



# Remittances, Exchange Rates and Dutch Disease in Sub-Saharan Africa

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## Abstract

This study empirically investigated remittances' short-run and long-run effects on actual exchange rates. Further, it examined the impact of remittances on resource movement from the tradable to the nontradable sector in the CFA franc and non-CFA zones of sub-Saharan Africa (SSA). A panel-based, Pooled Mean Group estimation technique was adopted to estimate the data collected from 1981 to 2018 for 26 SSA countries which comprise 15 non-CFA and 11 CFA countries. Both aggregate (SSA) and disaggregated (CFA franc and non-CFA) analyses were conducted. The data utilized were collected from the World Bank's World Development Indicator and International Monetary Fund's International Financial Statistics database. Evidence from the results indicated that remittances inflow led to real exchange rate appreciation in the CFA zone. However, the effect of remittances on the real exchange rate in the non-CFA zone is not statistically significant. Moreover, while remittances caused a shift of resources from tradable to nontradable sector in the CFA zone, in the long run, there is no substantial evidence that remittances would lead to resource movement from tradable to nontradable sector in the non-CFA zone. Thus, in the CFA zone, effective policies need to be implemented to channel remittances towards investment in agriculture and industry (tradable sector) to reduce the negative impact of remittances in the industry.

**Keywords:** Remittances, Dutch Disease, CFA, Non-CFA, Pooled Mean Group.

**JEL Classification:** F20, F24, O11, O55.

## Introduction

Over the past decades, global migration has received significant interest from government and academics. International migration involves labor movements accompanied by a considerable amount of remittances to their home countries. Remittances that arise when migrants send money back home to their families are an essential lifeline for some of the poorest countries in the world since it supports the recipients' income (Singer, 2010).

Remittances to family members in their countries of origin have substantially increased. It serves as an important source of foreign funds for several developing countries. Workers' remittances represent an important flow of funds to developing countries and sub-Saharan Africa in particular. In 2018, over \$46.1 billion of workers' remittances were transferred to sub-Saharan Africa (SSA) through official channels (WDI, 2019). Ratha (2003) claimed that usually, remittances through the informal channels are estimated to range between 10% and 50% of the official channel. On average, the share of remittances to the GDP in SSA countries increased from 1.1% in 1998 to 2.8% in 2018. This figure is far higher in some countries in SSA. For instance, the shares of remittances to GDP in Guinea-Bissau and Cabo Verde in 2018 were 8.8% and 11.9%, respectively (WDI, 2019).

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The inflow of remittances to SSA shows that it is extremely important for macroeconomic performance. Migrants' remittances are extremely important to countries that are facing economic difficulties. A number of these countries could be identified in the SSA. Hence, remittances serve as insurance for such countries against exogenous shock (Kapur, 2004; Lopez-Cordova and Olmedo, 2006; Yang and Choi, 2007). Additionally, Migrants tend to increase their remittances to families that are unemployed and are facing financial crises to smooth their income and consumption.

It has been argued that remittances can lead to the overshooting of a country's foreign exchange rate and harm its competitiveness, a phenomenon referred to as Dutch disease (Makhlouf and Mughal, 2013). Appreciation of exchange rate due to remittances inflow makes the country's export expensive and import cheaper and therefore puts pressure on the country's current account. In a small open economy, an increase in demand arising from remitted money raises the prices of commodities in the nontradable sector relative to the tradable sector (spending effect). This process shifts resources from the tradable sector (industry and agriculture) to the nontradable sector (services) and makes the country's tradable sector less competitive (resource movement effects).

Several studies have examined the spending and resource movement effects of Dutch disease for developing countries. For instance, based on disaggregated sectoral data, Lartey et al. (2008) showed that increases in remittances have spending effects that lead to real exchange rate appreciation and resource movement effects that favor the nontradable sector at the expense of the tradable sector. For a sample of developing countries, Acosta et al. (2009) revealed that remittances would lead to real exchange rate appreciation and how much the domestic currency appreciates depend on how well the recipients can channel the remitted capital into new investment.

In spite of the importance of remittances in the total international capital flows to developing countries, the relationship between remittances and exchange rate in SSA has not been adequately studied. Most of the earlier studies generally focused on Latin America, East Asia, and Europe (see, for instance, Aggarwal et al., 2011; Serino and Kim, 2011; Betti and Lungren, 2012; Brown et al., 2013) with little attention given to sub-Saharan Africa. Some studies on SSA only centered on the relationships between remittances and growth. For instance, Anyawu and Erhijakpor (2010) only look at how remittances can affect growth. Other studies generally focused on the relationship between remittances and poverty (see, for instance, Acosta et al., 2008; Portes, 2009; Betti & Lundgren 2012; Serino and Kim, 2011; Beyene, 2012). These studies left out the effect of remittances on the exchange rate. Besides, one of the reasons little attention is given to the remittances-exchange rate relationship could be because remittances are mainly motivated by altruistic reasons; exchange rate may not be a significant concern of the sender.

Recently, the study by Ojapinwa and Nwokoma (2018) examined the effect of remittances on real exchange rates in SSA to test the Dutch disease paradigm. However, their study simply measures the effect of remittances on exchange rate without adequately estimating how remittances affect resource movement from tradable to nontradable sectors. Some major improvement over the study by Ojapinwa and Nwokoma (2018) and other related studies in SSA that are considered in this present study includes; first, the ratio of tradable (agriculture and industry) to nontradable (services) sector is computed following the procedure adopted by Lartey et al. (2012), Acosta et al. (2009) and Makhlouf and Mughal, (2013) to determine the effect of remittances on resource movement from tradable to the nontradable sector. Second, the present study bifurcates SSA into CFA<sup>1</sup> franc and non-CFA groups because each

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1. CFA franc stands for "Communauté Financière Africaine" in West Africa and "Coopération Financière en Afrique Centrale" in West Africa. The CFA franc currency is hard pegged to Euro.

