

## INTERNATIONAL REMITTANCE INFLOWS AND IMPORT SPENDING IN NIGERIA

### Gbenga Peter Sanusi

Department of Economics, Faculty of Social and Management Sciences  
Anchor University, Lagos, Nigeria  
e-mail: gsanusi@aul.edu.ng  
ORCID: 0000-0002-9444-9911

### L. Oladele Oderinde

Department of Economics, Faculty of Social and Management Sciences  
Anchor University, Lagos, Nigeria  
e-mail: loderinde@aul.edu.ng  
ORCID: 0000-0002-0606-2910

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**Abstract:** This study examined the historical trends of remittances and import spending in Nigeria to determine the possible aftermaths of COVID-19 pandemic. Time series data for the period 1977-2019 was used in a VAR model. Result indicates that a unit shock on remittances accounts for about 28% variation in import demand in the second period. Migrant's remittances and GDP per capita show a weak endogenous relationship. Remittances tend to be stable and not affected by the exchange rate. Thus, import demand may not reduce significantly due to fall in remittances as a consequence of COVID-19. Therefore, improved industrial expansion in the production of goods and services are essential in curtailing aggregate import demand.

**Keywords:** international remittance, migrants, import spending, VAR model, Nigeria.

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## 1. Introduction

International or migrant's remittance is one of the catalysts which could trigger domestic savings. Thus it is necessary to channel this exogenous fund appropriately to foster economic growth (Drinkwater, Lotti, and Levine, 2003; Kandil and Mirzaie, 2011; Okodua and Olayiwola, 2013). Many developing countries are losing on two

fronts when it comes to labour movement through migration which is an integral part of global integration. First, is the loss of a skilled labour force to foreign countries, and second, the loss of remittances<sup>1</sup> through the importation of goods and services. This has hampered domestic production and by inference, economic growth.

Globalisation has enhanced the free movement of labour around the globe, and this has made international remittances an integral part of the economy of many developing countries. A report by the Organisation for Economic Co-operation and Development (OECD) indicates that in 2000, about 3% of the global population are migrants residing and working away from their home countries. More than 17 million Nigerians are in diaspora in 2017, as reported by the federal government. This has resulted in a steady rise in international remittance over the past years. In 2018, an impressive \$25.08 billion was reported remitted by Nigerians into the country<sup>2</sup>. This is higher than the World Bank's projected or estimated \$22 billion for the same year under review and about a 14% from the previous year. It represents 83% of the federal government of Nigeria's budget for the same period. Nigeria is reported to have the highest international remittance in-flow in Africa.

A huge part of these international remittances into Nigeria comes from the private savings of Nigerians working in the United States, Europe (e.g. Germany, and Switzerland) and China, among others, whereas the foreign direct investment (FDI) has been on the decline; evidently the determinants of international remittances and FDI are different. While FDI is largely affected by the domestic interest rate, macroeconomic instability and an unpredictable political environment, international remittances are not affected by these domestic variables.

According to World Bank (2018) data, the highest value of personal (international) remittances over the four decades was \$24.3 billion in 2018. Figure 1 shows the ten-year average remittance between 1977 and 2018. It indicates an upward trend in annual remittances over the years. There have been increases in both the number of Nigerians travelling abroad and the in-flow of remittances. Figure 1 also shows that in the years before the Structural Adjustment Programme (SAP), such as 1986, in which the economy was still strong, the international remittance in-flow was lower compared to the SAP and post-SAP era. This indicates the exodus of more Nigerians moving out of the country for 'greener pastures', to more stolid economies.

Between 1977 and 1986, the maximum and minimum annual international remittances were \$21.9 million, and \$3.1 million, in 1980 and 1978, respectively. From 1987 to 1996, the maximum and minimum annual international remittances were \$793 million, and \$2 million, in 1993 and 1988 respectively, the latter being the lowest international remittance in the past 41 years. There have been increasing values of personal remittances into Nigeria. The lowest value of international

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<sup>1</sup> Remittances find their way back to developed economies via excessive importation through income received but not earned.

<sup>2</sup> Estimates by PricewaterhouseCoopers (PwC).

remittances between 1997 and 2006 was \$448 million, and the maximum under the same period was \$16.9 billion in 2006. Furthermore, between 2007 and 2016, the maximum and minimum annual international remittances were \$21.1 billion, and \$18 billion, in 2015 and 2007, respectively (World Bank, 2018).

International remittances by Nigerians living in diaspora into Nigeria have been increasing. According to the National Bureau of Statistics (NBS), an estimated \$96.5 billion was the remittance directed into the country between 2013 and 2018. Apparently, international remittances would have increased as a result of more Nigerians seeking to leave the country, yet the current global pandemic could lead to a reduction in the number of Nigerians able to travel overseas, as there would be limited opportunities across the globe. Besides, due to possibility of some Nigerians overseas being laid off from their jobs, international remittances may fall. This will temporarily affect the domestic economic situation depending on how the policies initiated after the pandemic will influence economic activities.

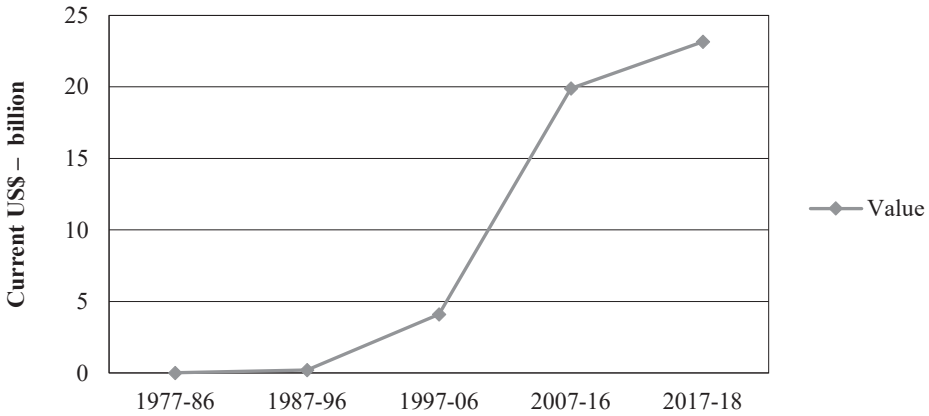


Fig. 1. Annual personal remittances in-flow (Nigeria)

Source: authors' elaboration based on (World Bank, 2018).

Any fall in international remittance will affect the total money in circulation. International remittances into Nigeria were 4.3% and 5.7% of GDP in 2013 and 2018, respectively. The fall in oil revenue as a result of fluctuating oil prices is likely to bring a decrease in foreign direct investment and loan availability. The relationship between imports and GDP per capita in Nigeria is illustrated in Figure 2. Interestingly, the two variables move in the same direction with varying degrees of fluctuations. The fact that imports of goods and services as a percentage of GDP exceeds GDP per capita indicates that there are other sources of income to maintain the high propensity to import. International remittances are a veritable source of augmenting households' income. However, a closer look at Figure 2 shows that

import demand has been falling as a result of income per capita decreasing, especially during the period of recession in the economy.

