Remittances, Financial Development and Real Exchange Rates in SSA: A Reverse Dutch Disease

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Abstract

The paper examines the effect of remittances and financial development on the real exchange rate in eight selected countries from Sub-Saharan Africa during the period from 1980–2018. The results from the Autoregressive Distributed Lag model, estimated using a pooled mean group estimator, reveal that remittances generate a depreciation effect. This confirms the existence of a reverse Dutch disease effect where remittances support export competitiveness via the real exchange rate mechanism in the long-run. In identifying the channels through which remittances affect real exchange rates, we find that financial integration, financial development as well as trade liberalization are key in mediating the observed remittance-real exchange rate linkage. These findings are in line with the literature on the effect of floating exchange rates – a key ingredient of liberalization in dampening real exchange rate appreciation that is induced by capital flows. The findings are vital and relevant for policy makers and scholars interested in dynamic capital flow movements as well as exchange rate dynamics and overall management of small open economies.

Keywords: Remittances, Real Exchange Rate, Dutch Disease, ARDL, SSA

JEL Classification: F0, F4, F24,F31,O1,O10

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1. Introduction

Remittances constitute a vital capital flow for many developing economies as their percentage contribution to GDP is in competition with inflows from official development assistance (Hien *et al.*, 2020). Whereas remittances represent a vital lifeline for many sub-Saharan African (hereinafter SSA) economies, their associated transaction costs are nearly 10 percent of the transferred amount for the region compared to the global average of 7 percent World Bank (2018). Development economists such as Rosenstein-Rodan (1943); Murphy *et al.* (1989) argue for remittances as key in reducing poverty, smoothing consumption, impacting labor supply, providing working capital to credit-stricken households, and exhibiting multiplier effects through increased household spending, particularly on education, health, and nutrition. Such inflows are therefore expected to act as a shock-absorber to obstacles faced by many developing economies as they are expected to generate the required 'big push' to break out of a self-feeding circle of poverty (Rabbi *et al.*, 2013). Empirical evidence to support the positive effects of remittance effects exist including inter alia, those relating inward remittances to economic growth (e.g., Mallick, 2008); investment (Bjuggren *et al.*, 2010); savings (Gani, 2016); aid (Laniran & Olakunle, 2019); foreign direct investment (Combes *et al.*, 2010); risk sharing (Nnyanzi, 2013); financial deepening (Gupta *et al.*, 2007); physical and human capital (Yang, 2008); overall poverty levels (Adams and Page, 2005); and, welfare (e.g. Page and Plaza, 2006).

The aforementioned benefits of inward remittances notwithstanding, one downside that is identified in the literature is that the sharp surge in inflows often results in pressure on the real exchange rate, commonly known as the Dutch disease[1]. Such a phenomenon is driven by remittance inflows being spent on non-tradable goods and services (Acosta *et al.*, 2009). If used for investment, such inflows often support export competitiveness. Where remittances lead to an appreciation of the real exchange rate, three macroeconomic dangers emerge for the recipient country (Lopez *et al.*, 2007). First, the tradable sector of the economy, i.e., the export and import-competing industries suffer losses resulting from a loss of competitiveness. If remittances result in a reduction in labor supply or even fuel inflation, the ramifications for the tradable sector can be catastrophic, amidst international competition. Second, is the widening of the current account deficit to the degree that some of the remittances-induced-consumption is directed towards tradable goods. A combination of this outcome together with the domestic firms' loss of international competitiveness most likely, culminates into a worse external position. Finally, the appreciation of the local currency instigated by remittance inflows weakens monetary control, propels inflationary pressures, and disorganizes the sectoral allocation of investment. For, example, if the current account fails to sieve out large remittances,

[1] As a concept, in open macroeconomics, the Dutch disease is in reference to the signs, symptoms and consequences for the recipient economy of such massive foreign exchange inflows (Adejumo, 2018).

the economy is likely to experience what Lopez *et al.* (2007) refer to as a 'push up in monetary aggregates' that potentially derail a country's inflation targets. Similarly, large remittance inflows are likely to facilitate a surge in asset prices, particularly those in the real estate sector, as recipients increase their demand for such assets, i.e., overinvestment in some sectors. All such macroeconomic effects of real exchange appreciation triggered by huge remittance inflows offer a serious challenge to policymakers. The foregoing macroeconomic dynamics associated with remittances thus motivate the focus of this paper. Specifically, the need to determine their quantitative impact on the real exchange rate for recipient economies has been of growing interest in the development macroeconomics literature.

The central focus of this paper is to examine whether the increasing inflows of diaspora funds has had an impact on the real exchange rate and export competitiveness in SSA. More importantly, and as a nuance of the current analysis, we investigate the mediating role of liberalization and financial development in the observed linkage. The underlying motivation are the divergent and inconclusive findings in the literature on the effect of remittances on real exchange rate. On the one hand, studies that record an appreciation effect of inward remittances on real exchange rate are not uncommon, including inter alia, Hien *et al.* (2020) for Asia; Bourdet and Falck (2006) for Cape Verde; Hyder and Mahboob (2006) for Pakistan; Saadi-Sedik and Petri (2006) for Jordan; Chnaina and Makhlouf (2015) for Tunisia; Fuentes and Herrera (2008) for Giatemala; Izquierdo and Montiel (2006) for El Salvador; Rabbi *et al.* (2013) for Bangladesh; Hassan and Holmes (2016) for less developed economies; Hassan and Holmes (2012) for high remittance economies; Lopez *et al.* (2007) for Latin America; Amuedo-Dolantes and Pozo (2004) for LAC; Holzner (2006) for the Common Wealth of independent states (CIS); and, Kemegue *et al.* (2011) for SSA. In these and similar studies, the Dutch Disease effect that undermines the competitiveness of the export sector is facilitated by an upward pressure exerted on the local currency by inward remittances, as additional income is spent mostly on non-tradable goods and services. It is hence assumed that inflows are consumed and not saved nor invested, otherwise real exchange appreciation would disappear (Acosta, *et al.*, 2007; Lopez *et al.*, 2007). However, there is evidence in literature to the effect that remittance inflows to developing countries are equally saved for investment purposes (Nnyanzi, 2016; Piracha and Saraogi, 2011), implying that the possibility of finding a 'reverse Dutch disease effect', where inward remittances exert pressure on the exchange rate in favor of excessive depreciation which in turn fosters the tradable sector, is equally plausible. There is already evidence of remittances exhibiting support for an expansion of the traditional export sectors with gains for exports competitiveness (see e.g., Izquierdo and Montiel (2006) for Dominica; Ozcan (2011) for 10 developing countries; Barret (2014) for Jamaica; Brahim *et al.* (2017) for the Middle East and North Africa (MENA); Polat and Andrés (2019) for developing countries. The third and last strand of the literature finds no relationship between remittances and real exchange rate (see Izquierdo and Montiel (2006); Sackey (2001); Vargas-Silva (2009);

Rajan and Subramanian (2005); Shobande and Shodipe (2019); Mongardini and Rayner (2009); Ojapinwa and Nwokoma (2018)).

On the basis of the foregoing discussion, empirical evidence is divided among the aforementioned strands of the literature and the debate thus far, remains inconclusive. The lack of consensus on the impact of inward remittances on the real exchange rate suggests that perhaps the effect varies with the sample, methodology, and time period under consideration. For the case of SSA, evidence of an appreciation effect is in Owusu-Sekyere *et al.* (2014), while Mongardini and Rayner (2009); Ojapinwa and Nwokoma (2018), find no effect. This therefore calls for a re-investigation of the issue using alternative methodologies that capture both the short and long run effects. More importantly, the lack of consensus would likely imply that the effect is indirect rather than direct and that previous studies over-looked certain transmission channels necessary for observing the expected impact.

This paper contributes to the existing literature by examining the dynamics of the Dutch disease for selected countries from SSA using a relatively longer time period (1980-2018) compared to previous studies (e.g., Owusu-Sekyere *et al.*, 2014; Ojapinwa and Nwokoma, 2018; Mongardini and Rayner, 2009). The analysis is critical for the surveillance of the exchange rate amidst increasing inward remittances to the region (World Bank, 2016). We similarly argue as in Bang and Wunnava (2013), that countries using liberalization to cope with external imbalances will find that granting greater financial freedom would help in attracting higher levels of remittances. Contextually, countries using liberalization to reduce their exposure to external risks would find policies that enhance the robustness of domestic financial markets to be more effective. In this paper, we further investigate the extent to which trade and capital account liberalization as well as financial development and financial shocks influence the remittances impact on real exchange rate. In so doing, we establish whether the upward or downward pressure on the real effective exchange rate is weaker or stronger in countries with greater openness and/or better developed financial systems.

The latter hypothesis is in line with Acosta *et al.* (2009) but different in the sense that we avoid lumping all developing countries together and focus on SSA; taking a longer time period that captures the most recent span of years that has witnessed a surge in inward remittances. Elsewhere, Saborowski (2009), argues that the financial role is further strengthened for emerging market economies where it is found that in improving the efficient allocation of resources, financial sector development could dampen the appreciation effect of capital inflows. In this paper, financial development is different from previous studies. Specifically, we adopt a more detailed index to take into account the complex multidimensional nature of financial development. This aspect of the paper contributes to the literature on how the various forms of financial development facilitate or discourage maintaining a competitive exchange rate in an environment of growing remittances.

Precisely, it can be observed that financial development in all eight selected countries — Cameroon, Cote d'Ivoire, Gabon, Ghana, Nigeria, Sierra Leone, South Africa, and Togo — has been trending upward during the study period (1980-2018). Figure 1 shows that whereas the overall financial development index for the South Africa was highest, it was lowest for Sierra Leone. Only the latter country, Cameroon, Ghana, Togo and Cote d'Ivoire appear to have experienced minimal progress.