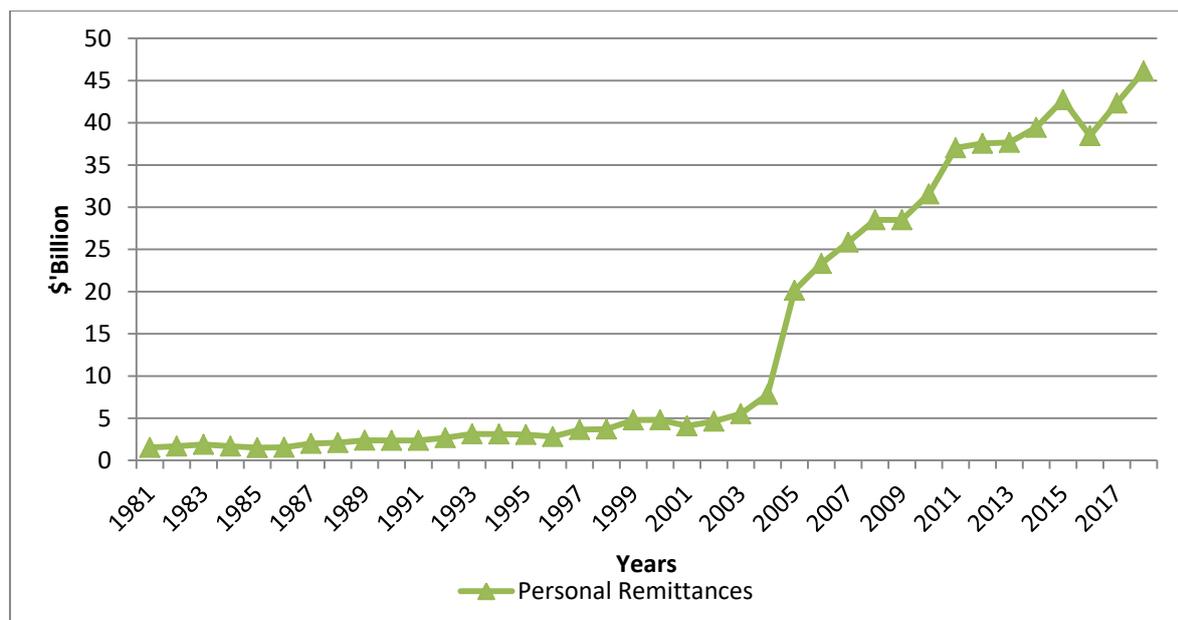
zone operates different exchange rate regimes. While the CFA franc zone exchange rate is more fixed in the non-CFA franc zone, it is relatively flexible. It helps us determine the differential impact of remittances on the real exchange rate and resource movement from the tradable to the nontradable sector in the zones. Third, Ojapinwa and Nwokoma (2018) employed the instrumental variables Generalized Method of Moments procedure for their study using data from 1996 to 2013. In this study, a longer period, that is, 1981 to 2018, is considered, and the Pool Mean Group technique is used to account for endogeneity in the analysis and to determine the long-run interrelationships among the variables. These three areas have been neglected in the existing literature on this subject.

The pertinent research questions to be addressed in this study are stated subsequently. Do remittances inflows cause an appreciation of domestic currencies and spending effect in sub-Saharan Africa? Can remittances lead to the shift of resources from the tradable (industry and agriculture) to the nontradable (services) sector in SSA? Hence, this study attempts to investigate the short-run and the long-run effects of remittances on real exchange rate using both aggregate (SSA) and disaggregate (CFA and non-CFA) data. Additionally, this study investigates the effect of remittances on resource movement from tradable to nontradable sector in SSA and its subgroups (CFA and non-CFA).

The remainder of this paper is organized as follows. Section two provides the stylized facts on remittances and real exchange rates in sub-Saharan Africa. The review of relevant literature is presented in section three. Section four entails the theoretical framework and methodology. The empirical analysis and interpretation are provided in section five. General conclusion and policy implications of findings are presented in section six.

### **Remittances and Exchange Rate in SSA: Trends and Development**

The growth of remittances to SSA over the last three decades has been remarkable. Figure 1 depicts the evolution of remittances in SSA. Nigeria received the largest remittances flow in 2013 (\$21billion); other countries in the top bracket include Senegal (\$1.7billion), Kenya (\$1.5billion), South Africa, Uganda (\$1billion) and Mali (\$800million). These were mainly sent from USA, UK, France and Australia. The 1% increase in remittances to SSA in 2015 shows some recovery to 0.2% recorded in 2014. Remittances to Nigeria accounted for two-third of the total remittances recorded in SSA in 2015; it was estimated to have declined by 0.8% over its value in 2014. The growth in remittances in SSA in 2015 was driven by strong remittances growth in Kenya (8.3%) and Uganda (21.1%) which amounted to \$1.6billion and \$1.1billion, respectively. Migrants' remittances declined by 6.1% to \$33 billion in sub-Saharan Africa in 2016 (WDI, 2016). The decline over the preceding year was due to slow economic activities in remittance-sending countries; decline in prices of major commodities, especially oil, which adversely affected remittance receiving countries; and diversion of remittances to informal channels due to controlled exchange rate regimes in countries such as Nigeria (African Economic Outlook, 2016). The fixed exchange rate regime or pegged arrangement adopted by some of the countries as well as limited organized Bureau de Change in SSA impacted negatively on the flow of remittances through the formal channels. For instance, in Nigeria, the premium between the parallel market exchange rate and the official market in 2016 was 172 Naira. The official exchange rate was 195 Naira to a dollar and the parallel market exchange rate was 367 Naira to a dollar. Such large differences between the parallel and the official exchange rate tend to drive remittances to informal channels. Remittances to the region increased by 6.7 percent from 2014 to 2018 and arrived at \$46.1 billion.



**Figure 1.** Evolution of Remittances in SSA, 1981-2018  
**Source:** World Bank's World Development Indicator.

Table 1 presents migrants' remittances as a percentage of GDP in the CFA and non-CFA countries from 1981 to 2018. The ratio of remittances to GDP in the non-CFA countries exceeded the CFA zone, especially between 1981 and 2012. This shows that remittances had been very significant in the financial inflows of the non-CFA zone since the past three decades. The high proportion of remittances as a share of GDP attributed to the non-CFA countries could be linked to the fact that large number of the remitters were working in the Anglophone countries with standard facilities for fund transfer to home countries. In addition, several financial institutions engage in the services of fund transfer from abroad to these countries and ability to easily convert it to local currencies in the black market at the non-CFA countries contributed to the huge remittances received during this period. Further, the non-CFA countries experienced severe economic crises in the 1980s and 1990s which prompted financial interventions from friend and families from abroad. Also, in 2014 and 2017 remittances as a share of GDP in the CFA countries were higher than the non-CFA probably because some of the non-CFA countries recorded low GDP and high remittances inflow in most of the reference years.

**Table 1.** Average Remittances as a Percentage of GDP for the CFA and Non-CFA Groups

Period	CFA	Non-CFA	Period	CFA	Non-CFA
1981-1985	1.64	12.45	2012	3.49	4.15
1986-1990	1.67	11.50	2013	3.75	3.69
1991-1995	1.66	7.68	2014	4.15	3.79
1996-2000	1.58	4.97	2015	3.99	4.44
2001-2005	2.41	3.85	2016	3.99	4.99
2006-2010	3.37	3.54	2017	4.74	3.97
2011	3.26	4.36	2018	4.00	3.99

**Source:** World Bank's World Development Indicator.

Average changes in the real exchange rates in the CFA and non-CFA zones are presented in table 2. Exchange rates had been very unstable in SSA with significant differences in its movement in the CFA and Non-CFA zones. Real exchange rates in the CFA and non-CFA