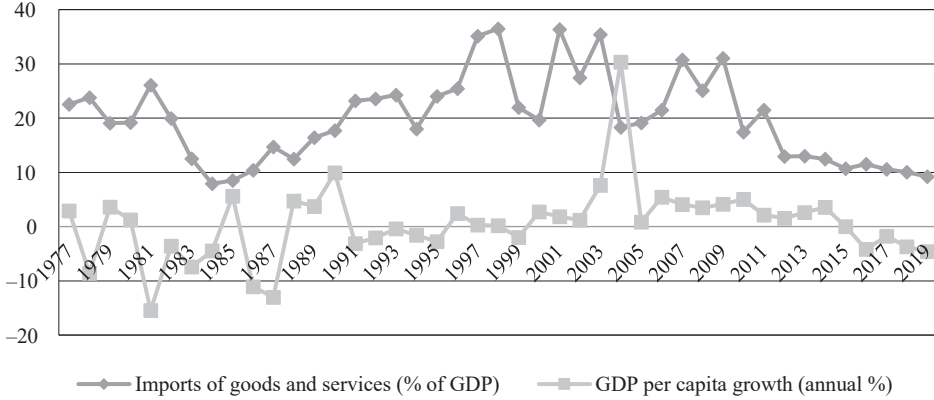


Fig. 2. Relationship between imports and GDP per capita (Nigeria)

Source: authors' elaboration based on (World Bank, 2018).

In a bid to understand the direction of Nigerians' import demand, the proportion of food imports was determined. Figure 3 depicts food imports as a percentage of merchandise imports. This follows a similar trend with total imports of goods and services, and reveals that an increase in per capita income also leads to changes in food imports. This indicates the high level of food imports, and reflects low agricultural productivity and the increased demand for imported food.



Fig. 3. Nigeria's food imports

Source: authors' elaboration based on (World Bank, 2018).

The global COVID-19 pandemic's first case in Nigeria was recorded in Lagos State in late February 2020. By the end of March, the number of cases had increased to 131 with a daily occurrence of 20 and spread to 12 states, including the Federal Capital Territory (FCT), Abuja. By the end of April the number of confirmed cases was 1,932 with daily occurrences of 204 in 35 states of the Federation. By June it was 25,694 with a daily occurrence of 569 in all states of the Federation. Two months later, at the end of August, it was 53,865 with daily infections at 136. This suggests the epidemic peaked by the end of August, thus necessitating lifting of the lockdown imposed since the end of March in Nigeria and also on global trade.

There is a clear tendency for personal remittances into Africa to fall as a result of the economic consequences of the outbreak of COVID-19. Ratha et al. (2020) projected that by end of 2020 international remittances to developing countries, Nigeria included, will decrease by \$109 billion. This represents about a quarter of the previous values of \$554 billion in 2019, but since demand for remittances inflow is likely to be higher than its supply, depreciation of domestic currencies of a number of remittance dependent economies may occur. This will further increase the demand for remittance inflow due to the increase in the expected exchange rate. The impact of the pandemic is global, thus the economic effects will not be restricted to a particular country or region. This trend will continue until the global economic begins to pick up again.

Many developing countries operate a deficit budget, which implies that countries borrow to augment the limited internally generated income for spending. While international financial organisations are a ready point of call, the borrowing comes with strings of conditions attached. Thus, for many developing economies, international remittances are veritable sources of income to support the domestic economy. Since these remittances are transferred funds by migrants into their home countries, it provides income for recipients in the home country and boosts the level of economic activities. Spending on food, clothing, payment of schools and other private expenditure has increased.

Ordinarily, this should impact on the domestic economy by spurring on the production of goods and services in demand. However, the reverse is usually the case for two reasons. First, the marginal propensity to import is high in many developing countries, especially in Nigeria, where locally produced goods are not appreciated due to lack of trust in the quality of the goods. The high cost of production makes the selling prices of domestically produced goods and services expensive relative to imported goods. Remittances often find their way back to the foreign countries due to spending of remittances on the importation of goods and services favoured by non-poor urban households (Andam, Oboh, Pauw and Thurlow, 2020). Second, recipients use these incomes not on investment which directly stimulates economic development, but on purchasing consumer goods.

However, as much as the inflow of foreign currency can help reduce the balance of payments deficit of the recipient country, huge inflows in foreign currency can

lead to an appreciation of the domestic currency (Urama, Edeh, and Urama, 2019). The macroeconomic effects work in two ways. First, the exports by the home country become more expensive and less price competitive in the international market. Second, since the value of the domestic currency is higher now, imports' consumption will begin to rise (Rehman, Khan, Hayat, and Balli, 2020).

Furthermore, the marginal propensity to import in Nigeria is high as it is in many less developed countries (Boddin, Raff, and Trofimenko, 2017). This is evident in the trade deficit in the country. The increasing trade deficit affects domestic investment negatively. Many African countries are import-oriented in spending. In estimating GDP the trade balance is often negative. It follows that, if imports have been induced previously through remittance inflows, the magnitude of its impact as an aftermath of COVID-19 would be high and requires urgent and decisive policy to alleviate the internal burden on the citizens.

According to Khurshid, Kedong, Calin, Meng and Nazir (2018), both remittances and imports are influenced by exchange rates. It will be expected that a rise in the exchange rate will reduce imports, but at the same time increase the demand for remittances.

The questions that arise from the above include: what is the relationship between migrant remittance and imports to Nigeria in the past four decades? To what extent will the exchange rate affect the trend and direction of both variables? The objectives of this study therefore are, firstly, to examine the relationship between international remittances and imports, and secondly, to determine the role of the exchange rate in increasing or decreasing remittance inflows and import spending in Nigeria. An empirical investigation of the nexus of international remittances and import expenditure is germane to the understanding of the attendant impacts of the consequences of the protracted lockdown brought by the Covid-19 pandemic.

The rest of the paper is organised as follows: Section 2 focuses on a review of the literature. The theoretical framework and methodology, as well as data issues, are presented in Section 3. Section 4 focuses on an analysis, presentation and interpretation of the results. The concluding section provides the summary and policy implications of the study.

## **2. A Review of the literature**

### **Theoretical literature**

In the view of Hagen-Zanker (2008), neoclassical migration theory posits that migration occurs as a result of geographical differences in the supply and demand of labour. An example of this is the basic model by Lewis (1954), the main thrust of which is that with a perfect market and excess supply of labour in the rural agricultural sector, migration occurs with the movement of workers to the modern manufacturing sector located in urban areas. This can be extended to the case of labour moving from less developed countries to developed countries for higher wages.

Todaro (1969), and Harris and Todaro (1970) extended this model to account for the significant unemployment in urban areas experienced in less developed countries. The main improvement of this model (Harris-Todaro) is the argument that migration will take place as long as the expected real income differential between the migrant source and the migrant destination is positive.