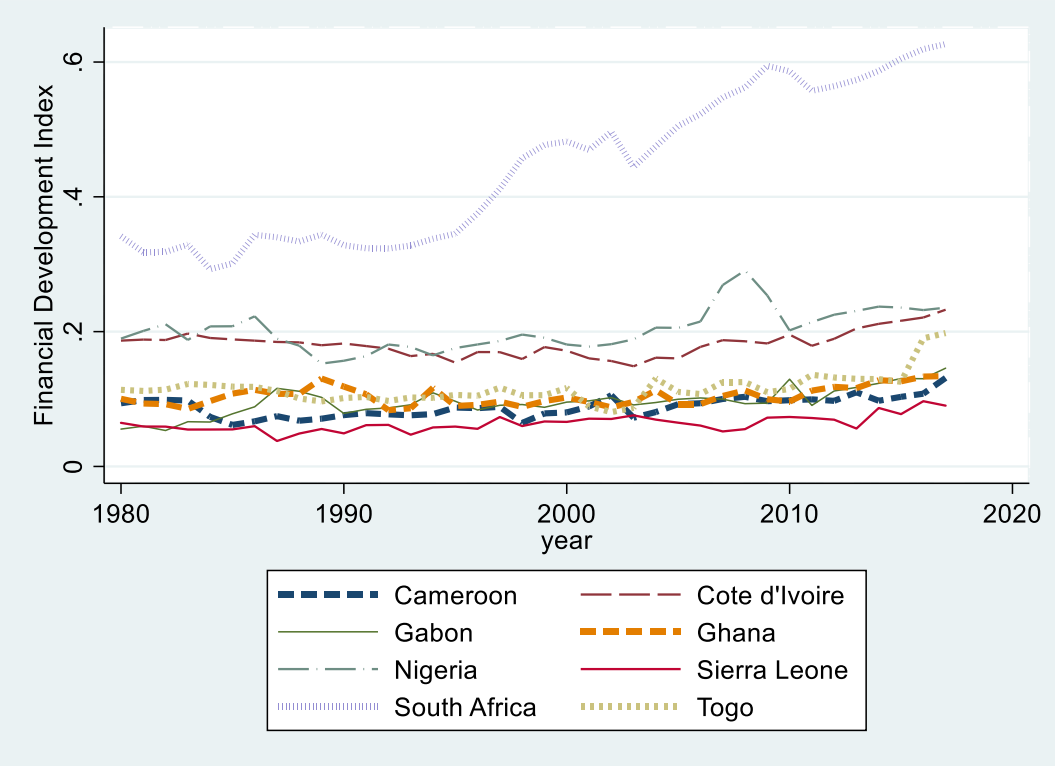

Figure 1: Financial Development Trends in Selected SSA Countries

Additionally, ascertaining the role of trade and capital account liberalization, in maintaining the competitive exchange rate in an environment of growing inward remittances is crucial and motivated by theoretical and empirical evidence. In Barajas *et al.* (2010), for example, trade openness of the recipient economy is a strong intervening factor that affects the role of remittances on real exchange rate in the Middle East and Central Asian countries. Likewise, it is documented that many African countries embraced liberalization policies to cushion their economies against country specific shocks, including those precipitated by remittance inflow surges (Krebs *et al.*, 2005). Related theory contends that economies that are more open relative to others are highly likely to attract higher cross-border capital flows, including remittance inflows. However, the empirical effects of liberalization on real exchange rate are less clear, particularly for SSA. Barajas *et al.* (2010) includes this variable in the real exchange model but fails to make a decisive conclusion about its effect, attributing the lack of robustness to the nature of sample under analysis. Fayad (2010) finds that the appreciation

effect of remittances hinges on the level of foreign direct investment, that proxies in some limited form, de facto liberalization. This paper contributes to the literature by investigating the role of trade and capital account liberalization in the remittance-real exchange rate linkage, if any, specifically for SSA. To the best of our knowledge, no previous study has investigated these interaction effects on real exchange rate for SSA, though there exists extensive scholarly works that analyze the Dutch disease effect of remittances based on mixed samples of industrial and developing economies, as well as on individual-specific countries.

More specifically, we address the following three questions: First, to what extent does the inflow of migrant transfers affect real exchange rate? Second, how does liberalization moderate the remittance-real exchange rate linkage, if any? Finally, does financial development matter in the observed nexus? These are important related questions for which the current study suggests empirical answers for SSA. Certainly, as earlier pointed out, there is plenty of empirical investigation on the effects of remittances on real exchange rate. However, analysis based on liberalization and financial development as transmission mechanisms in the remittance-real exchange linkage is largely absent for the case of SSA countries. Yet, these are realities characterizing the environment in which migrants remit funds back to their home countries. We hold strong the hypothesis that spending, and resource movement effects of inward remittances are different under alternative levels of liberalization and financial development as well as the extent to which global shocks affect the economy. Furthermore, the limited evidence on the possible differential short run and long run remittance effects for the region that accounts for the possible endogeneity as well as heterogeneity issues is a strong motivation for this paper. We thus employ the PMG-ARDL model for forecasting and disentangling the long-run relationships from short-run dynamics, while at the same time taking care of endogeneity and heterogeneity issues (Pesaran *et al.*, 1999).

The results confirm our hypothesis that remittances matter for real exchange rate, but the pressure exerted on the exchange rate favors excessive depreciation, which in turn fosters competitiveness in the tradable sector. By implication, a 'reverse Dutch disease effect' exists for the selected countries in SSA. However, the observed association is attenuated by liberalization and financial development. These findings not only point to possible policy outcomes that are urgently required for real exchange rate related macroeconomic surveillance and proper management of inward remittances but is also add to the pool of knowledge in the development macroeconomics literature.

The rest of the paper is organized as follows. Sections 2 and 3 respectively, capture the data and methodological aspects as well as the results and their discussion. The robustness checks to determine the sensitivity of our findings are given attention in section 4, while the concluding remarks appear in section 5, in addition to the policy recommendations and the potential areas for future studies emanating from the limitations in this paper.

2. Data, Model and Methodology

2.1. Data and Descriptive statistics

We employ panel data spanning 1980-2018, covering 8 SSA countries with complete data without gaps on the variables of interest, namely, Cameroon, Cote d'Ivoire, Gabon, Ghana, Nigeria, Sierra Leone, South Africa and Togo. These were selected on basis of data availability and size of remittance inflows. While the period coincides with the increasing flows of remittances to the region, the sample includes Togo, Ghana, and Nigeria, that have the largest share of remittances to GDP as of 2018. In Tables 1, 2 and 3, we respectively present the variable definitions and sources, descriptive statistics and the pairwise correlation of the main explanatory variables.

In Table 3, the variables that were highly correlated such as financial institutions (FI) and Financial development (FD), financial markets (FM) and FD, were not included in the same model due to multicollinearity suspicion.

Table 1: Definitions of the variables and sources

Variable	
REER	Real effective exchange rate is the nominal effective exchange rate (a measure of the value of a currency against a weighted average of several foreign currencies), divided by a price deflator or index of costs, taking year 2010 as base year. Source: WBI as reported by International Monetary Fund, International Financial Statistics.
RTNT	RTNT (Tradable/Non-Tradable Output): Ratio of the sum of agriculture and manufacturing output (as a share of GDP) over services' output (as a share of GDP). Source: World Bank World Development Indicators.
REM	Personal remittances comprise personal transfers and compensation of employees as defined by World Bank. It is expressed either as % of GDP or in $US dollars. Source: World Bank Indicators (WBI)
TL	Trade is the sum of exports and imports of goods and services measured as a share of gross domestic product. It proxies trade liberalization. Expected sign is either positive or negative. Source: WBI
GOVEXP	General government final consumption expenditure (as % of GDP). Either negative or positive sign is expected. Source: WBI
GDPPC	Gross domestic product per capita is used as a proxy measure for differential technological progress. Expected negative. Source: WBI
TOT	Terms of trade proxied by net barter terms of trade index, calculated as the percentage ratio of the export unit value indexes to the import unit value indexes, measured relative to the base year 2000. The expected sign on the coefficient is either positive or negative. Source: WBI
AID	Net official development assistance (ODA) as % of GDP, following data from World Bank. Source: WBI
FDI	Net Foreign direct investment as percentage of GDP. Source: WBI
NFA	Net foreign assets (% of GDP). Source: WBI
M2	Money supply proxied by broad money to capture monetary policy effect. Source: WBI
FD	Financial development index. It is a relative ranking of countries on the depth, access and efficiency of their financial institutions and financial markets. It is an aggregate of the financial institutions index (FI) and financial markets index (FM). In turn, FI comprises of three indices: financial institutions depth index (FID), financial institutions access index (FIA), and, financial institutions efficiency index (FIE). FM also constitutes three indices: financial markets depth index (FMD), financial markets access index (FMA), and, financial markets efficiency index (FME). Details can be found in the Financial Development Index Database. Source: IMF
CAL	Capital account liberalization index. Source: Chinn and Ito (2006)
Crisis	Financial crisis of 2007-2008 dummy. It takes 1 for the period 2007-2008 and 0 otherwise

Table 2: Descriptive statistics

Variable	N	Std.	Mean	Median	Min	Max	Skewness	Kurtosis
REER	312	253.33	153.7	103.62	49.73	3522.72	9.97	117.79
RTNT	312	.67	.93	.76	.22	5.05	3.09	17.11
REM	311	2.32	1.38	.4	0	10.71	2.4	7.98
TL	312	23.83	62.22	60.76	6.32	119.85	.01	2.36
M2	312	4004.12	1722.66	533.86	0	32717.2	4.91	30.67
TOT	312	49.72	124.94	118.23	21.4	357.58	1.21	6.03
GDP	312	104.54	55.22	10.72	.49	568.5	2.66	9.6
NFA	312	16.48	1.57	4.64	-128.22	21.52	-3.09	18.4
GOVEXP	312	4.85	12.14	12.12	.91	25.78	-.28	3.09
AID	299	6.4	5.6	3.15	-.17	30.69	1.68	5.72
CAL	304	.12	.19	.17	0	.45	.49	2.84
Crisis	312	.22	.05	0	0	1	4.07	17.55
FD	304	.12	.16	.11	.04	.63	2.07	6.99
FI	304	.14	.24	.2	.07	.74	2.07	6.68
FM	304	.12	.08	.02	0	.5	1.8	5.83

Notes: REER denotes real effective exchange rate; REM is inward remittances; M2 is broad money (US$ billion); AID is official development assistance; GDP is Gross domestic product (US$ billion); TOT is terms of trade; GOVEXP is government consumption expenditure; NFA is net foreign assets; TL is trade openness; CAL is capital account openness; FD is financial development index; FI is financial institutions index; FM is financial markets index; Crisis is financial crisis of 2007/08 dummy that takes 1 for the period 2007-2008 and 0 otherwise; RTNT is ratio of tradable to non-tradable. N are observations, SD is standard deviation, min is minimum, max is maximum. All variables are in their original form (i.e. untransformed).
Source: Author calculations based on STATA output.

