2. REMITTANCES INFLOWS, GAIN OF FOREIGN EXCHANGE OR TRADE LOSS? NEW EVIDENCE FROM LOW, LOWER-MIDDLE AND MIDDLE-INCOME GROUPS[1]

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Abstract

This study examines the relationship between remittances, exchange rate and export competitiveness for 58 countries from low, lower-middle and middle-income groups. In order to investigate this relationship, and building on our previous work found in Khurshid (2016), we applied the System Generalized Method of Moment Regression (SGMM) and bootstrapped panel Ganger causality approach using newly constructed remittances series for a period lasting from 1988 to 2014. The results unravel evidence that remittances appreciate the exchange rate and adversely affect competitiveness in lower-middle and middle-income countries whereas, the exchange rates negatively affect exports in the middle-income group. The consumption and spending effects remain dominating in causing the Dutch Disease in all groups. On the topic of remittances-exchange rate and remittances-export causal nexus, we find mixed results for the three income groups. There is not a clear consensus about the direction of the causal link, which means the findings are country-specific. The outcomes have significant policy implications for the groups in our analysis.

Keywords: remittances; export competitiveness; exchange rate; *Dutch disease*; panel bootstrap Granger test

JEL Classification: F24, F14, F31, C22

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1. Introduction

The international transfer of remittances contributes to the socio-economic development of the developing countries in several ways. It was an important and large source of external finance and foreign currency that goes beyond other inward flowing cash-flows in the last two decades. Obviously, remittances have a visible macroeconomic impact on the recipient economy. Circumstantial evidence links remittance inflows to higher prices. This puts added dependence on imports, instead of increasing the efficiency of the export sector (World Bank, 2009). Remittances are a more stable source of foreign currency than FDI, FPI and foreign aid in many low and lower-middle income countries of the world (Frankel and Jeffrey, 2011). They have various benefits both at micro and macro levels. The remittance inflow helps in reducing poverty (Taylor and Wyatt, 1996) and inequality (Stark, Taylor, and Yitzahki, 1986) along with representing a major source of funding for children's education (Kugler, 2007). Remittances are also heavily used for consumption, housing expenses and healthcare (Amuedo-Dorantes, 2007). Moreover, the remittances flow increases during financial distress to sustain the households of the migrants (Yang, 2004). At the same time, remittances increase foreign currency reserves, aid in the development of the financial sector, boost the accumulation of physical and human capital and help in current account adjustments (Adams and Page 2005, Barajas *et al.,* 2009; Hassan *et al.,* 2015). The inward flow of remittances also improves the macroeconomic stability and helps in reducing output volatility (Chami, Hakura and Montiel, 2011).

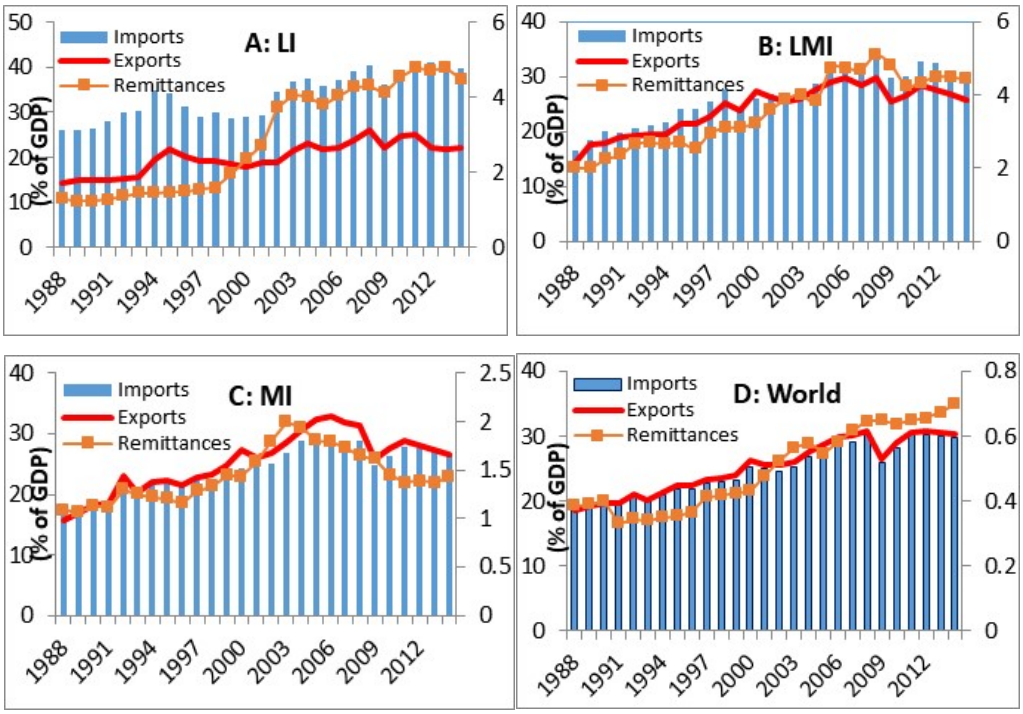
Regardless of the above-mentioned benefits that derive from the remittances inflow, the recipient economies have to face macroeconomic challenges as well (Barajas *et al.,* 2011). The substantial amount of remittances appreciates the exchange rate of the recipient economy and negatively affects international competitiveness. Exchange rate appreciation makes imports cheaper and exports relatively more expensive, thus affecting the country's trade balance. The increase in household income raises prices in the non-traded sector, but does not influence the tradable sector (Acosta *et al.,* 2009). The rise in non-tradable goods prices and resource movement appreciates the exchange rate (Amuedo-Dorantes and Pozo, 2006), which uplifts the wages in the tradable sector. It increases the production cost along with prices and negatively affects the tradable sector (Acosta *et al.,* 2007). The loss of competitiveness and resource movement shrinks the traded sector of the economy. Now the question arises, about the relevance of resource movement from traded to the non-traded sector. According to Rajan and Subramanian (2011), "*The trade sector is a channel through which any economy can absorb the best practices from abroad. The absence of these learning-by-doing spillovers, which may be critical to long-run productivity growth, could be one constraint on growth*."