In the 1980s there were efforts to provide a more robust framework to explain the increasing phenomena of international migration and the significant remittances to the home countries arising from this. The Harris-Todaro model proved inadequate in many respects. Stack and Bloom (1985) introduced a more encompassing theoretical model that presents migration as a decision being made in the context of a household. Furthermore, Taylor (1999), explained how migration in the view of this model could be growth or development-promoting to the source country and also how it could be detrimental to growth and development. The Stark and Bloom (1985) model, which is usually referred to as the New Economics of Labour Migration (NELM), posits that migration and the remittances resulting from it could be development-promoting. The argument for this is that decisions to migrate are part of family strategies to raise income and mitigate income and production risks. Additionally, the remittances or the potential for them go help relax the constraints on production and investment in migrant home countries.

On the contrary however, migration could inhibit growth and development if it drains the migrant-exporting countries of their skilled labour and capital, as well as stifle domestic production of tradable goods. This supports the Dutch-Disease hypothesis operating via exchange rate appreciation (see Khurshid et al., 2018 among others). Many empirical studies have used this model as a theoretical foundation for their studies (see de Haas, 2006; Mannan and Federicks, 2015).

## **Empirical literature**

A number of studies at both the micro and macro levels have examined the relationships between international remittances and imports for a number of countries over the years. Remittance has existed as far back as the 18<sup>th</sup> century, when the British were very much involved in slave trading. Morgan (2011) investigated how the British merchants were able to manage and consolidate the slave trade in the 18<sup>th</sup> century. Specifically, the study shows that the international remittance procedures adopted by the merchants for slave sales helped in debt payment and profit accumulation. Although these international remittances are for the merchants' home-countries, it provided a veritable means of credit protection and the bases for ensuring profits from international trade and the expansion of economic activity in the home country.

The positive international remittances-growth relationship has been emphasised in the literature. This is evident in: increased foreign exchange earnings by the host countries; reduction in poverty for families being supported by international remittances and increased economic activities (Adams and Page, 2003; World Bank, 2006; Yang, 2008 and Nwaogu and Ryan, 2015). Bettin and Zazzaro (2012) posited



that countries with a strong financial system showed the positive and significant effect of remittances on economic growth.

Jawaid (2014) argued that imports and exports have a positive influence on economic growth. Furthermore, a study on the international remittance-growth relationship for the Fiji Islands showed that international remittances impact positively on growth. However, there was a decreasing effect when the level of financial development was incorporated in the model (Chen and Jayaraman, 2016). Another study that confirmed the positive and significant effects of remittance on economic growth is by Eggoh, Bangake and Semedo (2019) who sought to determine whether international remittances encourage economic growth. They used panel smooth transition difference and a system-generalized method of moments in their study which covered 39 developing countries. In the same vein, Rehman et al. (2020) confirmed for Pakistan that the positive shock of migrant workers remittance stimulates real growth of the economy. They developed and estimated a small open economy dynamic stochastic general equilibrium model for the purposes of their study. Another publication that reported positive results on remittance and economic growth relationship was by Meyer and Shera (2016), who focused on six high remittance receiving countries of Albania, Bulgaria, Macedonia, Moldova, Romania and Bosnia-Herzegovina for the period 1999-2013. Panel data analysis was used for the study.

However, international remittances could also have a negative impact on economic growth. The following reported negative and significant effects of remittance on economic growth: Guha (2013) and Khurshid et al. (2018). Khurshid et al. (2018) covered 58 countries from low, lower middle and middle-income groups. The panel approach was adopted and the results confirm the operation of the Dutch-Disease phenomenon for all the countries groupings. This was also the case for Guha (2013), who focused on developing countries. Barajas, Chami, Fullenkamp, Gapen, and Montiel (2009) found that international remittance inflow does not affect economic growth.

The experience of Nigeria regarding the impact of remittance on GDP is largely negative as the following studies show: Raimi and Ogunjirin (2012), Urama, Edeh and Urama (2019), Anetor (2019). They used robust econometric approaches and provided consistent evidence that remittance ultimately exerted a negative effect on aggregate output via the exchange-rate appreciation as argued by the Dutch-Disease hypothesis.

The next group of literature reviewed include those that reported on the relationship between remittance and import spending in less developed countries. These include research by Khan et al. (2007), Hussain and Yan (2019), Hien (2017), Siddiqui and Kemal (2006), Glytsos (2005), Blouchoutzi and Nikas (2010), and Tung (2018).

Khan et al. (2007) examined the role of international remittances as a determinant of the import function in Pakistan. The study provided empirical evidence to support



increased imports arising from international remittances by Pakistanis living abroad. The export of labour export leads to both an increase in international remittances and import demand. The economy benefits more from international remittance revenue when it stimulates local production arising from increased demand for local goods and services.

A similar study in Pakistan, by Hussain and Yan (2019) investigated the impact of international remittances on import demand with an emphasis on the role of the population. A time series data for forty years was employed and the result indicated the positive and significant impact of population growth and international remittances on the demand for imports. Furthermore, the study provides empirical evidence that import volumes were reduced by 10 percent through the real exchange rate shocks. By extension, exports are similarly affected both in the short and long term by 2% and 5%, respectively.

More on the single country analysis is found in the study carried out by Hien (2017) on the impact of international remittance on Malaysia's trade balance for a period of twenty-five years ranging from 1990 to 2015 using the Ordinary Least Squares (OLS) regression analysis. International remittances inflow to Malaysia, even though small, has a positive influence on trade balance.

Trade liberalisation and its impact on international remittances were explored by Siddiqui and Kemal (2006). Focusing on urban and rural households of Pakistan with a CGE framework, they found that a negative impact of trade liberalisation exists on the inflow of international remittances over time in Pakistan. While there is a reduction in welfare in rural households, there is improved welfare and poverty reduction in all the compared urban areas. The authors concluded that the liberalisation of trade in Pakistan is an important factor for consideration in poverty reduction strategies in the country.

A study by Glytsos (2005) analysed how external shocks on international remittances impacted on demand among other selected economic variables in five Mediterranean countries. The study focused on how international remittances as an exogenous variable affect demand. The results from the least square technique showed that increased international remittances influence output, imports and development generally. This suggests the need for measures in maximizing this external revenue. The study by Okodua and Olayiwola (2013) empirically lends credence to international remittance boomerang effects<sup>3</sup> in sub-Saharan Africa.

Among the few studies that analyse the relationship between exports, imports, GDP and international remittance in Nigeria is that by Olubiyi (2014), who explored the causality effect among the variables using the Vector Error Correction Mechanism (VECM) for the period 1980 to 2012. The results showed the remittance Granger-cause GDP but does not Granger-cause import spending in Nigeria.

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<sup>3</sup> Induced rise in commodity import and deficits in trade balances arising from remittances.