Table 3: Pairwise correlation of main explanatory variables

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) REM	1.00												
(2) TL	0.26	1.00											
(3) M2	0.42	0.30	1.00										
(4) TOT	-0.08	0.16	0.10	1.00									
(5) GDP	-0.17	0.19	0.43	0.52	1.00								
(6) NFA	0.47	0.24	0.35	0.21	0.41	1.00							
(7) GOVEXP	0.34	-0.03	-0.24	-0.36	-0.57	-0.02	1.00						
(8) AID	0.21	0.29	-0.25	-0.24	-0.65	-0.29	0.50	1.00					
(9) CAL	-0.23	0.14	0.27	0.20	0.24	-0.18	-0.30	-0.12	1.00				
(10) Crisis	0.12	0.06	0.10	0.08	0.11	0.18	-0.01	-0.04	0.02	1.00			
(11) FD	0.20	-0.08	0.32	0.25	0.48	0.37	-0.12	-0.63	-0.02	0.06	1.00		
(12) FI	0.12	0.00	0.29	0.27	0.55	0.36	-0.09	-0.56	-0.03	0.04	0.93	1.00	
(13) FM	0.37	-0.07	0.18	0.19	0.19	0.38	0.02	-0.47	-0.11	0.07	0.86	0.68	1.00

Notes: REER denotes real effective exchange rate; REM is inward remittances; M2 is broad money; AID is official development assistance; GDP is Gross domestic product; TOT is terms of trade; GOVEXP is government consumption expenditure; NFA is net foreign assets; TL is trade openness; CAL is capital account openness; FD is financial development index; FI is financial institutions index; FM is financial markets index; Crisis is financial crisis of 2007/08 dummy that takes 1 for the period 2007-2008 and 0 otherwise. N are observations, SD is standard deviation, min is minimum, max is maximum. All variables except NFA, CAL, and Crisis are log-transformed.
Source: Author calculations based on STATA output.

2.2. Model Specification

In line with theory, and following inter alia (Fayad, 2010); Brahim *et al.* (2017); Adejumo (2018), we generally specify a model, assuming that the real effective exchange rate is a function of remittances and a host of other control variables identified in literature:

$$\text{REER}_{i,t} = \sigma_i + \lambda_{1,i} REM_{i,t} + \lambda_{2,i} Z_{i,t} + \varepsilon_{i,t}. \quad (1)$$

Where $REER$ is the real effective exchange rate to proxy the overall performance of a currency. If the overall effective exchange rate increases, it suggests the local currency is becoming stronger. In other words, an increase in $REER$ implies that exports become more expensive, and imports become cheaper. By implication, an increase indicates a loss in trade competitiveness; REM_{it} stands for remittances inflow (% of GDP or in US dollars); Z_{it} is the vector of the control variables identified in literature. These include GDP, net foreign assets, terms of trade, government expenditure, foreign aid, money supply, trade, capital account liberalization index, financial development index, and the global financial crisis dummy; ε_{it} is the error term. It has however been suggested by Bleaney and Tian (2014) as a good practice to incorporate the lagged values of $REER$ to test for longer term effect in static model. This leads to a dynamic panel model specified in (2):

$$\text{REER}_{i,t} = \sigma_i + \vartheta_i \text{REER}_{i,t-1} + \lambda_{1,i} REM_{i,t} + \lambda_{2,i} Z_{it} + \varepsilon_{i,t} \quad . \quad (2)$$

Instead of using $REER$, we can use the ratio of tradables to nontradables (RTNT) as a dependent variable to measure the resource movement effect. In this case, the equation would likewise appear similar to equations (1) and (2) for the static and dynamic models respectively, except for the dependent variable. Before checking for the stationarity of the series, Eberhardt and Teal (2011 and Moscone and Tosetti (2009) recommend first checking for cross-sectional dependence and homogeneity in the series.

2.3. Econometric methodology

The econometric investigation for the study involves several steps including testing for cross-sectional dependence and homogeneity in the first stage, followed by examining the stationarity of the series and finally an estimation of the model to capture the short- and long run model behavior.

2.3.1. Cross-sectional dependence tests and homogeneity test

We are aware that the period under analysis could have been characterized by global economic shocks, with heterogeneous impacts across countries in SSA. One prominent example is the global financial crisis of 2007-2008. This, and perhaps other shocks whether global or local, with spillover effects between countries or regions would give rise to a cross-sectional dependence type of correlation (Eberhardt and Teal, 2011; Moscone and Tosetti,

2009). We employ the CD test and the results are reported in Table 4. Here, it is revealed that with the exception of aid and government spending, all other variables exhibit cross-sectional dependence in levels. For the case of aid (AID) and government expenditure (GOVEXP), the null hypothesis of cross-sectional independence could not be rejected, and the average correlation in the panel for each of the two variables was near zero, further suggesting a distribution of cross-sectional independence. Otherwise for all the other explanatory variables, the null is rejected at 1% level of significance, implying strong cross-sectional dependence among the selected countries in the panel data. As for homogeneity, we employ Pesaran and Yamagata (2008) test and Blomquist & Westerlund (2013) test each of which that constitutes two statistics. The results, presented in Table 5, reveal a rejection of homogeneity, thus confirming heterogeneity slopes of variables.

Table 4: Pesaran Cross-sectional Dependence Test

Variable	**CD-test**	**p-Value**	**corr**	**abs(corr)**
REM	18.55	0.000	0.644	0.663
FDI	5.53	0.000	0.189	0.27
AID	0.63	0.53	0.012	0.298
NFA	17.89	0.000	0.634	0.634
TL	4.55	0. 000	0.139	0.336
GOVEXP	1.53	0.127	0.047	0.241
TOT	5.13	0.000	0.157	0.453
GDP	29.66	0.000	0.909	0.909
Crisis	32.62	0.000	1.000	1.000
FD	14.53	0.000	0.445	0.445
FI	9.96	0.000	0.305	0.326
FM	20.85	0.000	0.639	0.639

Notes: Presuming the null hypothesis of cross-sectional independence, the Pesaran statistic (CSD) is assigned as N (0, 1) with Stata command XTCSD. The average correlation (corr) and absolute average correlation (Abs (corr)) coefficients existing between each type of variable are estimated. REM is inward remittances; M2 is broad money; AID is official development assistance; GDP is Gross domestic product; TOT is terms of trade; GOVEXP is government consumption expenditure; NFA is net foreign assets; TL is trade openness; FD is financial development index; FI is financial institutions index; FM is financial markets index; Crisis is financial crisis of 2007/08 dummy that takes 1 for the period 2007-2008 and 0 otherwise. All variables except NFA, and Crisis are log-transformed.

Source: Author calculations based on STATA output.

Table 5: Test for slope homogeneity

Pesaran & Yamagata (2008) (PY)	Statistic	p-value
Delta	9.219	0.0000
Delta_adj.	10.999	0.0000
Blomquist & Westerlund (2013) (BW)	Statistic	p-value
Delta	3.389	0.0010
Delta_adj.	4.044	0.0000

Notes: For the BW test, HAC Kernel is obtained with Bartlett with average bandwidth 2.875. In both tests, the null is: slope coefficients are homogenous.

Source: Author's calculations.

2.3.2. Panel Unit Root Tests

In the presence of cross-sectional dependence, the first-generation unit root tests might provide misleading outcomes since they do not control for contemporaneous correlation. Therefore, we zero down on second generation tests which constitute this benefit. We apply the Pesaran's cross-sectional augmented Im-Pesaran-Shin (CIPS), also similar to Pesaran's cross-sectional augmented (CADF) test both advocated and developed in Pesaran (2007). According to the author, the CADF-CIPS test is explicitly derived with the aim of directly addressing the problem of cross-sectional dependence. The test results presented in Table 6 ascertain that none of the variables is integrated of order two or higher. Except for foreign aid, trade openness, ratio of tradable to non-tradable, capital account liberalization and money supply, the rest of the variables are stationary at levels albeit with mixed significance values. However, at first difference, the null hypothesis of non-stationarity is rejected at the 1% significance level, and the series are confirmed stationary. We therefore note a mixture of the order of integration between I(0) and I(1).