Remittances have been continuously expanding over the last four decades. In 2013, remittances were higher than FDI in all developing countries, except for China. As shown in the World Bank's Migration and Remittances Report 2015, the remittances flow was estimated to reach $440 billion in 2015 and expected to accelerate in 2016, reaching $459 billion and rising to $479 billion in 2017 (World Bank, 2015). The global remittance growth rate shows a decreasing trajectory since 2012. This decline was due to the unbalanced economic recovery of developed countries, dynamics of the exchange rate, tougher immigration rules, conflict and forced migration. The remittances growth rate drops from 12% to 5.6% in low and lower-middle income groups. In the low-income (hereafter LI) group, the labour force participation rate remained constant, net enrollment increased by 1 %, currency depreciated, but a growing trend in merchandise exports was observed. Furthermore,

imports declined from 11.95% to 4.8% while consumption expenditure slightly rose from 4.1 to 4.3 % of GDP. In the lower-middle income (hereafter LMI) and middle income (hereafter MI) group, the overall situation remains the same. The imports positively increased in LMI and decreased in MI from 1.99 to 0.17%. The household consumption expenditure fell, but we noticed a positive increase in the labour force participation rate. Overall, for both income groups (LMI, MI) a depreciation of currency and a slight increase in merchandise exports was observed (World Bank, 2015). The remittance inflow and exports trends are shown in Figure 1.

Figure 1

Remittances, Import and Export Trends

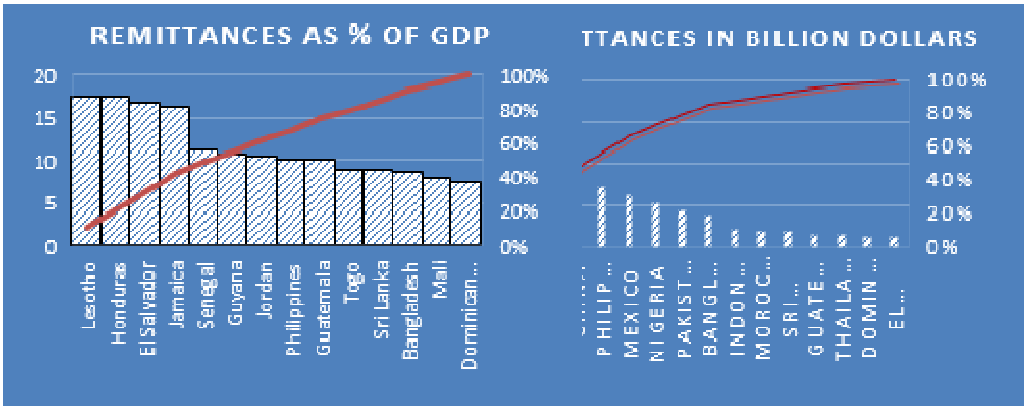


The inflow of remittances shows quite a different picture in each individual economy. For instance, India with $70.97 billion remains the top remittance receiver, followed by China from the MI group. In the LI group, Mali was the highest remittance receiver that consisted of 8% of its economy followed by Ethiopia and Madagascar, with $624.37 and $427.48 million. In Madagascar, the currency depreciated, inflation went up, and remittances as percentage of GDP remained the same, while exports increased, and household consumption expenditure decreased to 85.22% of GDP. The top remittance receiving countries, both as volume and percentage of GDP are shown in Figure 2 (a, b). In Pakistan, the growth of remittances was 16.6 %, imports decreased from 20.06 to 18.72 (% of GDP), the currency appreciated; export went down (13.2% to 12.27% of GDP) while inflation grew. The flow of remittances in the lower middle-income group was $237.25 billion, as compared to $170.142 billion as a total of FDI and ODA. Remittances are the second biggest source

of foreign currency due to low-cost transfer facilities in the MI group. In this group, China, Mexico, and Thailand were the highest remittance receivers, obtaining $62.33, $24.46 and $5.65 billion, respectively. A significant increase in the remittances inflow does not affect the Philippine's growing tendency of exports. In 2013-2014, the household consumption expenditure decreased from 53% to 52% of GDP, the labour force participation rate remained constant, imports dropped but gross saving increased from 26% to 27% of GDP. The robust recovery of USA boosted the remittances flow to El Salvador, Mexico, Honduras, Guatemala, and Nicaragua. However, due to weak economic activity in Japan and Spain, growth in remittances flow was sluggish in Argentina, Paraguay, Peru, and Brazil. The falling oil prices, depreciation of the ruble and euro affected the remittances inflows in Armenia, Georgia, the Kyrgyz Republic, and Tajikistan, Central Asia, and Morocco (World Bank, 2015). To sum up, the remittances inflow and exports trends vary across different groups. To be more specific, the increasing or decreasing trends of exports and remittances in various groups do not project the behaviour of each economy. Therefore, we may assume that the relationship between remittances and exports may differ from country to country.

Figure 2

Top Remittance Receiving Countries, both as volume and % of GDP



Data Source. World Bank development indicators (WDI).

The above-mentioned resource shifting and spending phenomena, effects of the *Dutch disease* were examined for many developing countries of the world. For instance, during the panel study of 13 Latin American and Caribbean countries over the period of 1979 – 98 Amuedo-Dorantes and Pozo (2004) found that worker remittances had appreciated the real exchange rate. Furthermore, doubling the remittances to GDP ratio leads to a real exchange rate appreciation above 22%. In a wide-ranging sample of 109 countries over the study period of 1992 – 2003, Lartey, Mandelman and Acosta (2012) found that remittances were a cause of real exchange rate appreciation and affected the export competitiveness. Similar results were observed during the panel study conducted by Hassan and Holmes (2013), Combes, Kinda, and Plane (2011); Acosta, Lartey, and Mandelman (2009). Lartey *et al*. (2012) studied the impact of foreign capital inflow and spending behavior and found that foreign remittances shrinked the tradable sector of the recipient economy – the results were consistent with the previous discussion. However, this assumes that households mainly spend remittances money on non-traded goods. According to Edwards, (1989) and Montiel, (1999), the Dutch disease effect of foreign capital inflow factors may also be influenced by

other factors of exchange, that depreciate exchange rate in that way, justifying the appreciating effect of capital inflow on real exchange rate. In another study, Javed (2009) finds evidence of *Dutch disease* in the South-East Asian countries (Pakistan, Bangladesh, India, Indonesia, Malaysia, and the Philippines). Similarly, Lopez, Molina and Bussolo (2008) using a fixed effect approach conclude that remittances appreciate the exchange rate and cause *Dutch disease* in Latin American countries. Likewise, Bourdet and Falck, (2006) find a positive correlation between remittances and exchange rate in Cape Verde, Hyder, and Mahboob (2005) observe the same for Pakistan while Chowdhury and Rabbi (2014) notice this phenomenon in Bangladesh. More recently, Ripon and Robert (2016) conducted a study to examine the relationship between remittances and competitiveness in the South Asian countries using a fixed effect model. The results show that remittances appreciate exchange rate and hurt competitiveness in Bangladesh, India, Pakistan and Sri Lanka. The exchange rate appreciating effect of foreign remittances appears to be even stronger in the low income developing countries (Kapur, 2004)