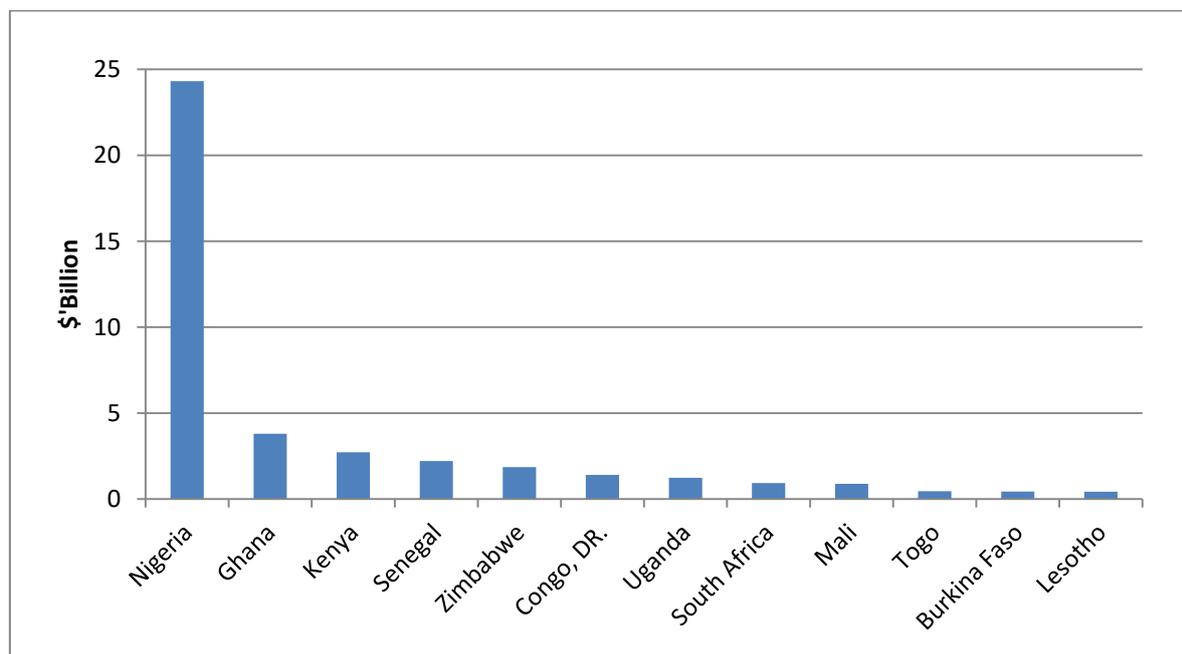
sub-groups reflected significant appreciation between 1981 and 1995. However, while the CFA zone recorded exchange rate depreciation between 2001 and 2005, non-CFA zone recorded an appreciation of their currencies on the average. Further, in 2012 the CFA zone experienced appreciation in their average real exchange rate changes and the non-CFA zone witnessed depreciation. In 2017 and 2018, significant appreciation was recorded in the average real exchange rate changes in the CFA zone and non-CFA zone witnessed marginal depreciation in their currencies.

**Table 2.** Change in Average Real Exchange Rates for the CFA and Non-CFA Groups

Period	CFA	Non-CFA	Period	CFA	Non-CFA
1981-1985	-1.96	-1.25	2012	-0.74	3.85
1986-1990	-2.23	-0.37	2013	3.29	1.33
1991-1995	-6.71	-2.13	2014	0.20	1.15
1996-2000	-0.60	1.39	2015	-2.79	6.12
2001-2005	2.47	-2.35	2016	0.52	-0.23
2006-2010	0.76	2.13	2017	-15.93	1.62
2011	-0.24	-0.56	2018	-7.70	0.70

**Source:** IMF's International Financial Statistics.

Figure 2 depicts ten top remittances destination in SSA countries. Nigeria recorded the highest figure of remittances inflow in 2018 with about \$24.3billion. The amount of remittances inflow to Nigeria in 2018 was about six times higher than that of Ghana and fifty-six times higher than Burkina Faso.

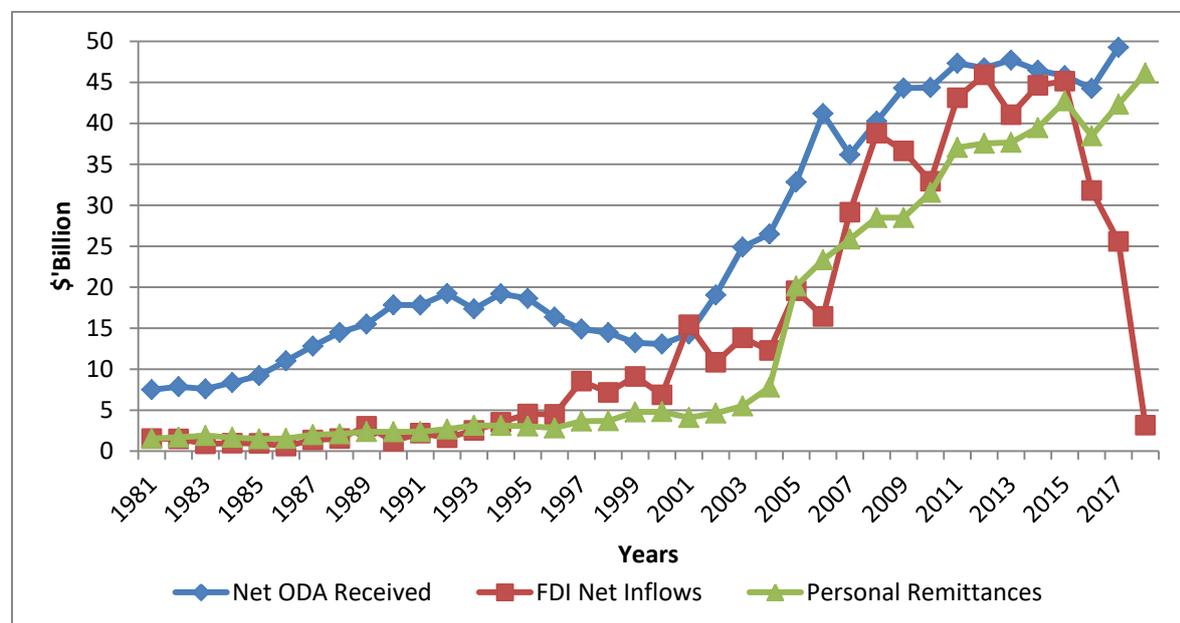


**Figure 2.** Top Remittances Destinations in SSA, 2018

**Source:** World Bank's World Development Indicator.

Figure 3 compares trends in personal remittances received with other international financial inflows in SSA. A close look at the figure shows that the inflow Official Development Assistance was higher than personal remittances and FDI in most of the years. Although the trend in FDI and personal remittances were moving almost at the same trend between 1981 and 1994, the value of FDI was greater from 1995 to 2004. Between 2005 and

2007, personal remittances inflow surpassed FDI, but FDI rose almost at the same level with ODA in 2008. Personal remittances maintained an upward trend but FDI was unstable up till 2015. The movement of net FDI and personal remittances between 2015 and 2018 is remarkable, while personal remittances continued to increase and stood at \$46.1; net FDI inflow had a sharp decline to about \$3.2 billion.



**Figure 3.** Remittances Compared with Other Financial Flows in SSA (1981-2018)

**Source:** World Bank's World Development Indicator.

## Literature Review

The theoretical link between workers' remittances and macroeconomic variables has been considered in many studies. To properly assess the association between remittances and exchange rates, firstly, it is vital to understand the relationship between remittances and other macroeconomic variables. There is substantial literature on the remittances-growth relationship. The channels within a growth accounting framework operate through capital accumulation, labor force growth, and total factor productivity growth. Rao and Hassan (2011) modified the traditional Solow model to analyze the direct growth effect of remittances. The analysis shows how remittances affect growth through financial intermediation.