Table 6: Second Generation CIPS Panel Unit Root Tests (Zt-bar)

	No Trend	p-value	With Trend	p-value
Level				
REER	-3.196	0.001***	-1.976	0.024**
REM	-3.204	0.001***	-2.099	0.018**
FDI	-4.392	0.000***	-3.901	0.000***
AID	-1.459	0.072*	-1.249	0.106
TL	-0.131	0.448	1.496	0.933
M2	3.655	1.000	5.778	1.000
TOT	-0.744	0.228	-3.228	0.001***
GDP	-2.529	0.012***	-2.876	0.043**
GOVEXP	-2.705	0.003***	-2.745	0.003***
RTNT	-1.167	0.122	-1.444	0.074*
CAL	2.925	0.998	3.507	1.000
FD	-2.829	0.002***	-2.747	0.003***
FI	-2.445	0.023**	-3.391	0.000***
FM	-1.971	0.283	-2.220	0.650
NFA	-2.525	0.013	-2.824	0.060
First Difference				
ΔREER	-11.157	0.000***	-10.008	0.000***
ΔREM	-11.490	0.000***	-10.783	0.000***
ΔFDI	-12.431	0.000***	-11.767	0.000***
ΔAID	-12.169	0.000***	-11.597	0.000***
ΔTL	-12.053	0.000***	-11.430	0.000***
ΔM2	-6.105	0.000***	-6.723	0.000***
ΔTOT	-11.711	0.000***	-10.941	0.000***
ΔGDP	-5.879	0.000***	-5.947	0.000***
ΔGOVEXP	-13.184	0.000***	-12.910	0.000***
ΔRTNT	-10.926	0.000***	-9.944	0.000***
ΔCAL	-7.180	0.000***	-6.254	0.000***
ΔFD	-12.593	0.000***	-11.737	0.000***
ΔFI	-6.059	0.000***	-6.137	0.000***
ΔFM	-5.351	0.000***	-5.428	0.000***
ΔNFA	-5.458	0.000**	-5.397	0.000***

Notes: Δ denotes the first difference of the variable; The null hypothesis of the CIPS unit root test assumes a non-stationary series while the alternative hypothesis implies a stationary series; REM is inward remittances; M2 is broad money; AID is official development assistance; GDP is Gross domestic product; TOT is terms of trade; GOVEXP is government consumption expenditure; NFA is net foreign assets; TL is trade openness; FD is financial development index; FI is financial institutions index; FM is financial markets index; Crisis is financial crisis of 2007/08 dummy that takes 1 for the period 2007-2008 and 0 otherwise. All variables except NFA, and Crisis are log-transformed. All are logged except Crisis and CAL.

Source: Author calculations based on STATA output

2.3.3. Panel ARDL

Given the mixture of order of integration between I~(0) and I~(1), and nothing of I~(2) or above, the appropriate technique adopted is the panel ARDL. According to Pesaran *et al.* (1999), the ARDL is meritoriously endowed with: the ability to simultaneously estimate short- and long-run dynamics; support for mixed order of I~(0) and I~(1); taking into account country-specific heterogeneity issue; and, being robust and performing better for both small as well as big samples. Pesaran and Shin (1999) argue further that modelling the ARDL with the appropriate lags of dependent and independent variables will correct for both serial correlation and endogeneity. Essentially, the Pooled Mean Group estimator constrains the long-run coefficients to be homogeneous and allows the short-run coefficients as well as the error correction terms, intercepts and the error variances to differ freely across the entire cross-section due to the widely different impact of the vulnerability to inter alia financial crises and external shocks, stabilization policies, and, monetary policy (Samargandi *et al.*, 2013). Thus, one outstanding advantage of using the PMG estimator is that it considers a lower degree of heterogeneity since it imposes homogeneity in the long run coefficients while still allowing for heterogeneity in the short-run coefficients and the error variances. Three basic assumptions characterize the PMG estimator: First, the error terms are assumed to be serially uncorrelated and distributed independently of the repressors, implying that the explanatory variables can be treated as exogenous; second, there is assumed to be a long-run relationship between the dependent and explanatory variables, and, lastly, the long run parameters are assumed the same across countries.

We are fully aware that two other alternative estimators of ARDL exist, viz., the Mean Group (MG) and the Dynamic Fixed Effects (DFE). One main disadvantage of the former approach, however, is that for small N, the MG estimator is quite sensitive to outliers and small model permutations (Favara, 2003). On the other hand, one serious drawback of DFE estimator is that it only allows for intercept heterogeneity. Also, as Baltagi *et al.* (2000) show, the DFE is subject to a simultaneous equation bias due to the endogeneity between the error term and the lagged dependent variable in case of a small sample size. Nevertheless, a Hausman test is employed to choose the most efficient estimator, among the three, for the study. The results indicate preference for PMG over the other two, as the relevant p-value suggests.

Generally, we rewrite equations (2) in the following ARDL (p,q) estimable PMG model:

$$\text{REER}_{it} = \sum_{j=1}^{p} \lambda_{ij}\, \text{REER}_{i,t-j} + \sum_{j=0}^{q} \delta_{ij}'\, X_{i,t-j} + \mu_i + \varepsilon_{it}, \qquad (3)$$

where REER_{it} is the real effective exchange rate for country i at time t; X_{ij} is the $k \times 1$ vector capturing the inward remittances, liberalization and control variables previously defined, for country i at time t; δ_{ij} are $k \times 1$ coefficient vectors; countries run from 1 to N, viz., $i = 1, \ldots, N$; just as time periods run from 1 to T, viz., $t = 1, \ldots, T$. While the parameter μ_i is the

fixed effects, and ε_{it} is the normal error term, $p$and q respectively denote the lags included in the model for dependent and independent variables. Equation (2) is therefore also re-parameterized to become equation (4), in consideration of the changes in (3):

$$\Delta \text{REER}_{i,t} = \left(\varphi_i \text{REER}_{i,t-1} + \beta_i' X_{it}\right) + \sum_{j=1}^{p-1} \lambda_{ij}^{*} \Delta \text{REER}_{i,t-j} + \sum_{j=0}^{q-1} \delta'^{*}_{ij} \Delta X_{i,t-j} + \mu_i + \varepsilon_{i,t}, \quad (4)$$

where $\Delta \text{REER}_{it} = \text{REER}_{it} - \text{REER}_{i,t-1}; \varphi_i = -\left(1 - \sum_{j=1}^{p} \lambda_{ij}\right); \beta_i = -\sum_{j=0}^{q} \delta_{ij};$

$$\lambda_{ij}^{*} = -\sum_{m=j+1}^{p} \lambda_{im}\,; \delta_{ij}^{*} = -\sum_{m=j+1}^{q} \delta_{im}.$$

To capture the role of either liberalization and finance in the remittance-real exchange rate linkage, we introduce interactions in the long run and short run models. In estimating the resultant model, we center the interaction variables at their mean to keep the usual interpretation for the non-interacted terms as being the raw effect of that variable at the mean as opposed to when the interacted variable equals zero. By so doing, we make the results in relevant tables more easily compared to the other tables without the interactions (see Wooldridge, 2012). In brief, whereas the main hypotheses being tested are that remittance inflows do not significantly affect real exchange rates directly in the selected countries, and, that financial development does play no role in the observed linkage between these migrant transfers and real exchange rate, the other important hypothesis is that liberalization does not influence the remittance-real exchange linkage.

It can be argued that whereas remittances could have an impact on real exchange rate, the possibility of a reverse effect may be non-dismissible, and hence necessitating performance of a causality test. In essence, while the paper discusses the impact of remittance on real exchange rate, it is also possible that the changes in exchange rate have effect on the willingness of working or investing abroad, which in turn could have an effect on remittances. From this view, the relationship between changes of real effect exchange rate (depreciation, negative) and remittance (inflow) would also be negative, the same as "the reverse Dutch disease effect". We therefore applied a granger causality test to determine the causal relationship. Specifically, we proceeded with a causality analysis by running a Granger non-causality test. As noted in Zonon (2021), the most widely used Granger causality tests are designed for heterogeneous panels. Juodis, Karavias, and Sarafidis (2021) proposed a novel approach that helps perform a Granger non-causality test in both heterogeneous and homogeneous panels that best fit our data. According to its authors, the test offers superior size and power performance, which stems from the use of a pooled estimator with a sqrt (NT) rate of convergence. The advantage of using the test lies in two other useful properties; it can be used in multivariate systems, and it has power against both homogeneous as well as heterogeneous alternatives. The test also reports results for the Half-Panel Jackknife (HPJ) Wald-type test for Granger non-causality.

3. Results and Discussion

The first objective was to investigate the extent to which inward remittances affect real exchange rate and export competitiveness in selected countries from SSA. The results are presented in Table 7, where evidence for the reverse Dutch disease effect accruing from these migrant funds is undeniably strong in the long-run. The associated coefficient on the remittance variable in all specifications (1) to (5) suggest that remittance inflows have a negative effect on the real exchange rate in the long run, implying that that an increase in remittance inflows leads to a depreciation of the domestic currencies for the selected countries. This positively affects their exports competitiveness, causing a boost in the current account balance. Based on specification (1), *ceteris paribus*, an increase in inward remittances by 100% would lead to a real exchange rate depreciation of about 10.5 percent. When all control variables are included (column 5), the reverse Dutch disease effect emanating from a surge in remittances-to-GDP ratio rises to about 15%. Our findings are in line with previous documented evidence in Acosta *et al.* (2009).