In contrast, Izquierdo and Montiel (2006) examined the impact of remittances on exchange rates and found mixed results using time series techniques for six Central American countries. The findings of the study argue on the absence of effects for the case of Honduras, Jamaica, and Nicaragua. Despite this fact, in the Dominican Republic remittances cause depreciation and contrary, appreciate the exchange rate in El Salvador. Rajan and Subramaniam (2011) inspected the empirical nexus between remittances, exchange rate and exports in a cross-country study. They found that foreign aid appreciates exchange rate and leads to a competitiveness problem, and not remittances. They supported the results with the argument that due to currency appreciation remittances are “drying up”. On the other hand, Grabel (2008) mentions that remittances and other inflows have a similar impact in the short run, but they differ according to the existing economic policies. Barajas *et al.* (2011) find that worker remittance inflow does not show a strong effect in a panel framework. The author further argues that the sign and effect of remittances on exchange rates vary from country to country. Barrett (2013) studied the relationship between remittances and the exchange rate for the Jamaican economy by using the OLS technique over the period of 1995-2010. The results of this study revealed that remittances depreciated the real exchange rate. Conversely, Owusu, Koekemoer & Kemegue (2014) investigate the effect of remittances on the exchange rate for 34 Sub-Saharan African (SSA) states from 1980 to 2008. This study used the method of moments’ estimator, and the results reveal that remittances cause an appreciation in exchange rate, but this exchange rate appreciation is not the reason for the decline in export competitiveness. Mongardini and Rayner (2009) find similar evidence in Sub-Saharan Africa. More recently, Khurshid *et al*. (2017) examine the effects of workers' remittances on exchange rate volatility and exports dynamics for Pakistan using system GMM and bootstrap sub-sample causality approach. The outcomes of this study reveal that remittances depreciate the exchange rate and positively boost exports in Pakistan. In addition to this, remittances appreciate the exchange rate if the funds are used for saving purposes and negatively affect competitiveness.

This study focuses on the following research questions. Have exchange rates gone up due to remittances inflows? If this is the case, then the exports of which group suffered most? Did consumption, spending, resource movement and saving affect exports? Furthermore, are group results consistent with the individual economy? Lastly, is this a global phenomenon or an individual problem?

To investigate the remittances and *Dutch disease* relationship, most of the panel studies used a single estimation procedure for all countries that fall into different income groups.

This brings an estimation bias because, in the various income groups liquidity, financial constraints, trade, and production factors vary. In general, labour force, exchange rate regime and the level of unemployment, institutional corruption and ethnic tensions are different. Therefore, the results of these kinds of panel studies cannot be generalised to all recipient economies. This study fills in this gap in three ways. *Firstly*, we divide countries by income, because each group has similar economic characteristics. This study ignores the high-income countries considering the size of the economy and remittance inflow. *Secondly*, this study uses newly constructed remittances series proposed by Khurshid *et al.* (2016) to overcome data limitations. These series have never been used before to find a remittances-export relationship. The informal flow of remittances is about 10-40 % of the total amount, and in the absence of employee compensation and migrant transfers this figure rises to 60% of the total remittances. So, in this case, the outcome cannot project the real picture in the economy (Khurshid *et al*., 2016). Due to limited observation, a significant number of parameters and potential endogeneity problems, using ordinary least squares (OLS) is not suitable in this case. Hence, using the system of generalised moment method regression (SGMM) can be more useful. Fundamentally, exchange rate regimes and the level of unemployment, trade policies and barriers to trade, internal resources, production capabilities and remittances as a share of the economy are different. Therefore, it is expected that the remittances and export relationship is rather more country-specific. To address this issue, we use the bootstrap panel Granger causality method together with slope homogeneity and cross-sectional dependency approach. The bootstrap method tests the causality relationship on each member separately without if the panel is homogeneous. Before applying this approach, it is not pre-requisite to test for cointegration or unit root as it generates country-specific critical values. This approach has never been used to investigate the relationship between remittances and export. No doubt that all members of the group (LI, LMI, MI) will have a high degree of integration and, thus, migration and the trade situation of one is likely to affect the other countries. After addressing all the concerns related, the results point to the fact that remittances-export competitiveness and exchange rate relationships vary from country to country.

This paper is organised in the following way. Section 2 introduces the data and methodology used in this study. Section 3 discusses the empirical findings while Section 4 concludes this study and builds on policy implications.

2. Data and Methodology

2.1 Data

In order to examine the remittances, exchange rate and export relationship, we selected 58 countries from the LI, LMI and MI groups and tested them for a period lasting from 1988 to 2014. This study follows the approach of Khurshid *et al.* (2016), who defines remittances as the sum of *migrant transfers, worker remittances and compensation of employees*. These series have never been used to test the relationship that is the focus of this article. In all regressions, remittance and export values are used as percentage of GDP. The exchange rate is calculated as an annual average for the local currency against the U.S. dollar. Other variables include: Consumer Price Index (*CPI*), Trade Openness (*TDO*), Foreign Direct Investment (*FDI*), Money and Quasi Money (*M2*), Manufacturing Value Added (*MVA*), Services Value Added (*SVA*) and Productivity (*PROD*) that is proxied by GDP per capita. All variables except Consumer Price Index and Productivity are used as % of GDP. The data used in this article is collected from World Bank development indicators (WDI, 2015).

Anti-money laundering legislation reduces the informal movement of remittances around the world, but this still represents a problem and was a limitation of all the previous studies. This study ignores in the panel settings the remittances inflow surging in via informal channel due to unavailability. If other things are unchanged, then unofficial remittances flows have added effect on the exchange rate and export competitiveness.

2.2 Methodology

2.2.1 Income Group Effect (SGMM Approach)

To estimate empirically the remittances and export relationship, we divide this study into two parts. Firstly, we estimate the above-mentioned relationship (*group wise*) using the System Generalized Method of Moment Regression (*SGMM*), proposed by Arellano and Bover (1995). Secondly, we find a country-specific causal link between the variables using the panel bootstrap causality approach.

To find the impact of remittances on exchange rate, we estimated the following equation using the *SGMM* approach:

$$EXR_{it} = \alpha_0 + \alpha_1 EXR_{i,t-1} + \alpha_2 REM_{it} + \alpha_3 CON_{it} + +\alpha_5 SAV_{it} + \alpha_7 X_{it} + \varepsilon_{it} \quad (1)$$

where: $EXR_{i,t-1}$ represents the initial exchange rate, REM_{it} is the remittance, CON_{it} stands for the household consumption expenditure, SAV_{it} is for gross saving. The other variables in this expression are; Consumer Price Index (*CPI*), Trade Openness (*TDO*), Foreign Direct Investment (*FDI*), Money and Quasi Money (*M2*) and Productivity (*PROD*) proxied by GDP per capita, while, ε_{it} is the error term in the equation.