Two things are clear from the extant literature reviewed. First, the literature provides mixed evidence on the relationship between international remittance as an external factor and import induced spending in the countries considered. Second, there is limited up-to-date empirical evidence from Nigeria which has a huge international remittance inflow to the country and perhaps, the possible magnitude of the effects that a fall in international remittance in light of COVID-19 could occasion. Thus this became the impetus to undertake this empirical study to ascertain the international remittances-import demand nexus for Nigeria.

### 3. Theoretical framework and methodology

This study is linked to the theory of labour migration which views migration as market failure induced. In other words, the labour market disequilibrium in the home country necessitated the migration of a fraction of the population to relocate to regions where their skills could be better rewarded. This explains where transfers in the form of international remittances arises (Stark and Bloom, 1985). Economic growth was equally included to examine if the increasing propensity to import in Nigeria is either national income induced or via international remittances. The inclusion of the real exchange rate is to indicate and reflect the purchasing power parity or real price. The data sourced from the World Bank (World Development indicators) has observations from 1977 to 2019. The interactive relationship between the variables is as specified in equation (1).

$$\text{Imp}pse_{(t)} = F(\text{mirei}_{(t)}, \text{reefe}_{(t)}, \text{gdpca}_{(t)}). \quad (1)$$

Where *Impse* is the import of goods and service; *mirei* is migrants' remittance inflow; *reefe* is the real effective exchange rate and economic growth proxy by GDP per capita is represented by *gdpca*. The subscript 't' indicates the time dimension. The model specification in econometric format as estimated is stated in equation (2). All variables remain as earlier defined except the inclusion of the white noise represented as  $w_t$

$$\text{Imp}pse_{(t)} = \beta_0 + \beta_1 \text{mirei}_{(t)} + \beta_2 \text{reefe}_{(t)} + \beta_3 \text{gdpca}_{(t)} + \omega_t. \quad (2)$$

In equation (2), import of goods and services is the endogenous variable measured as a percentage of GDP. Migrant remittance inflows and GDP per capita are measured in millions of US dollars. The real effective exchange rate remains an index with 2010 as the base year. The a-priori knowledge of the exogenous variables in relation to the import of goods and services which is the dependent variable; *mirei* (+/-) represents international remittances inflow as share of GDP, *reefe* (+/-) denotes the country's competitiveness in the global market, and *gdpca* (+/-) represents national income.  $\beta_1$ , 2 and 3 are the parameters to be estimated and  $w_t$  stands for the errors as earlier stated. The main independent variables are international remittance

inflows and per capita income. The country’s competitiveness in the global market is a control variable.

To ensure consistencies in coefficient estimated, as suggested by Gujarati and Porter (2009), the series are often expected to be stationary. Therefore the necessary preliminary tests were conducted. To check the stationarity properties of the variables of interest, the Augmented Dickey-Fuller (ADF) and Phillip Perron Unit-root tests were employed for checking any non-stationarity. Furthermore, other analysis conducted on the basis of the order of integrations of the variables include the Johansen test for cointegration in the long run. The model was estimated using the Ordinary Least Squares (OLS) technique with the VAR-in-First Differences specification as stated in equation 3<sup>4</sup>.

$$\begin{aligned}
 \Delta mpse_{(t)} &= \beta_0 + \sum_{i=1}^k \beta_{1i} \Delta mpse_{t-i} + \sum_{i=1}^k \beta_{2i} \Delta mirei_{t-i} + \sum_{i=1}^k \beta_{3i} \Delta reefe_{t-i} + \\
 &\quad \sum_{i=1}^k \beta_4 \Delta gdpca_{t-i} + \omega_{1t} \\
 \Delta mirei_{(t)} &= \delta_0 + \sum_{i=1}^k \delta_{1i} \Delta mpse_{t-i} + \sum_{i=1}^k \delta_{2i} \Delta mirei_{t-i} + \sum_{i=1}^k \delta_{3i} \Delta reefe_{t-i} + \\
 &\quad \sum_{i=1}^k \delta_4 \Delta gdpca_{t-i} + \omega_{2t} \\
 \Delta reefe_{(t)} &= \phi_0 + \sum_{i=1}^k \phi_{1i} \Delta mpse_{t-i} + \sum_{i=1}^k \phi_{2i} \Delta mirei_{t-i} + \sum_{i=1}^k \phi_{3i} \Delta reefe_{t-i} + \\
 &\quad \sum_{i=1}^k \phi_4 \Delta gdpca_{t-i} + \omega_{3t} \\
 \Delta gdpca_{(t)} &= \gamma_0 + \sum_{i=1}^k \gamma_{1i} \Delta mpse_{t-i} + \sum_{i=1}^k \gamma_{2i} \Delta mirei_{t-i} + \sum_{i=1}^k \gamma_{3i} \Delta reefe_{t-i} + \\
 &\quad \sum_{i=1}^k \gamma_4 \Delta gdpca_{t-i} + \omega_{4t}.
 \end{aligned}
 \tag{3}$$

Where *k* denotes the optimal lag length which is determined by the Akaike information criterion (AIC) and the Schwarz information criterion (SIC) information criteria.

### 4. Results and discussion

The estimation procedures were divided into three separate sub-sections. The first one, the pre-estimation, includes a discussion on the data employed, e.g. a graphic and descriptive analysis of data. A formal pre-test of the unit root and cointegration

<sup>4</sup> Based on the Johansen co-Integration test.

tests were conducted. In sub-sections 2 and 3, the estimation and post-estimation results were discussed, respectively.

### 4.1. Data and preliminary analysis

This study covers four variables, namely the import of goods and services, international remittance inflows, the exchange rate, and the Gross Domestic Product (GDP) in the Nigerian economy. The variables were sourced from the World Bank data.

The graphic representations of the main series are as shown in Figures 4, 5 and 6. This indicates that the series were moving with varied speed and in different directions over time.

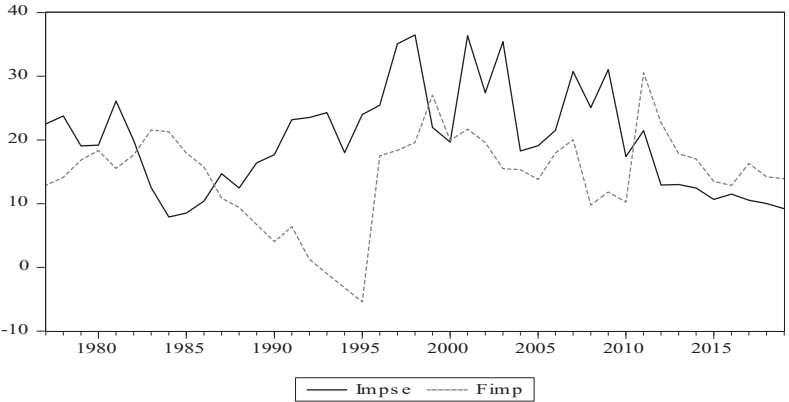


Fig. 4. Total imports versus food imports

Source: authors' computation, 2020.