Table 7: Remittances (as % of GDP) and Real exchange rate

Variables	(1) REM		(2) TL		(3) CAL		(4) Crisis		(5) REM	
Long run										
REM	-0.105***	(-4.87)	-0.115***	(-6.10)	-0.129***	(-6.53)	-0.112***	(-5.40)	-0.151***	(-6.45)
M2	-0.229***	(-6.97)	-0.217***	(-7.47)	-0.248***	(-8.26)	-0.208***	(-6.30)	-0.284***	(-7.95)
AID	-0.075**	(-2.55)	-0.044*	(-1.88)	-0.040	(-1.46)	-0.062**	(-2.31)	0.003	(0.19)
GDP	0.223***	(3.38)	0.144*	(1.93)	0.321***	(5.52)	0.215***	(3.18)	0.279***	(3.50)
TOT	0.111	(1.59)	0.100	(1.57)	0.033	(0.60)	0.109	(1.61)	0.098	(1.43)
GOVEXP	0.887***	(3.55)	0.836***	(3.92)	0.576***	(2.95)	0.830***	(3.49)	0.331	(1.45)
NFA	0.004	(1.41)	0.009***	(2.95)	0.004*	(1.71)	0.004	(1.33)	0.009***	(3.86)
TL			-0.353***	(-3.62)					-0.163*	(-1.67)
CAL					-0.069	(-0.34)			-0.699***	(-4.93)
Crisis							-0.039	(-0.75)	-0.090*	(-1.81)
ECT	-0.259***	(-3.07)	-0.242**	(-2.37)	-0.268**	(-2.46)	-0.258***	(-3.03)	-0.215**	(-2.42)
Short run										
REM	-0.007	(-0.22)	-0.005	(-0.18)	-0.002	(-0.06)	-0.011	(-0.33)	-0.005	(-0.19)
M2	-0.265***	(-2.93)	-0.246**	(-2.13)	-0.257***	(-2.68)	-0.239***	(-2.83)	-0.229*	(-1.76)
AID	-0.080	(-1.01)	-0.033	(-1.01)	-0.094	(-1.15)	-0.079	(-1.00)	-0.038	(-1.17)
GDP	0.234*	(1.76)	0.173	(1.16)	0.227*	(1.66)	0.242*	(1.78)	0.168	(1.07)
TOT	0.069	(1.01)	0.230	(1.16)	0.035	(0.49)	0.047	(0.73)	0.197	(0.85)
GOVEXP	-0.063	(-0.30)	0.341	(1.07)	-0.118	(-0.45)	-0.064	(-0.31)	0.324	(0.98)
NFA	0.001	(0.39)	-0.001	(-0.36)	0.001	(0.39)	0.001	(0.34)	-0.001	(-0.44)
TL			-0.230**	(-1.98)					-0.304**	(-2.52)
CAL					-0.298*	(-1.87)			-0.334	(-1.58)
Crisis							-0.031*	(-1.91)	0.002	(0.13)
Observations	287		287		279		287		279	

Notes: The dependent variable in all specifications is real effective exchange rate (REER). Explanatory variables include inward remittances (REM), broad money (M2), official development assistance (AID), Gross domestic product (GDP), terms of trade (TOT), government consumption expenditure (GOVEXP), net foreign assets (NFA), trade openness (TL), capital account openness (CAL), financial crisis of 2007/08 dummy (Crisis) that takes 1 for the period 2007-2008 and 0 otherwise. ECT is the error correction term. All are logged except Crisis, NFA and CAL. The results are from the pooled mean group estimator, as supported by the Hausman test results not shown in the table. z-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' calculations.

Regarding the other capital inflow in the model, Table 7, Column 1 reveals a reverse Dutch disease effect emanating from aid. Specifically, an increase in aid by 100 per cent is expected to generate a reduction in real exchange rate by about 7.5 percent. This is nearly three-quarters of the effect caused by remittance inflows (Column 1). Adejumo (2018) and Quattara and Strobl (2008) record similar outcomes for Nigeria and Ghana respectively.

Furthermore, Tables 7 reveals that an expansionary monetary policy produces a depreciation effect on the real exchange rate in the selected countries from SSA. Here, the relevant coefficients on the money supply throughout all specifications are significantly negative and at 1 percent statistical level, suggesting a pronounced reverse Dutch disease effect emanating from such a macroeconomic policy. Note further, that the outcome is valid both in

the short and long-run. The finding is in line with theory, where we would expect quantitative easing to diminish the value of the local currency relative to other currencies. Hence, the final long-run effect of an increase in the money supply is a depreciation of the currency that normally occurs in a floating exchange rate system. Our finding is in line with Acosta *et al.* (2009), particularly from their GMM-IV system estimation results based on unbalanced panel data for developing countries. By implication, among other factors, expansionary monetary policy influences aggregate demand by adding extra income for consumption and investment.

The fiscal policy, here proxied by government expenditure, is found to be another important cause of depreciation of the real exchange rate in the selected SSA countries. The result observed in Table 7, Column 1, reveals that an increase of 1 percentage point in the government expenditure share in GDP leads to a 0.887 percentage point increase in real exchange rate in the long-run. This Dutch disease effect consistent with earlier findings in Khushid *et al.* (2018) implies that a greater portion of government spending in the selected countries from SSA is on average dedicated to non-tradable, which in turn causes their relative prices to increase, thus causing real exchange rate to appreciate.

On the other hand, it is demonstrated in Table 7, Column 2, that the net foreign are positively associated with real exchange rate in the selected SSA countries. Specifically, if we increase net foreign assets by 1 unit, we'd expect our real exchange rate variable to increase by 9 percent, implying an appreciation effect and reduction in export competitiveness. The finding is significant at 1 percent level and consistent with theory where an increase in net foreign assets will lead to real exchange rate appreciation which is characteristic for transition or developing countries. Intuitively, a higher value for this variable will lead to a higher yield for domestic savings. Higher levels of foreign currency entering the country therefore result into an appreciation of the real exchange rate. Previous study by Dumitrescu and Dedu (2009) record similar findings for Romania.

Likewise, an increase in income positively affects real exchange rate. This is clear evidence of the prediction of the Balassa-Samuelson effect which asserts that productivity grows faster in the tradable sector than in non-tradable sector in the developing countries. As a higher GDP per capita is expected to increase incomes and hence increase demand for non-tradable, causing a real appreciation. From Table 7, column 1, an increase in income by 100 percent would approximately lead to a 22 percent appreciation in real exchange rate in on average. The Dutch disease effect observed suggests that the demand effects of the increase in income are greater than the supply effects. Similarly, the effect of the global financial crisis is negative though weakly significant in Tables 7, Column 5, implying that for SSA countries, the shock was a blessing for real exchange rate, as it precipitated a reverse Dutch disease effect,

propelling export competitiveness. Kataria and Gupta (2018) record similar findings for the Emerging markets during the period 2000-2015.

Turning to liberalization, several findings presented in Table 7 deserve attention. In Column 5 for example, the results reveal that at a given level of remittances as a share of GDP, a 1 percentage increase in capital account liberalization would lead to a reduction in real exchange rate equivalent to -0.699 percentage points. Similarly, Column 2 shows that in response to a 1 percent increase in the ratio of the sum of exports and imports to GDP, at a given remittance level, real exchange rate would depreciate by -0.353 percentage points *ceteris paribus*. The observed effect is highly significant at 1 percent statistical level, but only valid in the long-run. Acosta *et al.* (2009), document that the removal of trade restrictions during the period 1980-2018 generated a reduction in export competitiveness, as a 10 percent increase in trade liberalization directly led to about 6.3 percent increase in real exchange rate. In principle, the income effect of the change in prices as a result of embracing trade openness dominated the substitution effect from the same, causing prices of non-tradable (home goods) relative to tradable to decrease, thus leading to a depreciation of the local currency. Similarly, the removal of capital account restrictions, such as exchange rate controls, appears beneficial to the export sector competitiveness in the selected countries. The absence of the Dutch disease effect in this regard is a clear confirmation of Obstfeld (1986) argument that although capital account liberalization could lead to an initial period of real appreciation, it results in long-run real depreciation.

Table 8: Interactive effect of remittances, liberalization and financial crisis on real exchange rate

	(1)		(2)		(3)	
VARIABLES	REM*CAL		REM*TL		REM*Crisis	
Long run						
REM	0.075**	(2.42)	-0.138***	(-3.94)	-0.116***	(-5.73)
M2	-0.181***	(-6.87)	-0.059	(-1.11)	-0.193***	(-5.70)
AID	-0.026	(-1.60)	-0.026	(-0.68)	-0.055**	(-2.14)
GDP	0.317***	(7.01)	0.241**	(2.00)	0.210***	(3.07)
TOT	0.134**	(2.54)	-0.047	(-0.63)	0.104	(1.59)
GOVEXP	0.127	(0.69)	0.428	(1.37)	0.809***	(3.38)
NFA	-0.010***	(-4.87)	-0.002	(-0.52)	0.002	(0.93)
CAL	-0.704***	(-5.53)				
REM*CAL	-0.837***	(-8.91)				
TL			0.484***	(2.95)		
REM*TL			-0.070*	(-1.66)		
Crisis					-0.002	(-0.03)
REM*Crisis					0.075	(0.75)
ECT	-0.309**	(-2.49)	-0.180***	(-2.87)	-0.258***	(-2.96)
Short-run						
REM	-0.007	(-0.22)	-0.033	(-0.85)	-0.014	(-0.41)
M2	-0.288***	(-2.61)	-0.257***	(-4.11)	-0.246***	(-3.09)
AID	-0.111	(-1.31)	-0.036	(-1.38)	-0.082	(-1.03)
GDP	0.216	(1.48)	0.159	(1.38)	0.235*	(1.71)
TOT	0.004	(0.05)	0.191	(1.07)	0.045	(0.73)
GOVEXP	0.060	(0.29)	0.288	(0.92)	-0.022	(-0.09)
NFA	0.006*	(1.95)	0.001	(1.35)	0.002	(0.50)
CAL	-0.074	(-0.69)				
REM*CAL	0.170***	(3.74)				
TL			-0.496***	(-5.44)		
REM*TL			0.058	(0.45)		
Crisis					0.224	(0.33)
REM*Crisis					-0.219	(-0.71)
Observations	279		287		287	

Notes: The dependent variable in all specifications is real effective exchange rate (REER). Explanatory variables include inward remittances (REM), broad money (M2), official development assistance (AID), Gross domestic product (GDP), terms of trade (TOT), government consumption expenditure (GOVEXP), net foreign assets (NFA), trade openness (TL), capital account openness (CAL), financial crisis of 2007/08 dummy (Crisis) that takes 1 for the period 2007-2008 and 0 otherwise. ECT is the error correction term. All are logged except Crisis, NFA and CAL. The results are from the pooled mean group estimator, as supported by the Hausman test results not shown in the table. z-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1.

Source: Authors' calculations.