In the following regression, we check the effect of remittances and exchange rate on export competitiveness. To do so, we estimate the following expression:

$$EXP_{it} = \alpha_0 + \alpha_1 EXP_{i,t-1} + \alpha_2 REM_{it} + \alpha_3 X_{it} + \varepsilon_{it} \quad (2)$$

In equation (2), we add two additional explanatory variables, namely Manufacturing Value Added (*MVA*), and Services Value Added (*SVA*). The outcomes of these two proxy variables show how the growth in traded and non-traded sector affects the exports. The results of regressions (1) and (2) using the *SGMM* test are shown in Table 1.

2.2.2 Cross-sectional Dependence and Slope Homogeneity

It is necessary to inspect the cross-sectional dependence before applying the Granger causality test, especially in the panel setting. Khurshid *et al*. (2016) argue that because of globalisation and international trade, substantial cross-border movement of workers and financial integration, it is possible that an economic shock occurring in one economy affects the other members of the group. Pesaran (2006), based on the Monte Carlo experiment, emphasises the importance of cross-sectional testing and shows the possible size distortion and bias if such aspects are ignored. Before running the causality test and implementing causality restrictions on parameters, it is vital to look at whether the slope coefficients are treated as heterogeneous or homogeneous. The causal relationship runs from one variable to another by imposing the combined limit for the panel to be the strong null hypothesis Granger (2003). Also, homogeneity assumption for the parameter is unable to capture the heterogeneity, because of the different characteristics of countries (Breitung, 2005).

To follow the above arguments, we start by testing for slope homogeneity and cross-sectional dependence across countries. The outcomes enable us to decide which causality approach is more suitable to find a causal link between remittances, exchange rate and trade competitiveness. The econometric methods applied in this research are described in detail hereafter.

2.2.3 Cross-sectional Dependency Tests

Breusch and Pagan (1980) introduced the Lagrange multiplier approach (*LM* hereafter) for verifying the presence of cross-sectional dependence across the countries. The LM method is extensively discussed and widely used in the empirical works. The method to compute LM test relies on the estimation of the subsequent equation:

$$y_{it} = \alpha_i + \hat{\beta}_i x_{it} + \varepsilon_{it} \; for \; i = 1,2,3, \dots \dots, N; t = 1,2,3, \dots \dots .., T \quad (3)$$

where: i represents the cross-sectional dimension and t denotes time dimension, x_{it} is the vector of the explanatory variables. Moreover, α_i denotes the intercept and β_i symbolises slope that differs across the countries. The null and alternative hypothesis of *LM* test is defined as:

H_0: $Cov\,(u_{it}, u_{it}) = 0$, $for\ all\ t\ and\ i \neq j$

H_1: $Cov\,(u_{it}, u_{it}) = 0$, $for\ at\ least\ one\ pair\ of\ i \neq j$

The null and alternative hypotheses are tested using the *LM* statistic by the following relation:

$$LM = T \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \hat{\rho}_{ij}^2 \quad (4)$$

where: $\hat{\rho}_{ij}^2$ is the estimate of pair wise correlation for each *i*. Under the null hypothesis, the *LM* test statistic has asymptotically distributed as chi-square with *N* (*N* -1) / 2 degrees of freedom. This technique is effective with comparatively small *N* and reasonably large *T*. Pesaran (2004) overcomes the shortcomings of this approach by following the scaled version that is:

$$CD_{lm} = \left(\frac{1}{N(N-1)}\right)^{1/2} T \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} (T\hat{\rho}_{ij}^2 - 1) \quad (5)$$

The CD_{lm} approach can be used for large *N* and *T* but shows size distortions in all other cases. Pesaran (2004) goes then past the inadvertences of both the *LM* and CD_{lm} tests, and and introduces the *CD* test defined as:

$$CD = \sqrt{\left(\frac{2T}{N(N-1)}\right)} \left(\sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \hat{\rho}_{ij}^2\right) \quad (6)$$

The CD test has asymptotic standard normal distribution for any value of *N* and *T*.

2.2.4 Slope Homogeneity Tests

Before imposing the causality restrictions in the panel causality research, it is important to check that the slope coefficients are homogenous or heterogeneous.

The null and alternative hypotheses of the slope homogeneity test can be described in the following manner:

H_0: $\beta = \beta_i \; (for\ all\ i)$

H_1: $\beta_i = \beta_j \; (for\ a\ non-zero\ friction\ of\ pair-wise\ slopes\ for\ i \neq j$ (Apply F-test)

It should be noted that the *F* test is valuable only if time dimension (*T*) is large and cross section dimension (*N*) is relatively small. Moreover, the error variance should be homoscedastic, and all explanatory variables must be exogenous. To relax the homoscedasticity assumption, Swamy (1970) proposed a new test that is grounded on individual slope estimates from a suitable pooled estimator. However, these two tests require a panel model, where N is relatively smaller than T. Swamy's approach for the modified slope homogeneity is:

$$\tilde{S} = \sum_{i=1}^{N} (\hat{\beta}_i - \tilde{\beta}_{WFE})' \frac{x_i' M_\tau x_i}{\widetilde{\sigma_i^2}} (\hat{\beta}_i - \tilde{\beta}_{WFE}) \quad (7)$$

where: $\hat{\beta}$, $\tilde{\beta}_{WFE}$ denotes the pooled OLS and the weighted pooled estimator, respectively. Moreover, $\tilde{\sigma}_i^2$ estimate σ_i^2 and M_τ signifies the identity matrix.[7]

In order to check the slope homogeneity for a large panel, Pesaran and Yamagata (2008) proposed the $\tilde{\Delta}$ test. This approach is valid as (N, T) → ∞ and does not require imposing any restrictions on the comparative expansion of N and T when the error term is normally distributed. The Standard dispersion is given by:

$$\tilde{\Delta} = \sqrt{N}\left(\frac{N^{-1}\tilde{S} - k}{\sqrt{2k}}\right) \quad (8)$$

The bias-adjusted version improves the small sample properties of the $\tilde{\Delta}$test when the error term is normally distributed. The $\tilde{\Delta}_{adj}$ version is usually formulated as:

$$\tilde{\Delta}_{adj} = \sqrt{N}\left(\frac{N^{-1}\tilde{S} - E(\tilde{z}_{it})}{\sqrt{var(\tilde{z}_{it})}}\right) \quad (9)$$

where: $E(\tilde{z}_{it}) = k$ represents the mean and $var(\tilde{z}_{it}) = \frac{2k(T-k-1)}{T+1}$ the variance term.

2.2.5 Bootstrap Panel Granger Causality Test

The Granger causality relationship resides on the observation that the past evidence of a variable (X) is helpful in improving the forecast of another variable (Y) (Granger, 1969). Kar *et al*. (2011) provide the detailed description of the different causality approaches. However, this study employs the specifications found in Kónya (2006), because this procedure accounts for cross-sectional dependence and country-specific heterogeneity as well. The bootstrap method tests the causality relationship on each member separately without assuming that the panel is homogeneous.