Similarly, Nyamongo et al. (2012) adopted a Barro-type growth model to indicate that remittances and financial development promote growth. This process involves financing capital accumulation by complementing the domestic source of capital. The inflow of remittances may ease the financial constraints of the recipient, permitting an increase in capital accumulation, investment, and growth. Giuliano and Ruiz-Arranz (2009) argued that remittances might become a substitute for inefficient or nonexistent credit markets by helping domestic entrepreneurs to overcome the constraints of collateral or high lending costs and start productive activities.

The macroeconomic theories on remittances and exchange rates differ in several ways. The Mundell-Flemming (Fleming, 1962; Mundell, 1961) condition implies that capital mobility responds to differential returns between domestic and the world. In highly integrated financial markets, a difference between domestic and foreign interest rates causes capital to flow toward a higher return. The exchange rate appreciates capital inflow and depreciates

with capital outflows in a floating regime. However, the interest rate differential is arbitrage in a fixed regime by the capital flows. This paradigm indicates that remittances are sensitive to the differential rate of returns among countries, especially when the purpose is for investment. Another major argument in considering the relationship between workers' remittances and the exchange rate is the one put forward by Obstfeld and Rogoff (1996). Their paper shows that remittances hurt a country's competitiveness in the world market by reducing its export range. The reduction in competitiveness is because the transfer increases the country's real exchange rate. The appreciation in the real exchange rate would make the price of goods the country export expensive in the world market. The channels through which remittances transfer to real exchange rate appreciation can be in various forms. Recipients may be prompted to want more leisure; the impact of additional spending may vary in different sectors of the economy. The rise in spending may increase the relative prices of non-traded goods, appreciating the real exchange rate.

Often used in the remittances and exchange rate literature is the "Dutch Disease". The Dutch disease is an upward pressure on the real exchange rate as a result of financial capital inflow such as resource boom, foreign aids and remittances. This model can be explained in two different channels which are highlighted subsequently. In Corden and Neary (1982), increase capital inflow can lead to "spending effect". This happens when an increase in income following a rise in capital inflow given an exogenously determined tradable prices, causes an increase in prices of nontradable goods and services. The increase in prices of nontradable goods results to expansion in the sector relative to the tradable sector. The process leads to real exchange rate appreciation and "resource movement effect" exerting pressure on the local currency and drawing additional resources to the nontradable sector (Acosta, et al., 2009). As discussed in Acosta et al. (2007), the second channel operates through an increase in household's wealth which makes them to substitute more leisure for work. The decrease in labor arising from this put upward pressure on wages. The rise in wage rate increase production costs and contracts the tradable sector. This process leads to the appreciation of the real exchange rate and reduces the international competitiveness of goods produce by the tradable sector.

A number of empirical studies have investigated the relationship between remittances and macroeconomic variables. The findings of these studies are mixed. Several studies supported the view that inflows of remittances promote growth in the recipient country (see for instance, Giuliano and Ruiz-Arranz, 2008; Mundaca, 2009; Chowdhury, 2011; Nyamongo et al., 2012; Lartey, 2013). However, Barajas et al. (2011), Rao and Hassan (2011) and Brown et al. (2013) all pointed out that the contribution of remittances to growth and development is negative and insignificant.

Studies that focused on remittances and exchange rate nexus have produced insightful findings. Acosta et al. (2009) explored the relationship between remittances, financial sector development and real exchange rate in panel of 109 developing and transition economies between 1990 and 2003. It was shown that remittances exert upward pressure on real exchange rate, leading to exchange rate appreciation. The extent the local currency appreciates depends on how effective the remittances are used to generate new investment. The long run relationship between remittances and real effective exchange rate for some selected developing countries was examined by Hassan and Holmes (2012). The findings showed a significant long run relationship which confirms the Dutch disease effect. Besides, the short run effect of remittances on real exchange rate was statistically significant. In a study of Pakistani economy, Makhoulf and Mughal (2013) found evidence of spending and resource movement effects in both the short and the long run as a result of migrant remittance inflows. The results have supported the argument that remittances caused a shift in resource allocation through consumption of nontradable goods and services. Rahman et al. (2013)

concluded that variation in exchange rate exerted a significant influence on changes in remittances in the long run. Similarly, in the short run, a positive and significant relationship between exchange rate changes and remittances was revealed.

Conversely, a few empirical studies have shown that remittances do not cause exchange rate appreciation and Dutch disease. Using OLS estimation technique, Barret (2012) showed that remittances caused real exchange rate depreciation in Jamaica. This is in contrast with the possible negative effect that would result to exchange rate appreciation and reduce the country's competitiveness. Similarly, Rahman et al. (2013) employed the OLS technique to investigate the short-run and long-run relationship between migrants' remittances in US dollar term to Mexico and Peso-Dollar nominal exchange rates from 1987 to 2008. A short-run interactive and negative effect was obtained between the variables. Hence, the findings imply that remittances lead to exchange rate depreciation and do not result to Dutch disease. Based on data from 9 countries in the MENA region between 1985 and 2015, Brahim et al. (2017) reported that in the long-run migrants' remittances have negative and significant effects on real effective exchange rate. This suggests an increase in remittances leads to a depreciation of the real exchange rate in the region. Ojapinwa and Nwokoma (2018) used the generalized method of moments to investigate remittances and Dutch disease nexus in SSA from 1996 to 2013. Their findings revealed that remittances do not cause Dutch disease in SSA. Although their study looked at the effect of remittances on real exchange rate, it did not account for how remittances affect the resource movement from tradable to the nontradable sector. This is because the computation of tradable to nontradable goods is not capture in the study. Additionally, the study by Ojapinwa and Nwokoma (2018) assumed that exchange rate regime is the same in SSA and left out different exchange rate regimes in the CFA and non-CFA countries.

Some studies have shown the importance of remittances flow in exchange rate regimes. Lartey et al. (2012) revealed that increasing remittances in emerging countries have important spending effect that would lead to real exchange rate appreciation and a resource movement effect that favors the nontradable sector at the expense of a tradable sector. These results confirmed a Dutch disease effect in the selected countries which operates stronger in the fixed exchange rate regime. Based on an analysis of data on *de facto* exchange rate regimes for 74 developing countries, David and Singer (2010) concluded that remittances increase the tendency for a policy maker to adopt a fixed exchange rate regime. Additionally, using a dynamic general equilibrium framework for Philippines, Mandelman (2011) suggested that increase in remittance flow would cause real exchange rate appreciation especially in fixed regime with price rigidities. Ball et al. (2010) adopted the panel autoregression technique to investigate the relationship between remittances, inflation, and real exchange in 21 emerging economies. Their findings indicated that under a flexible regime, remittances would raise inflation and cause real exchange rate appreciation. In a fixed regime, remittances lower inflation and lead to real exchange rate appreciation.

