positive correlation between remittances and physical investment. Moreover, the relationship between remittances and financial depth was found to be positive and significant. This, according to the author, suggests that financial development compliments remittances in enhancing investment. Therefore, as a policy recommendation, the author argues that for Nigeria to benefit from remittances from emigrants, the government should focus on improving financial development in order to enhance the effect of remittances on capital formation.

Furthermore, Hrushikesh (2012) utilizes an error correction model and the Dynamic Ordinary Least Squares procedure (DOLS) developed by Watson (1998) to investigate the impact of remittances on private investment in India. The paper finds that remittances crowds out private investment in India with the majority of income including remittances going towards consumption expenditure. In other words, remittances led to a decline in the rate of private investment. As a result, the author suggests that the government should formulate policy to encourage the allocation of remittances towards private investment.

It is evident that studies in remittances and private investment were tailored towards establishing the extent of the impact of remittances on private investment. However, this study sorts to examine the direction of causality between remittances and private domestic investment.

3. METHODS AND DATA

This study is anchored on the flexible accelerator theory. This theory asserts that the greater the gap between the desired capital stock and the actual capital stock, the greater the investment in the economy. It therefore means that the greater the inflow of international remittances in excess of domestic capital, the greater the amount of capital investment. This is the case in developing countries where households would first of all satisfy their domestic needs for fund before investing the residual. When the amount of international remittances exceeds the domestic demand, much fund would be available for investment.

With this private domestic investment is perceived to be function of international remittances and is define as;

\[ PDI = f(IMR) \]  
(3.1)

Where

\( PDI \) represents private domestic investment
\( IMR \) represents international Migrant remittances.

3.1. Model Specification

According to Madueme (2010), causality test is undertaken to investigate the degree of causation of one variable on the other. The test is conducted here to show whether it is international remittances that is causing private domestic investment or whether it is private investment that is causing international remittances, or whether both are causing each other or whether both of them are independent of each other. According to Gujarati & Porter (2003:654-655), for test on causality to be conducted there are certain assumptions that must be fulfilled. The assumptions include:

i. The disturbance term in the equation is uncorrelated.

ii. That the two variables are stationary

iii. The number of lagged terms which are expected to be included in the model should be determined.
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\[ PDI_t = \sum_{i=1}^{k} \alpha_{1i} PDI_{t-i} + \sum_{j=1}^{d_{max}} \alpha_{2j} PDI_{t-j} + \sum_{i=0}^{k} \alpha_{3i} IMR_{t-i} + \sum_{j=1}^{d_{max}} \alpha_{3j} IMR_{t-j} + \mu_t \]

\[-(3.2)\]

\[ IMR_t = \sum_{i=1}^{k} \alpha_{1i} IMR_{t-i} + \sum_{j=1}^{d_{max}} \alpha_{2j} IMR_{t-j} + \sum_{i=0}^{k} \alpha_{3i} PDI_{t-i} + \sum_{j=1}^{d_{max}} \alpha_{3j} PDI_{t-j} + \mu_t \]

\[-(3.3)\]

PDI = Private Domestic Investment
IMR = International migrant remittances

The test expectations are:

i. Unidirectional causality from IMR to PDI if \( \sum \alpha_i \neq 0 \) and \( \sum \delta_j = 0 \).

ii. Unidirectional causality from PDI to IMR if \( \sum \alpha_i = 0 \) and \( \sum \delta_j \neq 0 \).

iii. Feedback or bi-directional causality if \( \sum \alpha_i \neq 0 \) and \( \sum \delta_j \neq 0 \). In this case, the sets of IMR and PDI coefficients are statistically significant in the both regressions.

iv. Independence if \( \sum \alpha_i = 0 \) and \( \sum \delta_j = 0 \). In this case the set of IMR and PDI coefficients are not statistically significant in the both regressions.

The most commonly used method of testing for causality is the Granger Causality but this study employed Toda and Yamamoto (1995) and Dolado and Lutkepohl (1996) methodology (TYDL). They propose a technique that is applicable irrespective of the integration and cointegration properties of the system. The method involves using a Modified Wald Statistic for testing the significance of the parameters of a VAR(s) model. Thus the estimation of a VAR(std_{max}) guarantees the asymptotic \( \chi^2 \) distribution of the Wald statistic, where \( d_{max} \) is the maximal order of integration in the model. The lag length of the variables in the causal models is set according to Akaike Information Criterion (AIC). Since lagged dependent variables appear in each equation of the aforementioned causal models, their presence is expected to purge serial correlation among the error terms.

The lag length using the Akaike Information Criterion (AIC) will be determined. To increase the number of lags in the WALD model up to maximum cointegration level of variables entered in the model is crucially fundamental in opting for the Toda and Yamamoto causality testing procedure. The Toda and Yamamoto approach is an alternative causality testing approach based on the Granger non-causality equation but augmented with extra lags determined by the potential order of integration of the series causality tested.