Relatedly, in line with our hypothesis, we find liberalization to be important in influencing the remittance linkage with real exchange rate in the long-run. Evidence to this effect is provided in Table 8, Columns 1 and 2. While the interaction term of trade liberalization with remittances is negative but weakly significant at 10 percent statistical level, that on the capital account openness is negative and greatly significant at 1 percent conventional level. In either case, however, the total marginal effect exhibited is suggestive of a depreciation effect, though the absolute size of the impact is apparently smaller (-0.084) for capital account liberalization than for trade liberalization (-0.4523) in the interactive mode with remittances. A similar conclusion holds for the short-run results. Overall, we can intuitively argue that the adverse effects of inward remittances on real exchange rate depreciation are assuaged by liberalization policies, whether from the trade sector or current account.

In a further analysis, and in line with previous works by Acosta *et al.* (2009) and Saborowski (2009), the role of financial development is significantly observable in Table 9. Column 1 for example, demonstrates that a country with higher financial development ratio to GDP assuages real exchange rate depreciation. Specifically, an increase of 1 percentage point in the ratio of remittances to GDP in a country where financial development represents 2.02 on average generates a currency depreciation of -0.4073 percentage points (-0.179-0.113*2.02) instead of -0.179 if financial development contributed nothing to GDP. For purposes of illustration, if there was a 1 percentage point increase in remittance inflows in a country with 1 percent of financial development share in GDP, this would in turn cause the real exchange rate to depreciate to about -0.292 percentage points (-0.179-0.113*1), which is lower compared to a depreciation of -1.309 percentage points driven by a 1 percentage point increase in inward remittance for a country with a share of financial development equivalent to 10 percent of GDP. A deeper analysis of the component of financial development that actually drives this outcome reveals that whereas total marginal impact of remittances on real exchange rate in the presence of financial institutions is -0.4073, that of financial markets stands at a higher percentage of about 0.0206. In other words, quantitatively, the financial markets component of financial development appears to mitigate the role of remittances in real exchange rate more than financial institutions in SSA. These findings are in line with Acosta *et al.* (2009) in terms of the importance of financial development in mitigating the remittance effects on the real exchange rate, though in the present case, it is the reverse Dutch disease effect under mitigation rather than the appreciation effect.

Table 9: Interaction effect of remittances and financial development on real exchange rate

	(1)		(2)		(3)	
Variables	**REM*FD**		**REM*FI**		**REM*FM**	
Long-run						
REM	-0.179***	(-7.35)	-0.153***	(-7.43)	-0.156***	(-3.52)
M2	-0.229***	(-5.83)	-0.238***	(-5.99)	-0.263***	(-7.98)
AID	-0.071***	(-2.86)	-0.072***	(-2.86)	-0.052**	(-2.35)
GDP	0.080	(0.97)	0.047	(0.51)	0.292***	(5.02)
TOT	0.152**	(2.17)	0.205***	(2.61)	0.038	(0.65)
GOVEXP	0.634***	(3.13)	0.554***	(2.62)	0.684***	(3.44)
NFA	0.014***	(4.10)	0.013***	(3.75)	0.006*	(1.70)
FD	-0.142	(-1.15)				
REM*FD	-0.113***	(-3.57)				
FI			-0.055	(-0.41)		
REM*FI			-0.112***	(-3.16)		
FM					0.004	(0.11)
REM*FM					-0.012	(-0.91)
ECT	-0.230**	(-2.53)	-0.228**	(-2.55)	-0.254**	(-2.28)
Short-run						
REM	-0.046	(-0.77)	-0.057	(-1.16)	-0.125	(-0.71)
M2	-0.251***	(-2.82)	-0.302***	(-2.67)	-0.209**	(-2.31)
AID	-0.051	(-0.87)	-0.066	(-1.07)	-0.061	(-0.77)
GDP	0.212**	(2.03)	0.237**	(2.08)	0.217*	(1.83)
TOT	0.066	(0.76)	0.045	(0.84)	0.050	(0.48)
GOVEXP	-0.114	(-0.52)	-0.047	(-0.23)	-0.125	(-0.57)
NFA	-0.001	(-0.36)	-0.000	(-0.02)	-0.001	(-0.22)
FD	0.081	(0.36)				
REM*FD	0.213	(1.37)				
FI			0.036	(0.21)		
REM*FI			0.162	(1.57)		
FM					0.148	(0.51)
REM*FM					0.076	(0.78)
Observations	279		279		279	

Notes: The dependent variable in all specifications is real effective exchange rate (REER). Explanatory variables include inward remittances (REM), broad money (M2), official development assistance (AID), Gross domestic product (GDP), terms of trade (TOT), government consumption expenditure (GOVEXP), net foreign assets (NFA), trade openness (TL), capital account openness (CAL), financial crisis of 2007/08 dummy (Crisis) that takes 1 for the period 2007-2008 and 0 otherwise. ECT is the error correction term. All are logged except Crisis, NFA and CAL. The results are from the pooled mean group estimator, as supported by the Hausman test results not shown in the table. z-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' calculations.

4. Causality Test Results

As shown in Table 10, the outcome of the Granger non-causality test indicates a two-way causality between remittances and real exchange rate. The output in the Table corresponds to the Granger non-causality univariate test of the relationship between remittances and real exchange rate (panel A), and real exchange rate and remittances (Panel B). Going by panel B, the null hypothesis that real exchange rate does not Granger-cause remittances is rejected at the 1% level of significance. This implies that past values of real exchange rate contain information that helps to predict remittances over and above the information contained in past values of remittances. Similarly, in Panel A, the null hypothesis that inward remittances do not Granger-cause real exchange rate is rejected at 10 percent level of significance. By implication, at one lag, there is causality between real exchange rate and inward remittances in at least one country sampled. Past values of remittances are thus significant, albeit weakly, in predicting the future values of real exchange rate.

Table 10: Juodis, Karavias and Sarafidis (2021) Granger non-causality test results

Number of units= 7.974359;		T=38;			Number of lags: 1	
Panel A						
BIC = -815.21867;		HPJ Wald test: 2.7278219;			pvalue_HPJ: 0.0986	
H0: REM does not Granger-cause REER.						
H1: REM does Granger-cause REER for at least one panel var						
Results for the Half-Panel Jackknife estimator						
Cross-sectional heteroscedasticity-robust variance estimation						
REM	Coefficient	SE	z	P>z	[95% Confidence Interval]	
REM						
L1.	0.0156	0.0094	1.65	0.099	-0.0029	0.0340
Panel B						
BIC = -119.32623;		HPJ Wald test: 93.422496;			p-value_HPJ: 0.0000	
H0: REER does not Granger-cause REM						
H1: REER does Granger-cause REM for at least one panel var						
Results for the Half-Panel Jackknife estimator						
Cross-sectional heteroscedasticity-robust variance estimation						
	Coefficient	SE	z	P>z	[95% Confidence Interval]	
REER						
L1.	-0.7376	0.0763	-9.67	0.000	-0.8872	-0.588

Note: The test's null hypothesis is that the independent variable does not cause the dependent variable. In test 1 (Panel A), the dependent variable is the log of real exchange rate (REER) while log of remittance inflows (REM) is the independent variable. In test 2 (Panel B), the direction of causality is reversed, with REER being the independent variable and REM the dependent variable. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively. HPG is the Half-Panel Jackknife estimator. SE is standard error.

5. Robustness checks

In line with Lartey *et al.* (2008), instead of adopting the spending effect model of real exchange rate, we capture the resource movement effects of remittances. By definition, this is the ratio of tradable to non-tradable output (RTNT) and can be used as an alternative measure of real exchange rate. We regress it on the other independent variables with controls similar to those in the REER model in order to check for the robustness of our previous findings. The existential hurdle however is to find systematic and comparable data on tradable. To circumvent this challenge, Lartey et al. (2008) suggest summing agriculture and manufacturing output, to proxy tradable, and then taking service output as non-tradable output. Data on these variables are available in the World Bank World Development Indicators database. The results from this alternative estimation of the real exchange rate model, presented in Table 11, confirm the role of remittances inflows in real exchange rate, which, based on the evidence from the Table 11, is not substantially altered. This also applies to results obtained using remittances in volume terms instead of remittance as share of GDP for the main explanatory variable, presented in Table 12.

6. Conclusion

We set out to examine the effect of inward remittances on real exchange rate in SSA. Overall, the findings suggest no detectable presence of the Dutch disease effect for the period under study. Instead, we confirm the hypothesis of negative remittances effect on real effective exchange rate, which intuitively suggests that remittance inflows are beneficial to export competitiveness in the long-run. In an effort to disentangle the channels through which remittances affect real exchange rates, we find financial integration and development as well as trade liberalization to significantly mitigate the observed remittance-real exchange rate linkage. These findings are vital and relevant for policymakers and scholars interested in dynamic capital flow movements as well as in exchange rate dynamics and the overall macroeconomic policy management of small open economies. In the policy arena for example, regional economic integration efforts taking shape in various regions in SSA should be supported as well as well-calculated capital account liberalization policies, amidst integrated programs and strategies to enhance inward remittances. The global target of the United Nation's Sustainable Development Goals (SDGs) to reduce remittance costs to 3 percent by 2030 ought to be supported. It is possible that our findings could be different if the institutional environment was considered. However, the availability of data extending to the 1980s was not readily available for the current study to take this direction. This should be an interesting research area for future studies once data becomes available. Also, the possibility that while remittance inflows would affect real exchange rate, the reverse is possible, calls for further scrutiny using sophisticated methods to test for causality. This was an argument in our study.

Lastly, the discrepancy in the long-run and short-run results exhibited in the provided tables with regard to the real exchange rate effect of remittances only tells us that there is a difference in the impact between the short-run and long-run. Therefore, techniques that do not take care of this difference leave a lot to be desired. However, the causes of this differential impact needs to be explored in future study.