## **Research Methodology**

### *Theoretical Framework*

The theoretical relationship between remittances and exchange rate is often based on the Salter-Swan-Corden-Dornbusch model. This model presents the transmission mechanisms of remittances to exchange rate and reallocation of resources from tradable to nontradable sector which leads to spending and resource movement effects. Remittances inflows increase the disposable income of the recipients and spurred aggregate demand which raises the price of nontradable goods for a given price of tradable goods (Acosta et al., 2007). The effects of the

rise in prices of nontradable goods result to spending effect and real exchange rate appreciation. A higher nontradable goods price causes an expansion in the nontradable sector and subsequently movement of labor and capital from the tradable sector to the nontradable sector<sup>1</sup> which is term the resource movement effect. The overall effect of the process is a high cost of tradable goods sector which results in high prices of exportable goods and loss of export competitiveness in the tradable goods sector. Dadgar and Orooji (2020) argued that mismanagement of huge income from foreign capital inflows such as foreign aids can distort domestic economy balanced growth by unevenness the progress between tradable and nontradable goods by flourishing nontradable and unproductive activities and deteriorate the activities in the tradable goods' sector. In the process, weaken the competitiveness of tradable commodities and reinforces the competitiveness of nontradable commodities. According to Corden (1984), extra income from a booming sector can result to spending effect given that the demand for commodities in the nontradable sector is elastic and positive. This process would result to rise in price of nontradable goods relative to tradable goods (real appreciation). The increase in price in the nontradable sector would draw resources (capital and labor) from tradable to nontradable sector (resource movement effect).

This study focuses on the effect of remittances on two key macroeconomic indicators that capture the presence of Dutch disease. First, the effect of remittances on the real exchange rate is examined. In the second model, to capture the resource movements; the ratio of sectoral output of tradable and nontradable is computed as dependent variable and the effect of remittances and other capital inflows are analyzed. In this study, agricultural and manufacturing outputs are utilized to capture tradable goods while nontradable goods are measured by output from the services sector. These proxies have been used by similar studies (see for instance, Lartey et al., 2012; Acosta et al., 2009; Makhlouf and Mughal, 2013).

### *Estimation Technique*

Before proceeding to the estimation technique, it is necessary to verify the stationarity properties of the variables, especially in the case of this study where the time frame  $T > 30$ . This study has adopted the Im et al. (2003) (IPS) panel unit root test, this test is less restrictive compare to the one developed by Levin and Lin (1993) and Breitung (2000) that do not capture heterogeneity in the autoregressive coefficient. The IPS test helps to solve the problem of correlation by assuming heterogeneity between units in a dynamic panel framework. The equation for the IPS panel unit root test is as follows:

$$\Delta y_{i,t} = \beta_i + \delta y_{i,t-1} + \sum_{j=1}^{\delta} \varphi_{ij} \Delta y_{i,t-j} + \varepsilon_{i,t} \quad i = 1, 2, \dots, N; t = 1, 2, \dots, T \quad (1)$$

Where  $y_{i,t}$  stands for each variable under consideration in the model,  $\beta_i$  is the individual country fixed effect and  $\delta$  is selected to make the residual uncorrelated over time. The null hypothesis is that  $\delta = 0$  for all  $i$ , while the alternative hypothesis is that  $\delta < 0$  for some  $i = 1, 2, \dots, N_1$ . The IPS statistics is computed by averaging individual  $i$  Augmented Dickey-Fuller statistics which is expressed as follows:

$$\bar{t} = \frac{1}{N} \sum_{i=1}^N t_{i\tau} \quad (2)$$

Where  $t_{i\tau}$  is the ADF t-statistics for individual country  $i$ . The IPS statistics is normally distributed under the null hypothesis.

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1. Corden and Neary (1982) provided a foundational framework for the analysis of the spending and resource movement effects

The Pooled Mean Group (PMG) panel estimation technique proposed by Pesaran et al. (1999) is adopted in this study for several reasons. First, it is appropriate for estimating heterogeneous nonstationary panel data in which the number of time series  $T$  and cross section  $N$  are quite large. Second, it helps to estimate the short run and long run relationship of dynamic heterogeneous panel; in this process, it constraints long-run coefficients to be similar but allows short-run coefficients and error variances to differ across groups. Third, it allows for the case where some regressors are stationary and where others follow unit root process. Additionally, it can allow the short run dynamics to differ among countries while imposing equality on the long term coefficients. By not imposing equality of the short run parameters, it allows the dynamics specification to differ across countries. Hence, the long run relationship among the variables of interest in this study is expected to be identical across countries. However, the short run parameters are expected to be country specific. The choice of the lag length is based on the Akaike Information Criterion (AIC) and Schwarz Bayesian Criterion (SBC) with a maximum of one lag for all the variables. The PMG model for this study is presented as follows:

$$REER_{it} = \alpha_0 + \alpha_{1i}REM_{i,t-1} + \alpha_{2i}FDI_{i,t-1} + \alpha_{3i}ODA_{i,t-1} + \alpha_{4i}CPI_{i,t-1} + \alpha_{5i}M2_{i,t-1} + \alpha_{2i}OPEN_{i,t-1} + \varepsilon_{it} \quad (3)$$

The equilibrium error correction model of the PMG is expressed as follows:

$$\Delta REER = \varphi_i[REER_{i,t-1} - (REM_{it} + FDI_{it} + ODA_{it} + CPI_{it} + M2_{it} + OPEN_{it})] + \sigma_{0i} + \sigma_1\Delta REM_{i,t} + \sigma_2\Delta FDI_{i,t} + \sigma_3\Delta ODA_{i,t} + \sigma_4\Delta CPI_{i,t} + \sigma_5\Delta M2_{i,t} + \sigma_6\Delta OPEN_{i,t} + \varepsilon_{i,t} \quad (4)$$

Theoretically, for remittances (and other financial flows, FDI and ODA) to cause Dutch disease, a positive effect is expected between remittances and real exchange rate. In order to determine whether remittances cause Dutch disease in SSA, models that show the effect of remittances on the ratio of tradable goods and nontradable goods are specified for the long run and short run error correction. Some studies have computed the resource movement using the ratio of tradable to the nontradable sector, that is, agriculture and industry to service sector (see for instance, Lartey et al., 2012; Makhoul and Mughal, 2013).

The model of the effect of remittances on resource movements is expressed as:

$$TNT_{it} = \beta_0 + \beta_{1i}REM_{i,t-1} + \beta_{2i}FDI_{i,t-1} + \beta_{3i}ODA_{i,t-1} + \beta_{4i}CPI_{i,t-1} + \beta_{5i}M2_{i,t-1} + \beta_{6i}OPEN_{i,t} + \varepsilon_{it} \quad (5)$$

The corresponding error correction model is as follows:

$$\Delta TNT_{it} = \varphi_i[REER_{i,t-1} - (REM_{it} + FDI_{it} + ODA_{it} + CPI_{it} + M2_{it} + OPEN_{it})] + \sigma_{0i} + \sigma_1\Delta REM_{i,t} + \sigma_2\Delta FDI_{i,t} + \sigma_3\Delta ODA_{i,t} + \sigma_4\Delta CPI_{i,t} + \sigma_5\Delta M2_{i,t} + \sigma_6\Delta OPEN_{i,t} + \varepsilon_{i,t} \quad (6)$$

Based on theory and as explained by Lartey et al. (2008) and Makhoul and Mughal (2013) a negative effect of remittances (and other financial flows, FDI and ODA) on the tradable to nontradable ratio (TNT) implies that remittances cause the shift of resources from tradable to nontradable sector.