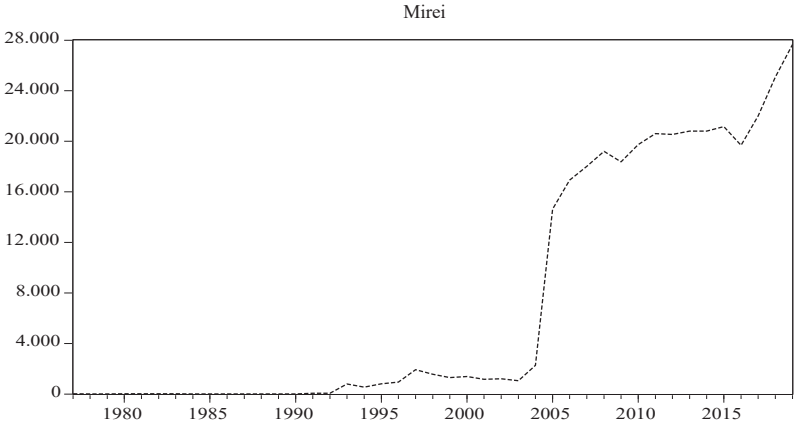
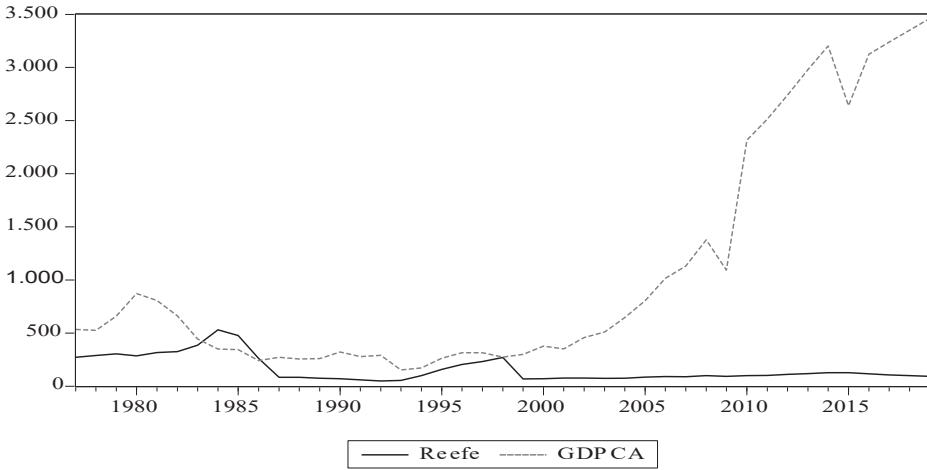


Fig. 5. Migrant remittance

Source: authors' computation, 2020.



**Fig. 6.** Real exchange rate and GDP per capita

Source: authors’ computation, 2020.

Table 1 shows the descriptive results. It summarizes the main statistical features of the data which include, mean, median, the minimum and maximum values, standard deviation, data skewness, kurtosis and the Jarque-Bera test for the data. The results indicate a significant variation in the data as indicated by the large difference between the minimum and maximum values especially for the GDP and the migrant remittances. This shows the range of values in the data set.

**Table 1.** Descriptive statistics of trade imports and selected exogenous variables

	Log(IMPSE)	Log(MIREI)	Log(REEFE)	Log(PGDP)	Log(FIMP)
Mean	19.92	7453.44	159.98	1075.25	14.37
Median	19.19	1170.00	100.00	525.48	15.54
Maximum	36.48	27655.05	531.2015	3462.641	30.56138
Minimum	7.903	2.424	48.96	153.07	-5.43
Std. Dev.	7.93	9733.84	119.16	1096.98	7.40
Skewness	0.45	0.73	1.44	1.16	-0.74
Kurtosis	2.45	1.72	4.30	2.70	3.79
Jarque-Bera	2.01 (0.36)	6.79(0.03)	17.95(0.00)	9.85(0.00)	5.12(0.07)
Observation	43	43	43	43	43

Source: authors’ computation, 2020.

The results of the skewness of the data series indicate an asymmetric distribution for the variables. The result of the Kurtosis statistic equally shows that the variables

are leptokurtic. The Jarque-Bera (JB) test and the Lagrange multiplier tests for normality, the null hypothesis shows that the series are not normally distributed, except for the import of goods and services since the JB P-value is greater than 0.05. Based on the Jarque-Bera statistics results and using the P-values, the normality test varied. This suggests that if the goodness-of-fit test deviates from normality which is one of the assumptions, the data are normally distributed and as such reliable.

### The formal pre-tests (unit root test) of endogenous and exogenous variables

The unit root tests examined are the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP). The null hypothesis for ADF and PP suggests that the series are not stationary at levels or has unit root. Table 2 shows the ADF and PP unit-root tests results. Both the ADF and PP unit-root tests applied were three sets, being constant, constant with time trend and none. The results showed that the selected variables were non-stationary at all levels. However, the variables were stationary in first difference, therefore the order of integration is  $I(1)$  for all variables and it was not greater than one. This implies that the means of the variables does not change with time, thus increasing the predictability of the economic variables.

**Table 2.** Unit root and stationarity tests of trade imports and international remittances

Panel A: Unit Root Tests							<i>I(d)</i>
Variable: IMPSE							
	Level			Difference			
	Constant	Constant & Trend	None	Constant	Constant & Trend	None	
ADF	-2.733	-2.729	-1.046	-8.880*	-4.505*	-8.958*	I(1)
PP	-2.615	-2.603	-1.105	-15.085*	-17.295*	-13.241*	I(1)
Variable: MIREI							
ADF	0.762	-1.406	1.563	-4.868*	-5.110*	-4.519*	I(1)
PP	0.563	-1.406	1.844	-4.868*	-5.110*	-4.516*	I(1)
Variable: REEFE							
ADF	-2.657	-3.247	-1.803	-4.482*	-4.432*	-4.517*	I(1)
PP	-2.015	-2.466	-1.459	-4.623*	-4.703*	-4.449*	I(1)
Variable: GDPCA							
ADF	0.898	-0.993	1.925	-7.195*	-8.111*	-6.673*	I(1)
PP	1.129	-0.003	2.245	-7.144*	-8.111*	-6.777*	I(1)

Note: \*, \*\* and \*\*\* implies significance at 1%, 5% and 10% respectively. Na implies Not applicable. ADF & PP are Augmented Dickey-Fuller and Phillips-Perron tests respectively.

Source: authors' computation, 2020.