Therefore, before applying this approach, it is not mandatory to test cointegration or unit root, as it generates country-specific critical values.

The bootstrap panel causal approach depends on the two-dimensional vector autoregressive model, and we applied it in the context to trade competitiveness (*TC*), exchange rate (*EXR*) and remittances (*REM*). The bootstrap Granger causality test for our panel setup is formulated in the following manner:

$$Y_{1,t} = \alpha_{1,1} + \sum_{j=1}^{p_{y1}} \beta_{1,1,j} Y_{1,t-j} + \sum_{j=1}^{p_{x1}} \gamma_{1,1,j} X_{1,t-j} + \varepsilon_{1,1,t}$$

$$Y_{2,t} = \alpha_{1,2} + \sum_{j=1}^{p_{yi}} \beta_{1,2,j} Y_{2,t-j} + \sum_{j=1}^{p_{xi}} \gamma_{1,2,j} X_{2,t-j} + \varepsilon_{1,2,t}$$

$$Y_{N,t} = \alpha_{1,N} + \sum_{j=1}^{p_{y1}} \beta_{1,N,j} y_{N,t-j} + \sum_{j=1}^{p_{x1}} \gamma_{1,N,j} X_{N\ t-j} + \varepsilon_{1,N,t}$$

And

(A)

$$X_{1,t} = \alpha_{2,1} + \sum_{j=1}^{p_{y2}} \beta_{1,1,j} Y_{1,t-j} + \sum_{j=1}^{p_{x2}} \gamma_{2,1,j} X_{1,t-j} + \varepsilon_{2,1,t}$$

[7] *For in-depth details on Swamy's test see Pesaran and Yamagata (2008).*

$$X_{2,t} = \alpha_{2,2} + \sum_{j=1}^{p_{yi}} \beta_{2,2,j} Y_{2,t-j} + \sum_{j=1}^{p_{xi}} \gamma_{2,2,j} X_{2,t-j} + \varepsilon_{2,2,t}$$

$$X_{N,t} = \alpha_{2,N} + \sum_{j=1}^{p_{y2}} \beta_{2,N,j} y_{N,t-j} + \sum_{j=1}^{p_{x2}} \gamma_{2,N,j} X_{N\ t-j} + \varepsilon_{2,N,t}$$

where: *i,* and *t* represent countries and periods included in the study. Considering *j* lags, p_{1i} and p_{2i} represent the longest lags which differ across the variables but remain the same across each equation. This study evaluates the system for each possible pair, on the assumption 1-4 lags and selects the one that minimises the Schwarz criterion.[8] In the above system of equations (A), $\varepsilon_{1,i,t}$ and $\varepsilon_{2,i,t}$ are white noises. They are correlated for each country but behave otherwise in the panel.

We employ the Seemingly Unrelated Regressions (*SUR*) technique for the (A) system. Afterwards, a possible link may exist between the individual regressions via coexistent correlation within the two equations. The Wald tests for the Granger causality approach are performed with each country specific bootstrap values generated by simulations. In system (A), one-way causality runs from *X* to *Y* if all $\gamma_{1,i}$ are not zero, but $\beta_{2,i}$ in the second equation must be zero and otherwise. The two-sided causality relation exists only if neither all $\gamma_{1,i}$ nor $\beta_{2,i}$ are zero and otherwise for the case of no causality.[9]

3. Empirical Findings

The results on the relation between remittances, exchange rate and exports under the *SGMM* approach for the three income groups are listed in Table 1. The results hint to the fact that remittances have a negative and insignificant impact on the exchange rate in LI, LMI while positively appreciating it in the MI group. In contrast, remittances are negatively affecting competitiveness in LMI and MI groups; nevertheless, however, we find more robust evidence in the LI group. The inward flow of FDI is appreciating the exchange rate in LI and MI and shows the presence of the *Dutch disease* only in the LI group. According to Lartey (2007), investments made in productive areas of the economy will ultimately result in improving competitiveness. In contrast, if foreign investors gain access to domestic assets through the privatisation process, the FDI may not cause the exchange rate to appreciate (Hyder and Mahboob, 2005). The outcomes reveal that the money supply and the exchange rate are appreciating in the LI and LMI groups, while negatively affecting the exports in the three groups. The money growth is not usually considered as a determinant of the exchange rate. However, many recent studies such as Lommatzsch and Tober (2004) and Lartey *et al*., (2012) count it as one of the leading causes of exchange rate appreciation. Money growth increases the prices of non-tradable goods, causes inflationary pressure and appreciates the exchange rate (Lartey *et al*., 2012). The rise in the purchasing power of remittances receiving households increases the demand for services and uplifts the prices in the non-tradable sector. This leads capital and labour movement towards the non-tradable sector at

[8] *As observed by the Kónya (2006), the causality results critically depend on the lag structure. Too many or few lags can cause problems: for instance too few means some variables are gone from the model and this cause bias in the remaining regression equation that lead to incorrect results. On the other hand, too many lags waste observations, fact that increases the standard error making outcomes less reliable.*

[9] *In the approach of Kónya (2006) this definition implies causality for one period ahead.*

the expense of tradable sector, resulting in a loss of competitiveness in exports and increase in imports of goods. Also, growing trends in consumption negatively affect competitiveness, while positively affecting the exchange rate in the LI and LMI groups. The growth in the manufacturing sector boosts the exports in all the income groups. However, the rise in the services sector determines positive effects on exports only in the LI and MI groups. The dummy variable is used to check the impact of regime change on the exchange rate. The results show that change in the regime has a negative but insignificant effect on the LI and LMI countries, but positive and significant effect on the MI group. The results of regime shift variables are consistent with the previous findings of Mtonga (2011). The outcomes of other explanatory variables are also consistent with the previous literature. The results of the Hansen test confirm the validity of our instruments and the autocorrelation AR (2) test exhibits no second order serial correlation in our models. In the next section, we discuss the country-specific effect due to the remittance inflow.