The rationale for adopting this method is because variables that enter the model might have different order of integration and might not be cointegrated at all; therefore, using the Granger causality model will give a spurious result which will bring about spurious inference and conclusion.

The study used data from world development indicators 2020. The period of study was from 1981 to 2020. The study converted the annual data to quarterly data to increase the number of observation. This would help to take care of loss of degrees of freedom. Lastly, Eviews-9 software was used to analyse the data.

4. DATA ANALYSIS AND DISCUSSION OF RESULTS

Stationarity test was conducted using two traditional unit root tests to side step spuriousness of the regression result. The traditional tests employed was Phillips-Perron (PP) test. One advantage of Phipps-Perron over the popular Augmented Dickey-Fuller is that PP tests are robust to general forms
of Heteroskedasticity in the error term. Another advantage is that the user does not have to specify a lag length for the test regression.

**Table 4.3. Phillips-Perron Test Result**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Level Form</th>
<th>First Difference</th>
<th>Order of Integration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PP Statistic</td>
<td>PP Critical Value</td>
<td>5%</td>
</tr>
<tr>
<td>PDI</td>
<td>-4.065138</td>
<td>2.8709610</td>
<td></td>
</tr>
<tr>
<td>IMR</td>
<td>-0.210344</td>
<td>2.8709610</td>
<td></td>
</tr>
</tbody>
</table>

**Source:** Authors’ compilation from the result of PP unit root test

Table 4.3 shows the result of PP unit root test of private domestic investment (PDI) and international migrant remittances (IMR). It could be observed that private domestic investment was stationary in its level form while international migrant remittances became stationary after first difference. This shows the mixture of I(0) and I(1) in the unrestricted VAR model. However, Toda and Yamamoto Causality does not consider whether the variables are cointegrated or not. With this, the study presents VAR lag length selection in table 4.4.

**Table 4.4. VAR Lag length selection based on AIC**

<table>
<thead>
<tr>
<th>Lag</th>
<th>LogL</th>
<th>LR</th>
<th>FPE</th>
<th>AIC</th>
<th>SC</th>
<th>HQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>-4347.178</td>
<td>NA</td>
<td>2.44e+22</td>
<td>57.22602</td>
<td>57.26581</td>
<td>57.24219</td>
</tr>
<tr>
<td>1</td>
<td>-3732.405</td>
<td>1205.278</td>
<td>7.90e+18</td>
<td>49.18954</td>
<td>49.30890</td>
<td>49.23803</td>
</tr>
<tr>
<td>2</td>
<td>-3649.720</td>
<td>159.9293</td>
<td>2.81e+18</td>
<td>48.15422</td>
<td>48.35316</td>
<td>48.23503</td>
</tr>
<tr>
<td>3</td>
<td>-3633.174</td>
<td>31.56972</td>
<td>2.38e+18</td>
<td>47.98913</td>
<td>48.26764*</td>
<td>48.10227*</td>
</tr>
<tr>
<td>4</td>
<td>-3631.525</td>
<td>3.101287</td>
<td>2.45e+18</td>
<td>48.02007</td>
<td>48.37816</td>
<td>48.16554</td>
</tr>
<tr>
<td>5</td>
<td>-3626.020</td>
<td>10.21473</td>
<td>2.41e+18</td>
<td>48.00026</td>
<td>48.43792</td>
<td>48.17805</td>
</tr>
<tr>
<td>6</td>
<td>-3617.293</td>
<td>15.96094*</td>
<td>2.26e+18*</td>
<td>47.93806*</td>
<td>48.45530</td>
<td>48.14818</td>
</tr>
<tr>
<td>7</td>
<td>-3614.601</td>
<td>4.852704</td>
<td>2.30e+18</td>
<td>47.95527</td>
<td>48.55209</td>
<td>48.19772</td>
</tr>
<tr>
<td>8</td>
<td>-3613.347</td>
<td>2.227567</td>
<td>2.39e+18</td>
<td>47.99140</td>
<td>48.66780</td>
<td>48.26618</td>
</tr>
</tbody>
</table>

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

**Source:** Authors’ compilation from the result of lag length selection

Table 4.4 shows the result of VAR lag length selection. It could be observed that AIC favoured lag 8. This therefore becomes the lag length of the model. However, in the estimation of Toda and Yamamoto causality, lag 9 will be added to take care of d_max included in the model.

**VAR Stability Condition Check**

This study ensure that the selected lag length passed the stability test. The result of this test is presented in table 4.5.