**Co-integration test of international remittances and trade imports in Nigeria**

The Johansen co-integration test was employed. The Johansen co-integration test uses the trace statistic and the maximum eigenvalue criteria, being generated with the maximum likelihood technique. Theoretically, the null hypothesis stipulates that there is no form of co-integration among the series under consideration. A rejection of the null hypothesis will imply that co-integration exists, thus there is long-run relationship between international remittances and trade imports. If not, it can be concluded that there is no long-run relationship between the dependant and independent variables considered in the study. As indicated in Tables 3 and 4, both the trace and eigen statistics show that there is a long-term relationship among the variables in the model. The null hypothesis was not rejected at the 0.05 level of significance. This implies that the variables in the model affect each other in the long run.

**Table 3.** Co-integration test results of trade imports and international remittances

3A: Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.330425	43.31139	47.85613	0.1252
At most 1	0.302106	26.86579	29.79707	0.1050
At most 2	0.255784	12.11857	15.49471	0.1513
At most 3	0.000151	0.006212	3.841466	0.9366
Trace test indicates no cointegration at the 0.05 level. * Denotes rejection of the hypothesis at the 0.05 level. ** MacKinnon-Haug-Michelis (1999) <i>p</i> -values.				
3B: Unrestricted Co-integration Rank Test (Maximum Eigen value)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.330425	16.44560	27.58434	0.6277
At most 1	0.302106	14.74722	21.13162	0.3070
At most 2	0.255784	12.11236	14.26460	0.1065
At most 3	0.000151	0.006212	3.841466	0.9366
Max-eigenvalue test indicates no cointegration at the 0.05 level. * Denotes rejection of the hypothesis at the 0.05 level. ** MacKinnon-Haug-Michelis (1999) <i>p</i> -values.				

Trend assumption: Linear deterministic trend (Constant without Trend).

Source: authors' computation, 2020.

The upper panel, (3A) is for  $\lambda$ -Trace statistic and the lower panel (3B) is for  $\lambda$ -Max-Eigen statistic. Panel 3A shows that Trace Statistics (43.31) does not



exceed its critical value of 47.85 at 5% level of significance. Thus the null hypothesis of no co-integration equations is not rejected. Again, at  $r = 1$ , the  $\lambda$ -trace value of 26.86 is also less than its critical value of 29.79 at 5% level which implies that the null hypothesis that there is no co-integration equations was not rejected. The Johansen test based on  $\lambda$ -trace statistics suggest that there is a co-integration relationships among the variables considered. A similar result was equally obtained for the  $\lambda$ -max at panel 3B. It follows that  $\lambda$ -trace test and the  $\lambda$ -max test suggest that there is no co-integration relationship among the variables. Since this is evidence that there is no co-integration, it means there is no long-term relationship among the series. Furthermore, it can be deduced that there would likely not be a long-run convergence if there is any shock to the system. It is only a short-term model that is feasible. A VAR model is therefore estimated.

**Estimation of international remittances and trade imports data**

This section is divided into two parts: first is the model specification, and second, the estimation and results. Since the series are integrated of the same order, and they are not co-integrated, VAR-in-First Differences were estimated.

**Vector Autoregressive Models (VAR)**

This model is considered because the series are non-stationary, i.e. they are I(1) series and were not co-integrated based on the Johansen co-integration test reported previously.

**Table 4.** Vector autoregression estimates of trade imports and international remittances in Nigeria

	D(IMPSE)	D(MIREI)	D(REEFE)	D(GDPCA)
1	2	3	4	5
D(IMPSE(-1))	-0.292777	-89.24421	-1.673262	-1.991774
	(0.17665)	(57.7975)	(1.71332)	(7.31507)
	[-1.65739]	[-1.54408]	[-0.97662]	[-0.27228]
D(IMPSE(-2))	-0.001024	28.82755	-0.933642	-7.799318
	(0.18082)	(59.1605)	(1.75372)	(7.48757)
	[-0.00566]	[ 0.48728]	[-0.53238]	[-1.04163]
D(MIREI(-1))	0.000361	0.236031	-0.000197	-0.004379
	(0.00057)	(0.18533)	(0.00549)	(0.02346)
	[ 0.63818]	[ 1.27359]	[-0.03594]	[-0.18671]
D(MIREI(-2))	0.000586	0.008700	0.000146	0.013699
	(0.00054)	(0.17724)	(0.00525)	(0.02243)
	[ 1.08182]	[ 0.04909]	[ 0.02774]	[ 0.61069]

1	2	3	4	5
D(REEFE(-1))	0.006006	0.900555	0.406032	-0.221878
	(0.01758)	(5.75065)	(0.17047)	(0.72782)
	[ 0.34172]	[ 0.15660]	[ 2.38185]	[-0.30485]
D(REEFE(-2))	-0.025160	-0.221136	-0.277358	0.195441
	(0.01751)	(5.72818)	(0.16980)	(0.72498)
	[-1.43712]	[-0.03860]	[-1.63341]	[ 0.26958]
D(GDPCA(-1))	0.003007	0.535965	-0.004191	-0.114389
	(0.00440)	(1.43820)	(0.04263)	(0.18202)
	[ 0.68406]	[ 0.37266]	[-0.09831]	[-0.62843]
D(GDPCA(-2))	-0.004423	0.465839	0.021737	0.122294
	(0.00445)	(1.45645)	(0.04317)	(0.18433)
	[-0.99361]	[ 0.31984]	[ 0.50348]	[ 0.66344]
C	-0.885421	450.3869	-6.529915	61.85048
	(1.17116)	(383.189)	(11.3590)	(48.4979)
	[-0.75602]	[ 1.17536]	[-0.57486]	[ 1.27532]

Note: 1. Sample (adjusted): 1980 2019. 2. Included observations: 40 after adjustments. 3. Standard errors in ( ) & *t*-statistics.

Source: authors' computation, 2020.

The result of the VAR model presented above enables the estimation of test for causality and computation of Variance Decomposition and Impulse Response Functions. To verify that the estimates reliability of the estimated multivariate model are reliable, diagnostic checks or a post-estimation test are necessary. One of the relevant post-estimation tests for multivariate models is the serial correlation test. The LM test for serial correlation has a null hypothesis that there is no serial correlation.

The results presented in Table 5 suggest that there is no serial correlation among the variables. The joint test for the presence of heteroskedasticity statistics does not indicate the rejection of the null hypothesis of homoskedasticity as shown in Table 5 (lower panel 5B).

In Table 6 the Granger causality test is presented. The Wald test which is chi-square distributed was used to test for Granger non-causality. This test indicated if the variables Granger-cause each other. Three feasible results are: unidirectional causality, bidirectional causality and non-causality where none of the groups is statistically significant. The multivariate model shows non-causality among the variables. The probabilities for all the variables are not statistically significant.

**Table 5.** Diagnostic checks of VAR analysis trade imports and international remittances in Nigeria

5A: VAR Residual Serial Correlation LM Tests		
Lags	LM-Stat	Prob
1	15.83239	0.4647
2	18.09522	0.3184
3	20.56747	0.1957
5B: VAR Residual Heteroskedasticity Tests: No Cross Terms (only levels and squares)		
Joint test:		
Chi-sq	Df	Prob.
173.8957	160	0.2141

Note: 1. Null Hypothesis: no serial correlation. 2. Included observations: 40. 3. Probs from chi-square with 16 df.