Where  $REER_{it}$  is the real effective exchange rate for all 'i' distributed across t.  $rem$  is remittances inflow,  $FDI$  is the foreign direct investment inflow,  $oda$  is official development

assistance, *INF* is the rate of inflation, *M2* is the broad money supply and *OPEN* is trade openness.  $\varphi_i$  is the speed of adjustment of the short run error correction,  $\sigma_i$  are the various short run effects. All variables are expressed and computed in their natural logarithms forms. Models 1-4 are estimated for SSA, CFA zone and non-CFA zone. The justification for the applied method is that by dividing aggregate SSA into CFA and non-CFA zones, one can determine whether exchange rate regimes of these zones influence the effect of remittances on real exchange rate as well as resource movement from tradable to nontradable sector.

### Data

Annual data covering the period 1981 to 2018 (37 years) are collected from various publications. Data for personal remittances, foreign direct investment and official development assistance, agricultural output, industrial output, services output and trade openness were collected from the World Bank's World Development Indicator. The data on real effective exchange rate, consumer price index and broad money are retrieved from the International Monetary Fund's International financial statistics. Trade openness is computed as the ratio of sum of import and export to GDP. Agricultural, industrial and service outputs were expressed as percentages of GDP. These data were collected for 15 non-CFA countries and 11 CFA countries. The justification for the selected countries is based on data availability.

### Results and Discussion

The following sets of estimation show the Pool Mean Group<sup>1</sup> (PMG) coefficients for aggregate SSA and its sub-groups. The dependent variables are real effective exchange rate and ratio of tradable to nontradable goods to capture Dutch disease and resource movement effect, respectively (see for instance, Lartey et al., 2012; Makhlouf and Mughal, 2013; Rahman et al., 2013). Both the long-run and short run estimates are reported. The cointegration equations are estimated following Pesaran et al. (1999) and it excludes trends. The convergence parameters (*ec*) allow adjustment from short-run to long-run across countries.

Table 3 reports the long-run and short-run estimates for the SSA. This result is based on the aggregate of SSA sample. The ARDL lags (1,1,1,1,1) were selected based on Akaike and Schwarz information criteria. Among the long-run coefficients, foreign direct investment (FDI), consumer price index (CPI) and trade openness (OPEN) are statistically significant. However, remittances (REM), official development assistance (ODA) and broad money (M2) are not statistically significant at the conventional levels. Amid the financial inflows considered, foreign direct investment has a statistically significant effect on real effective exchange rate in SSA with a high coefficient of (-6.7%). It suggests that an increase in FDI would lead to real exchange rate depreciation. In line with theory, increase in price level causes real exchange rate appreciation. The degree of openness in the selected SSA countries would result to about 0.43% appreciation in real exchange rate over the long run.

In the short-run estimates, the coefficient of the speed of adjustment has the right sign and statistically significant. It shows about 19% of the short-run disequilibrium is corrected in the long-run. Although the positive sign of the coefficient of remittances shows that remittances could lead to real exchange rate appreciation, the coefficient is not statistically significant at conventional levels. This implies that considering the whole sample of SSA countries, remittances do not influence real exchange rate. Changes in general price level of the countries have a positive and significant effect on real exchange rate at 10% level. A 1% increase in general price level could cause exchange rate to change by 0.40%, approximately.

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1. The Mean Group estimates are available on request.

The effects of money growth and trade openness on exchange rate are not statistically significant in the short run.

**Table 3.** Pool Mean Group of the Effect of Remittances on REER for SSA

Long-Run Estimates		Short-Run Estimates	
Variables	Coefficients	Variables	Coefficients
		ec	-1.1921837***
lnREML1	-2.632286	lnREM.D1	(0.000)
	(0.556)		1.637458
lnFDIL1	-6.705206***	lnFDI.D1	(0.407)
	(0.000)		0.1192004
lnODAL1	-1.568065	lnODA.D1	(0.863)
	(0.253)		3.022017**
CPIL1	0.5515121***	CPI.D1	(0.053)
	(0.000)		(0.101)
M2L1	-0.1306469	M2.D1	-0.0685975
	(0.138)		(0.290)
OPENL1	0.4320513***	OPEN.D1	0.2241391
	(0.000)		(0.617)
		Cons	38.42711***
			(0.001)

**Note:** \*, \*\*, \*\*\* are statistical significance at 10%, 5% and 1% (p-values in parenthesis)

Dependent variable is REER, No of Groups: 26.

**Source:** Research finding.

Table 4 depicts the findings from the estimation of remittances and resource movements (i.e the ratio of tradable and nontradable sectors). Accordingly, these results are bifurcated into the long run and short run estimates. In line with theory<sup>1</sup>, remittances have a negative and statistically significant effect on sectoral reallocation (resource movement effect) in the long run; implying that an increase in remittances cause the movement of resources towards the nontradable sector in SSA. The coefficients of the long run PMG shows that a 10 percent increase in remittances would cause a 3% movement of resources from the tradable to the nontradable sector. These findings conform to the one obtained by Lartey et al. (2012) that increase in remittances lead to reallocation of resources from tradable to the nontradable sector. Similarly, official development assistance shows a statistically significant impact on the tradable to nontradable ratio at 1% level. This implies that in the long run, a 1% increase in official development assistance would result to 0.1% movement of resources from the tradable to nontradable sector. However, the coefficient of the FDI shows a converse sign and it is not statistically significant. A plausible reason for the positive coefficient obtained for FDI could be because FDI inflows improve the output of the tradable sector; hence it lowers the resource movements from the tradable to the nontradable sector. Among other findings, money growth (M2) shows a positive and statistically significant impact on the sectoral shift ratio (TNT) in the long run. This positive sign of the coefficient of broad money confirms that an increase in money growth retain resources in the tradable sector.

The coefficient of the speed of adjustment in the short run estimate is of the right sign and statistically significant. It shows about 23% of the disequilibrium in the short run is corrected in the long run. Although the coefficient of remittances is not statistically significant in the

1. According to Acosta et al. (2009), Makhoul and Mughal (2013) a negative effect of remittances on ratio of tradable to non-tradable (TNT) implies the shift of resources from industry and agriculture (tradable sector) to services (non-tradable sector) making the countries' tradable sector less competitive.

short run, its sign is in line with theoretical expectation. This implies that remittances have no significant impact on resource movement from tradable to the nontradable sector in short run. It should be noted that the time lag for the structural shift in the industrial sector in Africa could be responsible for the insignificant impact of remittances on TNT ratio in the short run. Official development assistance exhibit a significant effect on the sectoral shift ratio, suggesting that increase in ODA would lead to movement of resources from tradable to nontradable sector, though this is only significant at 10% level.