Table 1

Remittance, Exchange Rate and Competitiveness

	EXCHANGE RATE			EXPORTS		
	LIC	**LMI**	**MIC**	**LIC**	**LMI**	**MIC**
EXP(-1)				0.312***	0.784***	0.343***
EXR(-1)	1.074***	1.011***	0.935***			
EXR				0.011***	-0.010*	0.4095***
REM	-2.2047	-1.8411	0.050***	0.182***	-0.127***	-0.190***
CPI	-0.876**	-0.097	-0.037	-0.061	-0.086	-0.099**
TOPN	-0.6269	-0.654***	-0.008***	0.350***	0.096***	0.3445***
FDI	1.9513	-1.4893	0.091	-0.182***	0.152***	0.1304***
PROD	0.0139	-0.0154	0.049*	0.002	0.074**	2.476***
M2	0.7100	2.000**	-0.057***	-0.029*	-0.030***	-0.020***
SAV	1.1911	0.071	-0.051***	2.8824	-0.008**	0.0368
CON	0.0191	2.888**	-0.013	-0.107***	-0.234*	-0.133***
MVA	-1.8271	4.841**	-0.031	0.0339	0.0403	0.0595***
SVA	-0.4431	-5.162***	-0.070***	0.0138	-0.065	0.1431***
Regime change, DUMMY	-5.1650	-8.2869	0.618***			
GNE				-0.177***	0.104***	-0.150***
Observations	260	650	494	260	650	494
Countries	10	25	19	10	25	19
AR(2)	0.103	0.056	0.187	0.123	0.791	0.184
Hansan (*P-values)*	0.219	0.211	0.505	0.301	0.177	0.544

*Note: *, **, *** are representing significance at 10, 5 and 1 %. EXR and EXP are the dependent variables in two regression equations. All the regressions include the time dummies.*

3.1 Causality Findings

Given the methodological specifications, it is mandatory to test for cross-sectional dependence and for the slope homogeneity across countries to obtain an adequate estimator in the panel causality. Taking into consideration country-specific heterogeneity and cross-sectional dependence in empirical work is essential, since economies are highly integrated given trade and globalization. In order to examine the cross-sectional dependence, we conducted three tests (*LM, CD_{lm}*, and *CD* test) and the results are

presented in Table 2. The results reveal that the null hypothesis of no cross-sectional dependence across the countries is not accepted for all tests at all significance levels suggesting that the *SUR* approach is more adequate than the country by country *OLS* estimation.[10] More exactly, the results hint to the existence of a shock transmission from one country to another at intra-group level. Table 2 presents the results of the three slope homogeneity tests ($\tilde{S}$, $\tilde{\Delta}$, *and* $\tilde{\Delta}_{adj}$ **).** In the present analysis, we reject the null hypothesis of slope homogeneity for the three tests at almost all significance levels. This fact highlights the country-specific heterogeneity. This translates into the fact that a relevant economic connection in one of the income groups cannot be transmitted to another.

Table 2

Cross-sectional Dependency and Homogeneity Tests

Test	LIC			LMIC			MIC		
	REM	**EXR**	**EXP**	**REM**	**EXR**	**EXP**	**REM**	**EXR**	**EXP**
LM	61.13**	210.6***	66.62**	408.2***	384.7***	397.3***	275.8***	266.37***	271.8***
CD_{lm}	1.700*	17.46***	2.171*	4.42***	3.46***	3.974***	4.40***	3.918***	4.200***
CD	1.664*	10.34***	3.547***	7.18***	6.79***	5.833***	7.62***	6.817***	6.721***
$\tilde{S}$	143.1***	731.2***	100.8***	270.9***	466.7***	520.3***	129.1***	165.1***	115.9***
$\tilde{\Delta}$	319.1***	161.3***	20.3***	34.78***	62.44***	70.0***	202.23***	258.37***	15.1***
$\tilde{\Delta}_{adj}$	13.1***	6.60***	12.7***	36.8***	66.1***	74.1***	8.276***	10.576***	16.0***

*Note: (1): ***, ** and * mean the significance at 1, 5 and 10% levels.*

(2) LM, CDlm and CD tests are the cross-sectional dependence tests proposed by Breusch and Pagan (1980) and Pesaran (2004).

(3) $\tilde{S}$, $\tilde{\Delta}$ and $\tilde{\Delta}_{adj}$ are the slop homogeneity tests of Swamy (1970) and Pesaran et al. (2008), respectively.

(4) The cross-sectional dependence tests are performed in EVIEWS 8, and for slope homogeneity tests we use GAUSS 10 software.

We observe that the findings for cross-sectional dependence and slope heterogeneity in the three income groups point to the effectiveness and suitability of the bootstrap panel Granger causality method. Tables 3, 4 and 5 present the results of the above-mentioned method. The results for the three income groups are presented synthetically in the following manner:

[10] *The cross-sectional dependency further indicates that inspecting causal link between remittance and the export competitiveness in the LI, LMI and MI countries require as this info in estimations of causality regressions. The SUR approach is more efficient in the presence of the cross-section dependence, than country by country OLS method (Zellner, 1962). Hence, the causality outcomes from the SUR estimation procedure developed by Zellner (1962) will be more consistent than those obtained from OLS estimation. Zellner (1962), An efficient method of estimating seemingly unrelated regressions and tests for aggregation bias. Journal of the American statistical Association, 57(298), pp.348-368.*

	Low Income	Lower-Middle Income	Middle-Income
REM ⟶ ***EXR***	Benin, Burkina Faso **Guinea-Bissau, Togo**	Cote d'Ivoire, Guyana, Lao PDR, Lesotho, Swaziland, Vanuatu	Costa Rica, Paraguay Turkey
EXR ⟶ ***EXP***	**Ethiopia,** Guinea-Bissau**,** Madagascar	Senegal, Vanuatu	Belize, Dominican Republic, Jamaica, Turkey
REM ⟶ ***EXP***	Guinea-Bissau Mozambique, Togo	Guyana, Sri Lanka **Papua New Guinea**	Belize, **Jamaica**, Malaysia
EXR ⟶ ***REM***	**Guinea-Bissau,** Tunisia, **Togo**	Bolivia, India	Algeria, Belize, Brazil, Fiji, Jamaica, Malaysia
EXP ⟶ ***EXR***	Benin, **Ethiopia**, Togo	Bolivia, Congo, Rep., Pakistan, Swaziland	China, Paraguay, Suriname
EXP ⟶ ***REM***	Madagascar, Tunisia	Guatemala, Honduras Pakistan, **Papua New Guinea**	**Jamaica**

Note: The two-ways causality evidence is in bold highlighted countries.

The findings presented in Tables (3, 4) show that in the three income groups, remittances Granger influence the exchange rates in the following set of countries: *Benin, Burkina Faso, Cote d'Ivoire, Guyana, Lao PDR, Lesotho, Swaziland, Costa Rica, Paraguay* and *Turkey*. We also notice the fact that in *Tunisia, Bolivia, India, Algeria, Belize, Brazil, Fiji, Jamaica* and *Malaysia* the exchange rates determine remittances. The two-way causality is only observed in *Guinea-Bissau* and *Togo* from the low-income group. Regarding the exchange rate-export nexus, we find one-way causality running from exchange rate to export for *Guinea-Bissau, Madagascar, Senegal, Vanuatu, Belize, Dominican Republic, Jamaica*, and *Turkey*. Our results report that exports impact exchange rate in *Benin, Togo Bolivia, Congo, Rep., Pakistan, Swaziland China, Paraguay*, and *Suriname*. However, the two-way causality between exchange rates and export is found only in *Ethiopia* from the LI group. Table 5 shows that exports are not a relevant Granger cause of remittances, except for the case of *Guinea-Bissau, Mozambique, Togo* (LI), *Guyana, Sri Lanka, Papua New Guinea* (LMI), *Belize, Jamaica* and *Malaysia* (MI). Despite this observation, the null hypothesis that exports do not Granger cause remittances is rejected in *Madagascar, Tunisia* (LI), *Guatemala, Honduras and Pakistan* (LMI). In the remittance-export relationship, we find two-way causality only in *Papua New Guinea* from the LMI group and Jamaica from the MI group. In all other cases, no causality evidence is found in the three-income groups.