Source: authors' computation, 2020.

**Table 6.** VAR Granger causality/block exogeneity Wald tests of trade imports and international remittances

Dependent Variable:	Excluded	Chi-sq	Df	Prob.
D(IMPSE)	D(MIREI)	1.964792	2	0.3744
	D(REEFE)	2.083395	2	0.3529
	D(GDPCA)	1.614219	2	0.4461
	All	5.603691	6	0.4690
D(MIREI)	D(IMPSE)	3.432267	2	0.1798
	D(REEFE)	0.024698	2	0.9877
	D(GDPCA)	0.218732	2	0.8964
	All	4.305404	6	0.6354
D(REEFE)	D(IMPSE)	1.010348	2	0.6034
	D(MIREI)	0.001712	2	0.9991
	D(GDPCA)	0.276457	2	0.8709
	All	1.284193	6	0.9725
D(GDPCA)	D(IMPSE)	1.088323	2	0.5803
	D(MIREI)	0.376175	2	0.8285
	D(REEFE)	0.125325	2	0.9393
	All	1.457379	6	0.9623

Source: authors' computation, 2020.

Thus the null hypothesis is not rejected, which implies non-rejection of Granger non-causality. Put differently, the alternative hypothesis that there is Granger causality is rejected. The Granger causality test results are in line with the prior

expectation that, if there is co-integration, there will be Granger causality and vice-versa. It was reported earlier that there is no co-integration among the variables and no long-term relationships exist. This cross-checks or validates the causality results, in other words, since none of the groups are statistically significant, it implies no causality. If there is a long-term relationship, it must also be reflected in the causality results. This result is in line with the findings of Olubiyi (2014) on Nigeria, however it differs from Blouchoutzi and Nikas (2010) and Tung (2018) who find a positive and significant relation in the Balkan countries and in the Asia-Pacific region, respectively. This may not be unconnected with the nature of the Nigerian economy which is monocultural.

The results of the Variance Decomposition and Impulse Response functions are shown in Figure 7 and 8, respectively. Variance decomposition provides the means of determining the extent of the variability in the dependent variable when lagged by its own variance, it also indicates which of the independent variables best explain the variability in the endogenous variables over time. This further helps in the interpretation of the previously estimated or fitted VAR. Figure 7 shows the proportion of variation of the endogenous variable explained by each of the exogenous variables.

In the main, the past periods of each of the variables exhibit a strong endogeneity. It is only migrant's remittances and GDP per capita that show a weakly endogenous relationship. This implies that there is an influence of both variables on the import demand, but only weak. Other variables indicate a strong endogeneity, a minimal or no influence with the dependent variable. In relation to the VAR results, migrants' remittances accounted for 28.8% of the variation in imports in the second period. This implies that there are other factors that induce imports other than remittances. It follows that any fall in remittances as a consequence of COVID-19, may not reduce significantly demand for imports.

The impulse response plots shown in Figure 8 represent the response of a variable given an impulse in another variable. The impulse-response of the import of goods and services (Impse) to the import of goods and services depicts an initial shock which made the Impse to fall, decline to zero and fall below zero before a sharp reversal. The response of migrant remittances (MIREI) declines over time in the plot. This implies that, as time passes, the effects of a shock on Impse today decay to zero.

Similarly, a one standard deviation shock (MREI) will have a negative impact on Impse in the first period, but rises from the second period to a steady state. It fluctuates over time before falling to zero in the seventh period. Migrant remittance has a positive shock on its self, but falls over time before levelling off at the steady state to the tenth year. This suggests that remittances tend to be stable and not affected by the exchange rate in terms of inflows. The impact of the variables on itself follows the same pattern of an initial noticeable falling positive impact before the constant decline at a steady state.