**Table 4.** Pool Mean Group of the Effect of Remittances on TNT for SSA

Long-Run Estimates		Short-Run Estimates	
Variables	Coefficients	Variables	Coefficients
		ec	-0.2313472*** (0.000)
lnREML1	-0.0259488** (0.030)	lnREM.D1	-0.0011546 (0.959)
lnFDIL1	0.0106391 (0.303)	lnFDI.D1	0.0047652 (0.460)
lnODAL1	-0.1278095*** (0.253)	lnODA.D1	-0.0682619* (0.076)
CPIL1	-0.0002685 (0.654)	CPI.D1	0.0038474** (0.048)
M2L1	0.0047668*** (0.000)	M2.D1	0.0004786 (0.338)
OPENL1	0.0001185 (0.869)	OPEN.D1	-0.0025286 (0.276)
		Cons	0.8492365*** (0.000)

**Note:** \*, \*\*, \*\*\* are statistical significance at 10%, 5% and 1% (p-values in parenthesis)

Dependent variable is TNT, No of Groups: 26

**Source:** Research finding.

The main focus of this study is to assess the differential impact of remittances on real exchange rate and TNT ratio in the CFA franc and Non-CFA zones in SSA; hence the rest of the discussion is in this direction (see table 5). In the CFA franc zone, a statistically significant impact of remittances on real effective exchange rate is obtained in the long run. The magnitude of the effect is such that a percentage increase in remittances would lead to about 3.9% real exchange rate appreciation; this implies that remittances cause high spending effects. FDI shows a statistically significant impact on real effective exchange rate. A percentage increase in FDI would lead to 2.1% depreciation in exchange rate in the CFA zone. However, official development assistance has no significant effect on exchange rate in the zone. Also, the result reveal that trade openness has significant effect on real exchange rate in the CFA zone.

On the short run analysis of the CFA zone, as expected the coefficient of the error correction has the appropriate sign and it is statistically significant. Similar to the result obtained for the long run, remittances have a positive and significant effect on REER at the 10% level. Besides, the effects of FDI and official development assistance (ODA) on REER are not statistically significant. These imply that for the CFA zone remittances lead to real exchange rate appreciation both in the short and long run. Hence, the result obtained supports the Dutch disease hypothesis that remittances can lead to the overshooting of a country's real exchange rate and harm its competitiveness. Real exchange rate appreciation due to remittances inflow makes the country's export expensive and import cheaper and therefore put pressure on the country's current account (Acosta et al., 2009).

The estimates of non-CFA zone are presented in the last two columns in table 5. Accordingly, both the long run and short run estimates are provided. In the long run, the effect of remittances on real exchange rate is not statistically significant at the conventional levels. Similar to the CFA result, FDI increase leads to real exchange rate depreciation in the long run. It suggests that an increase in FDI would lead to 6.5% depreciation in real exchange rate. While money growth leads to real exchange rate depreciation, CPI and openness cause appreciation in the real exchange rates. The result obtained for the parameter estimates of the effect of remittances on real exchange rates in the short run is similar to the long run estimates. In terms of the sign of the coefficient, it also suggests that remittances could lead to exchange rate depreciation. However, the parameters of remittances are not statistically significant. Other variables used in the regression namely, FDI, ODA, CPI, M2 and openness had no statistically significant influence on the real effective exchange rate in the short run.

Table 5. Pool Mean Group of the Effect of Remittances on REER for CFA and Non-CFA Zones

CFA Zone		CFA-Zone		Non-CFA Zone		Non-CFA Zone	
Long-Run Estimates		Short-Run Estimates		Long Run Estimates		Short Run Estimates	
Variables	Coefficients	Variables	Coefficients	Variables	Coefficients	Variables	Coefficients
		ec		ec			
lnREML1	3.854222*** (0.000)	lnREM.D1	(0.000) 5.897295*	lnREML1	-0.0727084 (0.886)	lnREM.D1	(0.047) -0.3469885
lnFDIL1	-2.100687** (0.005)	lnFDIL.D1	0.2627484 (0.072)	lnFDIL1	-6.841291*** (0.894)	lnFDIL.D1	(0.894) 0.46845525
lnODAL1	1.11585 (0.227)	lnODA.D1	2.207629 (0.809)	lnODAL1	-0.549096 (0.000)	lnODA.D1	(0.585) 3.612126
CPII1	-0.421327 (0.438)	CPI.D1	0.603623 (0.150)	CPII1	0.6284265*** (0.760)	CPI.D1	(0.148) 0.0278698
M2L1	0.0425883 (0.740)	M2.D1	-0.1201256 (0.132)	M2L1	0.4394806*** (0.000)	M2.D1	(0.931) -0.0558633
OPENL1	0.1169382** (0.020)	OPEN.D1	-0.1768125 (0.213)	OPENL1	0.8912777*** (0.005)	OPEN.D1	(0.552) 0.7795098
		Cons	12.24540*** (0.000)			Cons	(0.435) 30.85047** (0.053)

Note: \*, \*\*, \*\*\* are statistical significance at 10%, 5% and 1% (p-values in parenthesis). Dependent Variable: REER, No of Groups for CFA Zone = 11, No of Groups for Non-CFA Zone = 15.

Source: Research finding.

Table 6 presents the effect of remittances on ratio of tradable to nontradable sector (TNT) for the CFA and Non-CFA zones. In the long-run estimates of the CFA zone, remittances have a negative and statistically significant effect on the TNT. This clear negative relationship supports the hypothesis of resource movement effect from the tradable to the nontradable sector. This suggests that remittances have added to the shift of resources from agriculture and industry (tradable) to services (nontradable) sector. This is in line with the findings of (Makhlouf and Mughal, 2013). The result shows that a 10 percent increase in remittances would lead to 0.5 percent increase in resource movement towards the nontradable sector. However, the effect FDI inflow is positive and statistically significant. Official development assistance has no statistically significant effect on the TNT. While CPI exerts positive and insignificant effect on TNT, trade openness has negative and statistically significant effect on TNT. In the short run estimates, the effect of remittances on TNT is not statistically significant. Similarly, other variables utilized in the analysis are not statistically significant at the required levels. The error correction term indicates that about 28% of the disequilibrium in the short run is corrected in long run.

Evidence from the result obtained in the long run analysis of the non-CFA group shows that the coefficient of remittances is negative and statistically insignificant. Official development assistance shows a negative and significant effect on TNT ratio; suggesting that increase in official development assistance would move resources towards the nontradable sector. Accordingly, money growth has a positive and statistically significant effect on TNT. Similarly, in the short run estimates, the coefficient of remittances-TNT ratio is of the right sign; however, the parameter is not statistically significant. Foreign direct investment is significant at 10% level; however, the positive sign of the coefficient does not support resource movement to nontradable sector. The coefficients of other variables in the short run estimates of the non-CFA zone exhibit insignificant effect on TNT.