It is noticeable that for the LI and for a few countries of the LMI group (Lesotho, Swaziland) remittances are negatively causing exchange rates, while they positively influence them in the MI countries. The consumption behaviour and the increasing trend in the consumption of non-traded goods depreciate the exchange rate (Lartey, Mandelman & Acosta, 2012). The LI economies are more consumption-oriented, so a depreciation trend due to remittances is more dominant, while we find mixed evidence in the LMI and MI countries. The exchange rate regimes are a peg to the Euro in the LI countries, where the causality evidence appear. The volatility of the exchange rate may differ from country to country, and depend on the size of the remittances inflow, exchange rate regime, consumption patterns and monetary policy in the host economy. Moreover, the remitting behaviour (altruism, compensatory or self-interested) of migrants plays a significant role in the determination of the country's exchange rate regime (Mughal, 2013). In the exchange rate and export hypotheses, the adverse effect of the exchange rate is more visible in the LMI and MI countries. However, in the remittance-export nexus remittances negatively affect exports in Mozambique (LI), Sri Lanka (LMI), Jamaica and Malaysia (MI). In other words, remittances

and exchange rates have a nominal effect on the competitiveness in the LI and the LMI, while relatively a strong impact on the MI group. The export sector of the MI is more affected by the real exchange rate fluctuation than the LI and LMI income groups. This occurs because of the credit constraints for the LI and LMI countries, both for importers and exporters. The countries from the three income groups are agriculture-based labour rich, with less technical and financial resources, which heavily depend on imports. As the above-mentioned results show, remittances positively affect inflation, money growth and aggregate demand that influence the export competitiveness. In few cases, our results are consistent with the existing literature but do not hold for all the countries included in the analysis. Given this fact, we note the country-specific character of the impact of remittances on export competitiveness.

In this context, the influence of remittances on the exchange rate and export competitiveness is observed to vary from country to country. The negative or positive effect of remittances is strongly depending on the behaviour of the remitters and on other attributes, among which we mention: exchange rate regime, trade policies, consumption patterns, production capacity, cost and barriers to trade, internal resources and the financial sector.

Table 3 (A, B, C)

(A): Remittance and Exchange Rate Causality Outcomes (Low Income)

Countries	*REM* does not cause *EXR*					*EXR* does not cause *REM*				
			Critical values					*Critical values*		
Low Income	C	Wald test	1%	5%	10%	C	Wald test	1%	5%	10%
Benin	-0.018	14.00**	21.14	10.75	7.222	-0.227	1.561	22.79	12.40	8.400
Burkina Faso	0.014	14.44**	18.57	11.22	8.598	-0.167	2.706	20.70	12.20	8.253
Ethiopia	0.034	0.810	22.36	13.52	9.515	0.519	4.563	28.90	14.46	9.606
Guinea	0.018	1.146	15.44	9.068	6.213	0.309	1.840	33.18	17.76	12.79
Guinea-Bissau	-0.129	28.74***	23.30	12.91	8.540	0.253	15.61*	28.40	16.10	10.04
Madagascar	-0.021	0.687	16.13	9.150	6.012	0.347	3.320	28.14	16.26	10.99
Mali	-0.125	0.126	13.42	8.016	5.553	0.013	0.164	19.72	11.50	7.960
Mozambique	-0.101	2.827	24.51	12.36	7.934	-0.088	3.133	26.23	13.40	9.172
Tunisia	-0.149	3.256	21.36	12.92	7.943	0.308	18.55**	21.47	11.35	8.113
Togo	-0.021	15.23***	7.056	4.766	3.384	0.493	9.068*	20.37	12.38	8.098

*Note: (1): ***, ** and * mean the significance at 1, 5 and 10% levels.*

(B): Remittance and Exchange Rate Causality Outcomes (Lower-Middle)

	REM does not cause EXR					*EXR does not cause REM*				
			Critical values					*Critical values*		
Lower-Middle	C	Wald test	1%	5%	10%	C	Wald test	1%	5%	10%
Bangladesh	-0.024	0.469	21.27	12.11	7.992	0.538	8.831	50.01	27.77	20.25
Bolivia	-0.013	6.654	20.59	13.39	8.955	1.907	25.76**	58.69	19.14	12.94
Congo, Rep.	0.019	1.320	30.19	12.81	8.422	0.514	4.448	18.96	8.971	6.240
Cameroon	-0.005	0.004	21.53	11.70	8.836	0.583	5.069	24.57	13.24	10.01
Cote d'Ivoire	0.078	10.77*	22.60	12.19	9.004	-0.225	1.504	22.49	13.06	9.753
El Salvador	0.032	1.464	16.39	9.349	6.407	-0.248	3.903	23.59	13.17	8.864
Ghana	-0.018	0.279	47.29	20.06	12.58	0.304	4.850	39.96	19.16	12.80
Guatemala	0.027	2.556	21.38	13.63	9.447	0.306	3.361	42.39	15.51	11.10
Guyana	0.047	8.624*	24.95	13.12	8.527	0.661	8.434	26.15	13.09	8.786