**Table 4.5. VAR Stability Condition Check**

<table>
<thead>
<tr>
<th>Root</th>
<th>Modulus</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.995813</td>
<td>0.995813</td>
</tr>
<tr>
<td>0.873234 - 0.200124i</td>
<td>0.895872</td>
</tr>
<tr>
<td>0.873234 + 0.200124i</td>
<td>0.895872</td>
</tr>
<tr>
<td>0.849885</td>
<td>0.849885</td>
</tr>
<tr>
<td>-0.552666 - 0.618837i</td>
<td>0.829698</td>
</tr>
<tr>
<td>-0.552666 + 0.618837i</td>
<td>0.829698</td>
</tr>
<tr>
<td>0.668188 - 0.396624i</td>
<td>0.777036</td>
</tr>
<tr>
<td>0.668188 + 0.396624i</td>
<td>0.777036</td>
</tr>
<tr>
<td>0.487902 - 0.590039i</td>
<td>0.765633</td>
</tr>
<tr>
<td>0.487902 + 0.590039i</td>
<td>0.765633</td>
</tr>
<tr>
<td>-0.716066</td>
<td>0.716066</td>
</tr>
</tbody>
</table>
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\[
\begin{array}{ccc}
-0.061666 - 0.600865i & 0.604021 \\
-0.061666 + 0.600865i & 0.604021 \\
-0.528445 & 0.528445 \\
-0.271477 - 0.305618i & 0.408781 \\
-0.271477 + 0.305618i & 0.408781 \\
\end{array}
\]

No root lies outside the unit circle.
VAR satisfies the stability condition.

Source: Authors’ compilation from the result of VAR stability condition check

Table 4.5 shows the result of VAR stability condition check. It could be observed that no root lies outside the unit circle. This means that the selected VAR satisfies the stability condition and is therefore suitable for our study.

Table 4.6. Toda and Yamamoto Causality Test

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Excluded</th>
<th>Chi-sq</th>
<th>df</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDI</td>
<td>IMR</td>
<td>16.23571</td>
<td>8</td>
<td>0.0391</td>
</tr>
<tr>
<td></td>
<td>All</td>
<td>16.23571</td>
<td>8</td>
<td>0.0391</td>
</tr>
<tr>
<td>IMR</td>
<td>PDI</td>
<td>2.640221</td>
<td>8</td>
<td>0.9549</td>
</tr>
<tr>
<td></td>
<td>All</td>
<td>2.640221</td>
<td>8</td>
<td>0.9549</td>
</tr>
</tbody>
</table>

Source: Authors’ compilation from the result of Toda and Yamamoto Causality Test

Table 4.6 shows the result of Toda and Yamamoto causality test. The null hypothesis for this test is that there is no direction of causality between PDI and IMR. Decision rule is to reject the null hypothesis if Probability value of Chi-square is less than 0.05 for any of the model otherwise, the null hypothesis is not to be rejected at 0.05 level of significance. It could be observed from table 4.6 that in the first model where PDI is the dependent variable, it was shown that the probability value of Chi-square (0.0391) is less than 0.05. This shows that we are to reject the null hypothesis. Therefore, the study shows that international migrant remittances causes private domestic investment and private domestic investment does not cause remittances in Nigeria.

5. DISCUSSION OF FINDINGS

The causality model reveals that there is exist causal relationship between remittance inflows and private domestic investment in Nigeria. This means that, just as the flexible accelerator theory posits, an increase in international remittances in excess of domestic fund need, there would be a corresponding increase in private domestic investment. The reason is that when households were able to meet most of their domestic demand for money, there would be need for investment. This is a peculiar characteristics of developing countries. Migrants desire to exploit new developing market by establishing small and medium scale enterprises where multinational corporations are scarce. However, the extent of investment of households and a country in general depends on the initial financial position of that household or country. All else equal, a country with greater number of poor people would have fewer private sector investment compared to a country with average and high level income.

However, this study established that there is a unidirectional causality running from international remittances to private domestic investment. This supports the findings of Cherono (2013), Hrushikesh (2012) and Ezike and Ogboi (2017) who discovered the existence of relationship between remittances and private domestic investment.

6. CONCLUSION AND RECOMMENDATIONS

This paper examined in a consistent and comprehensible form the causal relationship between remittances and private domestic investment in Nigeria using Toda and Yamamoto causality model. The empirical results show that there is a unidirectional causal relationship between remittances and private investment in the period reviewed. This relationship runs from remittances to private domestic investment.

Moreover, the aim of macroeconomic policy is the achievement of output stabilization in the short run and a diversified self-sustaining economic growth in the long run. This can only be achieved by maintaining the most important determinant of growth which is investment. Government should not
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only be concerned with attracting the maximum amount of remittances into our country but also directing these remittances through formal channels to maximize the benefits for the country as a whole through investment. Sequel to this, Nigeria’s government is expected to do the following:

1. Formulate and implement sound economic policies that will remove uncertain macroeconomic conditions such as high black-market premiums, unfavourable exchange rates, and inflation that may have negative impacts on remittance inflows.

2. Government should create an incentive scheme that will allow migrant workers to deposit remittances in repatriable foreign currency accounts with domestic banks. These accounts allow migrant workers to deposit funds in banks located in their country of origin with the assurance that they will be able to withdraw the funds at their discretion.

REFERENCES