Table 6. Pool Mean Group of the Effect of Remittances on TNT for CFA and Non-CFA Zones

CFA Zone		CFA-Zone		Non-CFA Zone		Non-CFA Zone	
Long-Run Estimates		Short-Run Estimates		Long Run Estimates		Short Run Estimates	
Variables	Coefficients	Variables	Coefficients	Variables	Coefficients	Variables	Coefficients
		ec	-0.2846121***			ec	-0.1782948***
lnREML1	-0.0532510** (0.052)	lnREM.D1	(0.000) -0.0521302	lnREML1	-0.0403995 (0.159)	lnREM.D1	(0.000) -0.0336513
lnFDIL1	0.0482101** (0.045)	lnFDI.D1	(0.186) 0.0061342	lnFDIL1	0.0165288 (0.441)	lnFDI.D1	(0.308) 0.0144923*
lnODAL1	0.0000512 (0.896)	lnODA.D1	(0.210) 0.0012412	lnODAL1	-0.190794*** (0.000)	lnODA.D1	(0.097) -0.0748055
CPIL1	0.0254712*** (0.001)	CPIL.D1	(0.412) 0.0022415	CPIL1	-0.0013094* (0.093)	CPIL.D1	(0.187) 0.002707
M2L1	0.0022154 (0.651)	M2.D1	(0.715) -0.0006541	M2L1	0.0080606*** (0.006)	M2.D1	(0.052) -0.0002239
OPENL1	-0.021471*** (0.000)	OPEN.D1	(0.612) -0.0021547	OPENL1	-0.0023133 (0.811)	OPEN.D1	(0.723) -0.0115328
		Cons	-0.0002457*** (0.000)			Cons	(0.345) 0.9304795*** (0.001)

**Note:** \*, \*\*, \*\*\* are statistical significance at 10%, 5% and 1% (p-values in parenthesis). Dependent Variable: REER, No of Groups for CFA Zone = 11, No of Groups for Non-CFA Zone = 15.

**Source:** Research finding.

## Conclusion

Remittances have become increasingly important in SSA because it serves as extra income for recipients. In 2018, the amount of personal remittances received (\$46.1billion) exceeded FDI (30.8 billion). In the last one decade, migrants' remittances in SSA increased from \$28.5billion in 2008 to \$46.1billion in 2018 (WDI, 2019). The substantial increase in remittances has renewed interest on whether it causes real exchange rate appreciation (Dutch disease) as well as resource movement from tradable to nontradable sector.

In order to test the Dutch disease hypothesis, this study investigated the effect of remittances on real exchange rate and resource movement from tradable to nontradable sector in the sub-Saharan African countries. The empirical model was based on the Salter-Swan-Corden-Dornbusch model. To capture the features of exchange regimes among the Francophone and Anglophone countries, SSA was bifurcated into the CFA and non-CFA zones. The study established that putting the SSA countries together; remittances do not lead to exchange rate appreciation. However, strong evidence that remittances led to resource movement from the tradable to the nontradable sector was obtained for the aggregate SSA countries in the long-run estimate.

For the CFA group; a positive and statistically significant effect of remittances on real exchange rate was obtained. Apparently, remittances led to real exchange rate appreciation both in the long run and the short run. However, in the non-CFA zone, the effect of remittances on real exchange rate is not statistically significant. This suggests that while remittances would lead to appreciation of exchange rate and loss of competitiveness of export in the CFA zone, it is unlikely that remittances would cause real exchange rate appreciation in the non-CFA zone. The results of the effect of remittances on resource movement in the CFA and non-CFA revealed interesting findings. While the effect of remittances on the ratio of tradable to nontradable sector is negative and significant for the CFA zone in long-run, a negative and statistically insignificant impact of remittances on the ratio of tradable to nontradable sector was obtained for non-CFA zone in the long-run. This implies that remittances would result to resource movement from tradable to the nontradable sector in the CFA zone in the long-run. While in the non-CFA zone remittances is unlikely to cause resource movements towards the nontradable sector.

It has been discovered that remittances has increased in the last few years in SSA with strong implications for the Dutch disease. Arising from the findings of this study some important policy implications are discernible. First, for the CFA group, appropriate incentives need to be put in place to induce remittance recipients to invest their extra income in agriculture and industry (tradable sector) in order to support production of tradable goods and reduce the negative impact of remittances in the tradable sector. Additionally, adequate financial education to remitters in the non-CFA zone could lead to a desirable impact of remittances on real exchange rates.

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## Appendix

Table I. IM Pesaran and Shin Unit Root Test for SSA

S/N	Variables	t-bar		
		Level	First Difference	Decision
1	REER	-2.2976 ***	-5.4623 ***	I(0)
2	REM	-0.1206	-5.6884 ***	I(1)
3	FDI	-1.9046	-7.8803 ***	I(1)
4	ODA	-1.9629 **	-7.6104 ***	I(1)
5	CPI	3.6109	-3.0469 ***	I(1)
6	M2	-5.0735 ***	-9.4223 ***	I(0)
7	OPEN	-2.1183 **	-6.4552 ***	I(0)
8	TNT	-1.9237**	-6.2259 ***	I(1)

Note: \*, \*\*, \*\*\* are statistical significance at 10%, 5% and 1%. FD refers to first difference

Source: Research finding.

Table II. IM Pesaran and Shin Panel Unit Root Test for CFA and NON-CFA Zones

Variables	CFA			Non-CFA		
	Level	FD	Decision	Level	FD	Decision
REER	-3.066***	-5.8784***	I(0)	1.7338	-5.1571***	I(1)
REM	0.3239	-5.8550***	I(1)	-0.4466	-5.5662 ***	I(1)
FDI	-1.7441	-7.3553***	I(1)	-2.0224*	-8.2652***	I(1)
ODA	-2.2346**	-8.1923***	I(0)	-1.7637	-7.1836***	I(1)
CPI	-0.9254	-4.4331***	I(1)	6.9375	-2.0304**	I(1)
M2	-5.8717***	-9.9520***	I(0)	-4.4881***	-9.0339***	I(0)
OPEN	-2.5122**	-6.9853***	I(0)	-1.8294*	-6.0665***	I(1)
TNT	-2.3873***	-7.2310***	I(0)	-1.5837	-5.4889***	I(1)

Note: \*, \*\*, \*\*\* are statistical significance at 10%, 5% and 1%. FD refers to first difference

Source: Research finding.

Table III. Descriptive Statistics

Statistics	REER	REM	FDI	ODA	CPI	M2	OPEN	TNT
Mean	106.5089	5.06E+08	4.43E+08	5.77E+08	67.65	16.68	66.97	0.82
P50	100.525	7.11E+07	6.23E+07	3.47E+08	63.15	13.50	57.84	0.79
SD	29.57949	2.44E+09	1.11E+09	7.82E+08	54.17	25.32	37.50	0.46
Skewness	2.403575	7.755269	4.622036	4.706558	4.46	11.71	1.00	1.06
Kurtosis	12.26746	63.56681	28.20396	47.09505	59.84	247.92	4.42	5.17
CV	0.277718	4.814825	2.518145	1.355212	0.81	1.58	0.56	0.56

Source: Research finding.

## Sampled Countries:

CFA Franc Countries: Benin, Burkina Faso, Cote d'Ivoire, Cameroon, Guinea Bissau, Mali, Niger, Senegal, Togo, Congo Republic, Gabon.

Non-CFA Countries: Botswana, Cabo Verde, Ethiopia, Ghana, Kenya, Mauritius, Nigeria, Rwanda, Sudan, Tanzania, South Africa, Madagascar, Seychelles, Malawi, Eswatini.



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