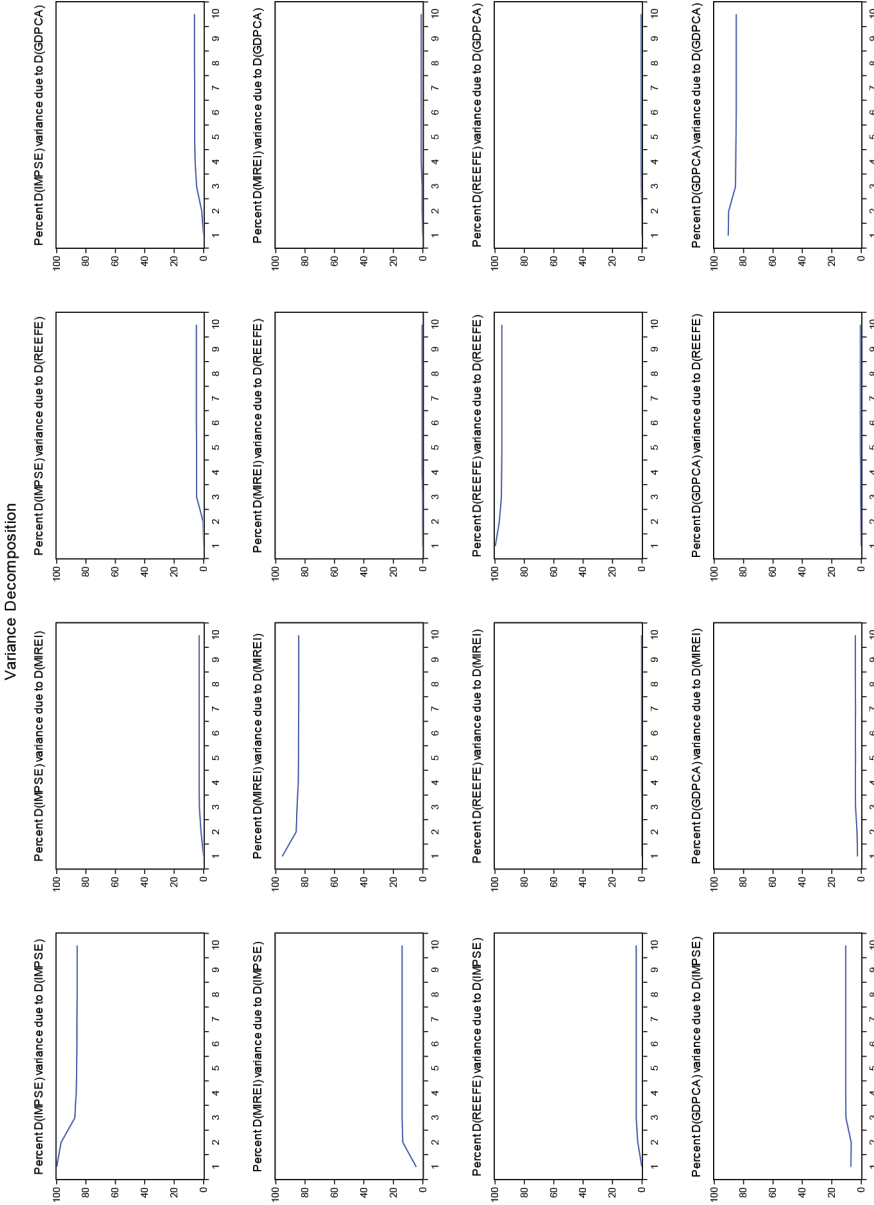
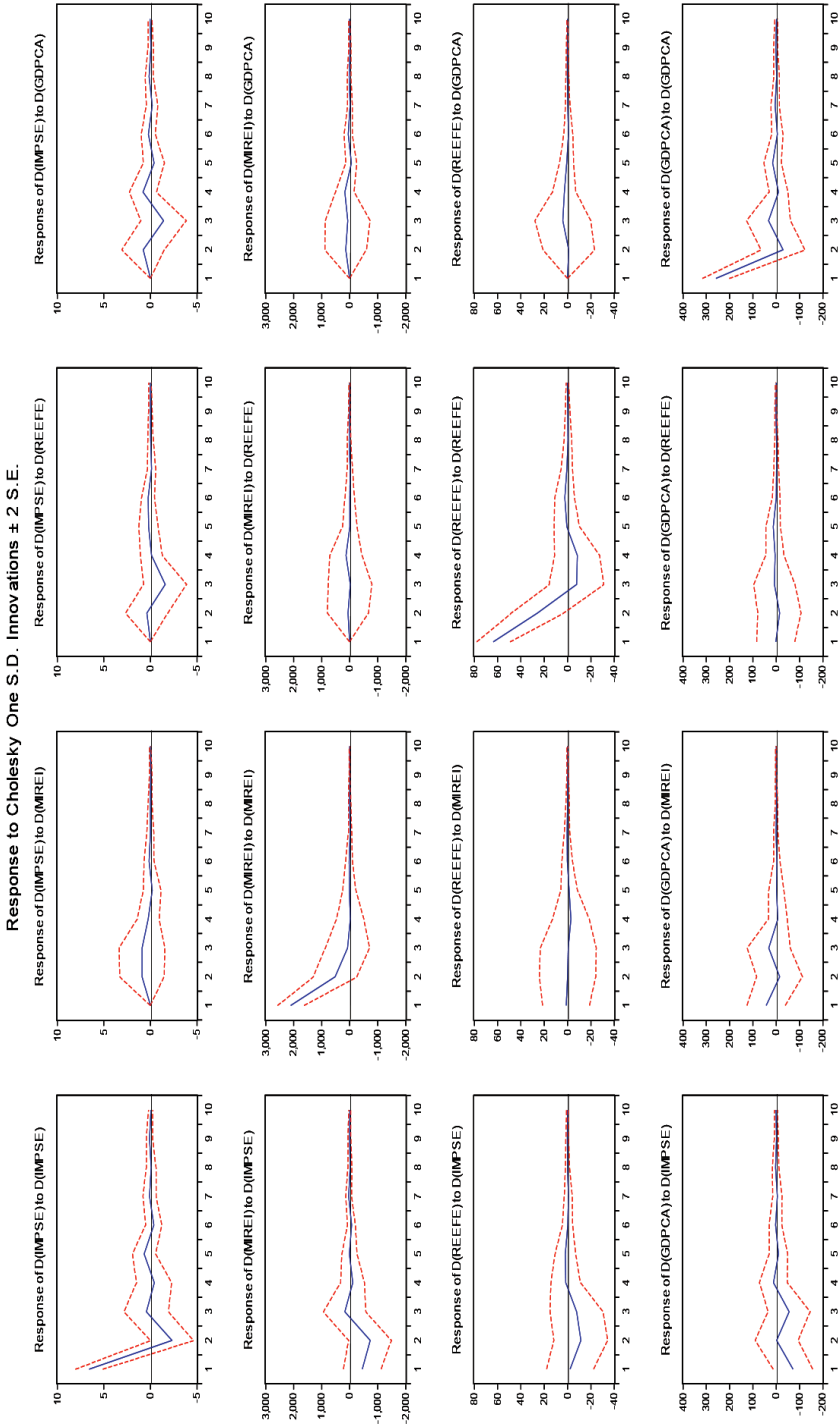


Fig. 7. Variance decomposition  
Source: authors' computation, 2020.



**Fig. 8.** Impulse response plots  
Source: authors' computation, 2020.

The exchange rate and GDP per capita both show a different pattern to the import of goods and services – a shock to the import of goods and services causes the exchange rate and GDP per capita to go down in the immediate future, but the effect of such a shock by the fourth year actually means reverting to zero.

## 5. Conclusion

The main objective of this study was to examine the relationship between remittance inflows and import spending in Nigeria as a way of predicting the possible aftermath of the Covid-19 pandemic. The paper focused on the Nigerian economy and used annual data from 1980 to 2019. The econometric analysis was conducted employing the VAR procedure. The findings, among others, indicate that remittances would not affect import demand in the short run in Nigeria. Imports were found not to be significantly induced by the inflow of remittances. This may be contrary to prior expectations, but it is interesting to note that the use of remittances varied among the different recipients from healthcare or medical bills to nutrition purposes; tuition, construction and several other uses.

Based on the findings from this study, one may conclude that citizens and the government could harness the inflow of remittances to invest in the economy through appropriate policies, since it has been empirically proven that there is no significant drain or outflow of remittances via the import channel in the short run. Importantly, any reduction in migrant remittances arising from the aftermath of the COVID-19 pandemic is not likely to reduce imports. This suggests the need to further examine the trade policy of the government in terms of trade liberalization, since lower product prices could be an inducement for a high propensity to import, or even to dumping commodities.

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## WPLYW MIĘDZYNARODOWYCH PRZEKAZÓW I WYDATKI IMPORTOWE W NIGERII

**Streszczenie:** W tym badaniu przeanalizowano historyczne trendy dotyczące przekazów pieniężnych i wydatków importowych w Nigerii, aby określić możliwe następstwa pandemii COVID-19. W modelu VAR wykorzystano dane szeregów czasowych z lat 1977-2019. Wynik wskazuje, że szok jednostkowy dotyczący przekazów pieniężnych odpowiada za około 28% wahań popytu importowego w drugim okresie. Przekazy zarobków migrantów i PKB na mieszkańca wykazują słaby związek endogeniczny. Przekazy pieniężne są zwykle stabilne i kurs wymiany nie ma na nie wpływu. W związku z tym popyt na import może nie spaść znacząco ze względu na spadek przekazów pieniężnych w wyniku COVID-19. Dlatego usprawniona ekspansja przemysłowa w zakresie produkcji towarów i usług ma zasadnicze znaczenie dla ograniczenia zagregowanego popytu na import.

**Słowa kluczowe:** przekazy zagraniczne, migranci, wydatki importowe, model VAR, Nigeria.