Table 11: Remittances (as % of GDP) and Real exchange rate – Robustness check

	(1)		(2)		(3)		(4)		(5)	
Variables	**REM**		**TL**		**CAL**		**Crisis**		**REM**	
					Long-run					
REM	0.048**	(2.01)	0.059**	(2.53)	0.046*	(1.76)	0.033	(1.38)	0.029	(1.14)
M2	-0.045**	(-2.19)	-0.055**	(-2.29)	-0.048**	(-2.03)	-0.031	(-1.44)	-0.050*	(-1.80)
AID	-0.021	(-0.57)	-0.039	(-0.97)	-0.019	(-0.49)	-0.024	(-0.63)	-0.039	(-0.98)
GDP	-0.416***	(-6.41)	-0.413***	(-6.43)	-0.385***	(-5.47)	-0.410***	(-5.57)	-0.285***	(-4.40)
TOT	0.064	(0.67)	0.033	(0.35)	-0.005	(-0.05)	0.068	(0.70)	-0.114	(-1.25)
GOVEXP	0.127	(0.27)	0.195	(0.39)	-0.315	(-0.61)	0.116	(0.23)	-0.355	(-0.73)
NFA	-0.005**	(-2.27)	-0.005**	(-2.25)	-0.004	(-1.62)	-0.007***	(-3.44)	-0.005***	(-2.67)
TL			0.002	(0.02)					0.001	(0.01)
CAL					0.208	(1.06)			0.407**	(2.41)
Crisis							0.104**	(2.31)	0.100***	(3.37)
ECT	**-0.288*** **	**(-4.05)**	**-0.294*** **	**(-3.88)**	**-0.292*** **	**(-3.86)**	**-0.282*** **	**(-4.37)**	**-0.315*** **	**(-3.78)**
					Short-run					
REM	-0.043***	(-2.94)	-0.035**	(-2.49)	-0.038***	(-2.83)	-0.038***	(-2.82)	-0.018	(-1.29)
M2	0.057	(0.50)	0.047	(0.44)	0.043	(0.35)	0.056	(0.48)	0.063	(0.55)
AID	-0.010	(-0.26)	0.001	(0.02)	-0.014	(-0.37)	-0.015	(-0.44)	-0.015	(-0.44)
GDP	-0.135	(-1.23)	-0.096	(-0.92)	-0.135	(-1.27)	-0.127	(-1.14)	-0.094	(-0.86)
TOT	0.015	(0.40)	0.036	(0.85)	0.009	(0.22)	0.016	(0.42)	0.041	(1.13)
GOVEXP	0.085	(0.53)	0.255	(1.30)	0.108	(0.57)	0.085	(0.49)	0.279	(1.16)
NFA	-0.007**	(-1.96)	-0.008*	(-1.83)	-0.007**	(-2.11)	-0.007*	(-1.89)	-0.007*	(-1.73)
TL			-0.064	(-0.40)					-0.065	(-0.40)
CAL					-0.016	(-0.13)			-0.051	(-0.38)
Crisis							-0.032	(-1.09)	-0.035	(-1.02)
Observations	287		287		279		287		279	

Notes: The dependent variable in all specifications is ratio of tradable to non-tradable (RTNT). Explanatory variables include inward remittances (REM), broad money (M2), official development assistance (AID), Gross domestic product (GDP), terms of trade (TOT), government consumption expenditure (GOVEXP), net foreign assets (NFA), trade openness (TL), capital account openness (CAL), financial crisis of 2007/08 dummy (Crisis) that takes 1 for the period 2007-2008 and 0 otherwise. ECT is the error correction term. All are logged except Crisis, NFA and CAL. The results are from the pooled mean group estimator, as supported by the Hausman test results not shown in the table. z-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1.

Source: Authors' calculations.

Table 12: Remittances (Volume) and Real exchange rate – Robustness check

	(1) **REM**		(2) **TL**		(3) **CAL**		(4) **Crisis**		(5) **ALL**	
Long-run										
REM	-0.080***	(-3.73)	-0.105***	(-5.96)	-0.106***	(-5.77)	-0.093***	(-4.54)	-0.131***	(-6.57)
M2	-0.241***	(-6.47)	-0.198***	(-6.47)	-0.228***	(-6.96)	-0.204***	(-5.53)	-0.267***	(-7.57)
AID	-0.120***	(-3.22)	-0.054**	(-2.23)	-0.071**	(-2.48)	-0.089***	(-2.88)	-0.015	(-0.73)
GDP	0.261***	(3.36)	0.229***	(2.94)	0.400***	(5.63)	0.282***	(3.61)	0.402***	(4.62)
TOT	0.158**	(2.10)	0.110*	(1.74)	0.064	(1.14)	0.141**	(2.00)	0.064	(1.01)
GOVEXP	1.114***	(3.78)	0.904***	(4.23)	0.700***	(3.44)	0.975***	(3.71)	0.512**	(2.45)
NFA	0.006*	(1.80)	0.010***	(3.28)	0.005	(1.59)	0.004	(1.51)	0.011***	(4.40)
TL			-0.436***	(-4.65)					-0.293***	(-3.02)
CAL					0.077	(0.37)			-0.513***	(-3.03)
Crisis							-0.050	(-0.89)	-0.079	(-1.52)
ECT	-0.250***	(-3.61)	-0.246**	(-2.44)	-0.272***	(-2.61)	-0.255***	(-3.46)	-0.227**	(-2.25)
Short-run										
REM	-0.009	(-0.30)	-0.005	(-0.19)	-0.004	(-0.11)	-0.013	(-0.41)	-0.007	(-0.25)
M2	-0.278***	(-3.00)	-0.247**	(-2.12)	-0.254***	(-2.93)	-0.239***	(-2.98)	-0.238*	(-1.81)
AID	-0.074	(-0.94)	-0.031	(-0.97)	-0.089	(-1.10)	-0.075	(-0.94)	-0.036	(-1.14)
GDP	0.250*	(1.91)	0.185	(1.23)	0.234*	(1.69)	0.258*	(1.93)	0.175	(1.11)
TOT	0.070	(1.03)	0.229	(1.17)	0.028	(0.44)	0.045	(0.72)	0.212	(0.92)
GOVEXP	-0.088	(-0.42)	0.322	(1.03)	-0.130	(-0.50)	-0.078	(-0.37)	0.304	(0.93)
NFA	0.001	(0.40)	-0.001	(-0.37)	0.002	(0.50)	0.001	(0.38)	-0.001	(-0.38)
TL			-0.210*	(-1.82)					-0.281**	(-2.26)
CAL					-0.303**	(-2.02)			-0.350*	(-1.65)
Crisis							-0.030*	(-1.85)	0.003	(0.14)
Observations	287		287		279		287		279	

Notes: The dependent variable in all specifications is real effective exchange rate (REER). Explanatory variables include: inward remittances (Volume) (REM), broad money (M2), official development assistance (AID), Gross domestic product (GDP), terms of trade (TOT), government consumption expenditure (GOVEXP), net foreign assets (NFA), trade openness (TL), capital account openness (CAL), financial crisis of 2007/08 dummy (Crisis) that takes 1 for the period 2007-2008 and 0 otherwise. ECT is the error correction term. All are logged except Crisis, NFA and CAL. The results are from the pooled mean group estimator, as supported by the Hausman test results not shown in the table. z-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1.
Source: Authors' calculations.

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References

Adams, R. H. & Page, J. (2005). Do international migration and remittance reduce poverty in developing countries? *World Development,* **33**, 1645-1669. DOI: 10.1016/j.worlddev.2005.05.004

Adejumo, A. O. (2018). *The Dutch Disease Effects of Remittances in Nigeria*. Unpublished Doctoral Dissertation, Stellenbosch University, https://scholar.sun.ac.za

Acosta, P. A., Lartey, E. & Mandelman, F. (2007). Remittances and the Dutch disease. Working paper, Federal Reserve Bank of Atlanta Working paper series 2007-8.

Acosta, P. A, Calderon, C., Fajnzylber, P. & Lopez, H. (2008). What is the Impact of International Migrant Remittances on Poverty and Inequality in Latin America? *World Development,* **36**, 89-114.

Acosta, P. A., Lartey, E. K. K., & Mandelman, F. S. (2009). Remittances and The Dutch Disease. *Journal of International Economics*, **79),** 102-116.

Acosta, P. A., Baerg, N. R., & Mandelman, F. S. (2009). Financial development, remittances, and real exchange rate appreciation. *Economic Review*, **94**, 1-12.

Baltagi, G., & Xiong (2000). To Pool or Not to Pool: Homogeneous Versus Heterogeneous Estimators Applied to Cigarette Demand. *Review of Economics and Statistics*, **82**, 117-126.

Bang, J. T., Mitra, A. & Wunnava, P. V. (2013). Financial Liberalization and Remittances: Recent Longitudinal Evidence. Discussion paper, IZA Discussion Paper Series, 7497. DOI: 10.1080/09638199.2014.1001772

Barajas, A., Chami, R., Fullenkamp, C., Gapen, M. & Montiel, P. (2010). *Do Workers' Remittances Promote Economic Growth?* Washington, D.C.: IMF.

Bjuggren, P., Dzansi, J. & Shukur, G. (2010). Remittances and Investment. Working paper, CESIS Electronic Working Paper Series, 216.

Bleaney, M., & Tian, M. (2014). Exchange Rates and Trade Balance Adjustment: A Multi-Country Empirical Analysis. *Open Economies Review*, **25**, 655–675. Doi: 10.1007/s11079-014-9310-3.

Brahim, M., Nefzi, N. & Sambo, H. (2017). Remittances and the real effective exchange rates in MENA countries: What is the long run impact? *Revue d'économie du développement*, **26,** 65-119.

Bourdet, Y. & Falck, H. (2006). Emigrants´ Remittances and Dutch Disease in Cape Verde, *International Economic Journal*, **20,** 267-284.

Chinn, M. D. & Ito, H. (2006). What Matters for Financial Development? Capital Controls, Institutions, and Interactions. *Journal of Development Economics*, **81**, 163-192.

Combes, J. L., Kinda, T. & Plan, P. (2010). Capital Flows and their Impact on the Real Effective Exchange Rate. *Document de travail de la série*, CERDI, Etudes et Documents, E 2010.32

Dumitrescu, B. A. & Dedu, V. (2009). The Estimation of the Equilibrium Real Exchange Rate for Romania. *European Research Studies*, **12,** 119-130.

Fayad, G. (2010). Remittances and Dutch Disease: A Dynamic Heterogeneous Panel Analysis on the Middle East and North Africa Region. Conference paper, Centre for the Study of African Economies (CSAE). Department of Economics, University of Oxford.

Favara, G. (2003). *An Empirical Reassessment of the Relationship between Finance and Growth*. Washington, DC: IMF.

Gani, A. (2016). Remittances and savings in Asia: Some empirical evidence based on the life-cycle model. *Journal of Finance and Economics*, **4,** 24–38.

Gupta, S., Pattillo, C. & Wagh, S. (2007). Making Remittances Work for Africa. *Finance & development***, 44,** 1–8.

Hassan, G. M. & Holmes, M. J. (2013). Remittances and the real effective exchange rate. *Applied Economics***, 45,** 4959–4970. https://doi.org/10.1080/00036846.2013.808311

Hien, N. P., Vinh, C.T. H., Mai, V. T. P., and, Xuyen, L. T. K. (2020). Remittances, real exchange rate and the Dutch disease in Asian developing countries. *The Quarterly Review of Economics and Finance*, **77**, 131-143. https://doi.org/10.1016/j.qref.2019.10.006

Holzner, M. (2006). Real Exchange Rate Distortion in Southeast Europe. Working paper, wiiw Balkan Observatory Working Papers 68.

Hyder, Z., & Mahboob, A. (2006). Equilibrium Real Effective Exchange Rate and Exchange Rate Misalignment in Pakistan. *SBP Research Bulletin*, **2,** 237-263.

Izquierdo, A., & Montiel, P. J. (2006). Remittances and Equilibrium Real Exchange Rates in six Central American countries. Working paper, IMF Working Papers 03/25.

Juodis, A., Karavias, Y., & Sarafidis, V. (2021). A homogeneous approach to testing for Granger non-causality in heterogeneous panels. *Empir Econ*, **60**, 93–112. https://doi.org/10.1007/s00181-020-01970-9

Kemegue, F., Van Eyden, R., & Owusu-Sekyere, E. (2011). Remittances and the Dutch disease in Sub-Saharan Africa. A dynamic panel approach. Working paper, University of Pretoria Working Paper series 259.

Kataria, N., & Gupta, A. (2018). Determinants of Real Effective Exchange Rates in Emerging Market Economies. Econometric Modeling: Commodity Markets eJournal. http://dx.doi.org/10.2139/ssrn.3144172

Krebs, T., Krishna, P., & Maloney, W. (2005). Human Capital, Trade Liberalization and Income Risk. Working paper, World Bank Policy Research Working Paper 4276.

Laniran, T. J., & Olakunle, V. A. (2019). Remittances and Foreign Aid: Substitutes or Complements in the Economic Growth of Developing Countries? *International Economics*, **72**, 23-46.

Lartey, E. K. K. (2008). Capital inflows, Dutch disease effects and monetary policy in a small open economy. *Review of International Economics*, **16**, 971-989.

Li, Y., & Rowe, F. (2007). Aid inflows and the real effective exchange rate in Tanzania. Working paper, Policy Research Working Paper Series 4456.

Lopez, H., Molina, L., & Bussolo, M. (2007). Remittances and the real exchange rate. Working paper, World Bank Policy Research Working Paper 4213.

Mallick, S. K., & Moore, T. (2008). Foreign Capital in a Growth Model. *Review of Development Economics*, **12,** 143-159. http://dx.doi.org/10.1111/j.1467-9361.2008.00437.x

Mongardini, J., & Rayner, B. (2009). Grants, Remittances, and the Equilibrium Real Exchange Rate in SubSaharan African Countries. IMF Working Papers, 09(75),

Murphy, K., Schleifer, A., & Vishny, R. W. (1989). Industrialization and the big push. *Journal of Political Economy*, **97**, 1003-1026.

Nnyanzi, J. B. (2013). Remittances and Risk Sharing in Africa. *Issues in Business Management and Economics*, **1,**107-114.

Nnyanzi, J. B. (2016). What drives International Remittances to Africa: Altruism, Self-interest or the institutional environment? *African Journal of Economic and Management Studies*, **7,** 397-418. DOI:10.1108/AJEMS-07-2013-0067.

Obstfeld, M. (1986). Capital Flows, the Current Account, and the Real Exchange Rate: Consequences of Stabilization and Liberalization. In S. Edwards & A. Liquat (Eds.), *Economic Adjustment and the Real Exchange Rates in Developing Countries*. Chicago: UCP.

Ojapinwa, T. V. & Nwokoma, N. I. (2018). Workers' Remittances and the Dutch-Disease Argument: Investigating the Relationship in Sub-Saharan Africa. *African Development Review*, **30,** 316-324. https://doi.org/10.1111/1467-8268.12339

Owusu-Sekyere, E., van Eyden R., & Kemegue,F. M. (2014). Remittances and the Dutch Disease in Sub-Saharan Africa: A Dynamic Panel Approach. *Contemporary Economics*, **8**, 289-298. DOI: 10.5709/ce.1897-9254.146.

Ozcan, B. (2011). The relationship between workers' remittances and real exchange rate in developing countries. *International Research Journal of Finance and Economics*, **80**, 84–93.

Saadi-Sedik, T., & Petri, M. (2006). To Smooth or Not to Smooth—The Impact of Grants and Remittances on the Equilibrium Real Exchange Rate in Jordan. Working paper, IMF Working Papers 06/257.

Page, J., & Plaza, S. (2006). Migration Remittances and Development: A Review of Global Evidence. *Journal of African Economies*, **15,** 245-336. DOI: 10.1093/jae/ejl035

Pesaran, M. H., Shin, Y., & Smith, R. P. (1999). Pooled Mean Group Estimation of Dynamic Heterogeneous Panels. Journal of the American Statistical Association, 94(446), 621-634.

Pesaran, H., & smith, R. (1995). Estimating Long-Run Relationships from Dynamic Heterogeneous Panels. *Journal of Econometrics*, **68,** 79-113.

Piracha, M., & Saraogi, A. (2011). Motivations for Remittances: Evidence from Moldova Discussion Paper, IZA DP 5467.

Plaza, S. & Ratha, D. (2017). Remittances. In Global Migration Group (Eds.), *Handbook for Improving the Production and Use of Migration Data for Development* (pp 65-78). Washington, D.C: Global Knowledge Partnership for Migration and Development (KNOMAD).

Polat, B., & Andrés, A. R. (2019). Do emigrants' remittances cause Dutch disease? A developing countries case study. *The Economic and Labor Relations Review*, **30,** 59-76. https://doi.org/10.1177/1035304619828560

Rabbi, F. (2011). Remittances and the Dutch Disease: Macroeconomic Consequences in Bangladesh. Master in Commerce (Honors) thesis, University of Western Sydney.

Rabbi, F., Chowdhury, M. B., & Hasan, M. Z. (2013). Macroeconomic Impact of Remittances and the Dutch Disease in a Developing Country. *American Journal of Economics*, **3,** 156-160. Doi: 10.5923/c.economics.201301.26

Rajan, R. G. & Subramanian, A. (2005). What Undermines Aid's Impact on Growth? Working Paper, National Bureau of Economic Research, 11657. https://doi.org/10.3386/w11657

Ratha, D., De, S., Kim, E. J., Seshan, G., & Yameogo, N. D. (2019). Migration and Movement: Recent Developments and Outlook. *Migration and Development Brief*, **31**, 1-29. Doi:10.1016/B978-0-12-409548-9.10596-2.

Rosenstein-Rodan, P. N. (1943). Problems of Industrialization of Eastern and South-Eastern Europe. *Economic Journal*, **53**, 202-2011. https://doi.org/10.2307/2226317

Saborowski, C. (2009). Capital Inflows and the Real Exchange Rate: Can Financial Development Cure the Dutch Disease?" IMF Working Paper 09/20 (Washington: International Monetary Fund).

Sackey, H. A. (2001). External aid inflows and the real exchange rate in Ghana. Research Paper, African Economic Research Consortium Research Paper 110.

Samargandi, N., Fidrmuc, J., & Ghosh, S. (2013). Is the Relationship between Financial Development and Economic Growth Monotonic for Middle Income Countries? Working Paper, Economics and Finance Working Paper Series, 13-21.

Shobande, O. A., & Shodipe, O. T. (2019). Remittances and Real Exchange Rate: Latest Evidence from Cochrane Orcutt Econometric Model. *Academic Journal of Economic Studies*, **5,** 166-172.

Vargas-Silva, C. (2009). The Tale of Three Amigos: Remittances, Exchange Rates, and Money Demand in Mexico. *Review of Development Economics*, 13(1), 1–14. https://doi.org/10.1111/j.14679361.2008.00468.x

Wooldridge, J. M. (2012). *Introductory Econometrics: A Modern Approach,* 5th Ed. Mason: Soth-Western Cengage Learning.

World Bank (2012). Global Financial Development Report 2013: Rethinking the Role of the State in Finance. World Bank, Washington, DC. Available at: http://www.worldbank.org/financialdevelopment

World Bank (2016). Migration and Remittances Factbook 2016. World Bank, Washington, D.C.

World Bank. (2016). World development indicators 2016. Retrieved 15 April 2017 from http://databank.worldbank.org/data/reports.aspx?Code=NY.GDP.MKTP.KD.ZG&id=af3ce82b&report_name=Popular_indicators&populartype=series&ispopular=y

Yang, D. (2008). International Migration, Remittances and Household Investment: Evidence from Philippine Migrants' Exchange Rate Shocks. *The Economic Journal*, **118,** 591-630. https://doi.org/10.1111/j.1468-0297.2008.02134.x

Zonon, B. I. P. (2021). Regional Stock Exchange Development and Economic Growth in the Countries of the West African Economic and Monetary Union (WAEMU). *Economies,* 9(181), 1-19. https://doi.org/ 10.3390/economies9040181.