	REM does not cause EXR					*EXR does not cause REM*				
			Critical values					*Critical values*		
Honduras	0.024	0.677	30.56	15.36	9.890	0.218	3.335	168.0	21.48	11.83
India	0.018	0.095	33.37	19.62	14.76	0.833	13.813*	25.78	15.16	10.83
Indonesia	0.146	1.368	39.60	17.17	10.82	0.070	0.167	32.28	17.59	11.53
Kenya	-0.077	1.589	26.98	14.10	9.830	0.063	0.375	26.37	14.41	10.31
Lao PDR	0.078	14.72**	27.99	13.41	9.974	-0.353	4.308	27.25	15.39	10.09
Lesotho	-0.084	13.58*	42.25	19.56	13.31	-0.051	0.519	47.25	22.22	14.36
Morocco	-0.115	9.298	31.28	17.49	12.02	0.208	1.294	28.66	14.69	10.36
Nigeria	0.021	0.276	41.76	16.06	10.01	0.222	1.915	33.35	14.97	10.68
Pakistan	-0.026	1.625	21.07	11.43	8.174	0.137	3.531	28.11	14.20	9.921
Papua New Guinea	0.030	1.218	34.42	17.96	12.89	-0.424	4.708	28.13	15.14	10.98
Philippines	0.069	1.499	41.86	20.02	13.73	0.413	10.28	36.56	17.61	12.84
Senegal	-0.011	0.054	24.81	14.23	9.869	0.075	4.194	27.41	15.67	9.878
Sri Lanka	0.159	1.381	23.32	13.86	9.666	0.225	10.68	48.68	31.71	21.90
Sudan	-0.353	4.799	28.62	17.97	12.20	-0.024	0.119	33.04	19.64	11.77
Swaziland	-0.054	18.35***	3.343	1.932	1.320	-0.031	0.084	33.85	21.03	15.84
Vanuatu	0.033	15.65**	31.88	13.39	9.239	-1.554	4.132	31.22	17.04	12.27

(C): Remittance and Exchange Rate Causality Outcomes (Middle Income)

	REM* does not cause *EXR					***EXR* does not cause *REM***				
			Critical values					*Critical values*		
Middle Income	**C**	**Wald test**	**1%**	**5%**	**10%**	**C**	**Wald test**	**1%**	**5%**	**10%**
Algeria	-0.202	0.032	21.05	12.46	8.515	-0.492	12.36*	34.55	15.81	10.63
Belize	0.007	0.014	26.05	12.15	8.178	0.730	18.25**	18.66	10.41	7.224
Botswana	0.019	0.666	23.15	12.43	7.935	-0.648	8.011	24.00	14.71	11.08
Brazil	0.201	2.630	21.02	10.95	6.794	-0.063	18.88**	25.30	11.74	7.588
China	0.072	0.001	22.82	11.57	7.725	0.822	7.138	24.09	14.29	9.816
Colombia	-0.080	3.696	16.93	9.422	6.538	0.097	1.022	22.51	13.10	9.372
Costa Rica	0.050	12.56**	18.84	10.44	7.181	0.231	0.916	40.95	18.71	12.28
Dominica	0.016	0.080	19.66	10.33	7.252	-2.259	1.092	21.61	12.42	8.084
Dominican Republic	0.103	1.942	24.55	12.41	8.617	0.086	2.651	22.01	14.33	9.939
Ecuador	0.026	4.159	24.09	8.479	5.567	0.085	0.047	18.32	10.26	6.898
Fiji	-0.030	2.818	24.26	14.13	9.310	0.993	9.783*	19.48	12.74	8.820
Jamaica	-0.178	2.435	24.19	13.12	9.450	0.376	31.74**	42.25	15.56	9.371
Jordan	0.009	1.031	18.81	11.05	6.897	-0.041	0.095	22.57	10.82	8.153
Malaysia	-0.032	2.595	24.53	12.74	8.933	0.990	15.26**	23.87	13.90	9.334
Mexico	-0.153	2.955	29.06	13.71	9.213	0.160	5.264	30.19	14.97	10.16
Paraguay	0.104	6.593*	16.63	9.228	6.185	0.061	0.375	24.35	14.15	10.68
South Africa	0.053	0.602	24.10	14.96	9.942	0.322	5.847	27.06	13.94	10.32
Suriname	0.051	0.306	22.48	12.13	7.501	-0.080	0.011	16.68	9.353	6.644
Thailand	0.037	0.535	29.62	13.26	8.204	0.015	0.008	20.86	10.17	7.285
Turkey	0.157	35.04***	25.52	16.63	11.40	-0.067	5.711	44.80	17.67	11.81

*Note: We obtain these results running TSP codes in GiveWin software. ***, ** and * mean the significance at 1, 5 and 10% levels.*

Table 4 (A, B, C)

(A): Exchange Rate and Exports Causality Results (Low Income)

	EXR does not cause EXP					EXP does not cause EXR				
			Critical values					*Critical values*		
Lower-Middle	**C**	**Wald test**	**1%**	**5%**	**10%**	**C**	**Wald test**	**1%**	**5%**	**10%**
Bangladesh	0.389	4.835	32.982	20.455	15.095	-0.034	0.5061	24.08	11.76	8.376
Bolivia	0.118	4.430	32.433	17.834	13.034	-0.092	53.26***	21.96	11.75	8.256
Congo, Rep.	0.046	0.518	18.338	10.643	8.067	-0.195	10.585*	28.80	12.47	8.182
Cameroon	0.213	9.118	30.728	18.728	12.302	-0.076	13.882	32.37	21.28	16.70
Cote d'Ivoire	0.141	3.776	24.372	13.602	9.797	-0.079	11.072	45.47	28.43	22.25
El Salvador	-0.862	0.279	30.345	12.360	7.917	-0.027	0.4598	20.34	10.73	7.112
Ghana	0.029	1.190	33.292	18.735	13.180	-0.072	0.5261	27.74	14.58	9.164
Guatemala	0.131	2.151	28.513	14.400	8.308	0.074	1.3308	22.82	14.62	9.658
Guyana	-0.118	6.270	65.181	19.404	12.262	-0.171	8.0210	26.21	13.70	9.733
Honduras	0.037	1.260	27.585	15.825	10.019	0.249	6.9709	30.64	14.96	11.53
India	0.056	0.703	23.051	14.423	10.441	0.1091	6.3070	36.12	17.73	10.98
Indonesia	-0.045	1.102	28.018	12.305	8.0140	-0.373	2.4168	36.87	11.96	7.304
Kenya	-0.158	8.453	36.266	14.172	10.424	-0.140	2.2381	32.78	17.86	10.83
Lao PDR	-0.017	0.280	26.141	15.626	11.142	0.414	10.314	47.61	24.93	17.27
Lesotho	0.268	4.511	38.476	18.688	12.248	-0.125	6.6026	28.03	16.51	11.63
Morocco	0.085	0.399	19.042	10.287	7.271	-0.063	1.9647	27.18	18.04	12.25
Nigeria	-0.068	3.1283	20.834	10.927	7.641	-0.262	2.0617	25.99	13.25	8.500
Pakistan	-0.112	12.708	36.695	21.834	15.923	-0.289	11.986*	28.60	13.96	9.318
Papua New Guinea	0.029	0.469	44.594	19.031	13.56	0.1207	1.2263	34.84	19.75	13.90
Philippines	-0.100	3.515	30.006	17.500	12.23	0.1199	3.9191	18.67	10.87	7.987
Senegal	0.222	8.461*	22.099	11.632	7.919	-1.004	9.7829	32.45	16.81	10.04
Sri Lanka	8.461	15.416	49.050	27.535	18.793	0.0471	1.6141	18.72	10.94	7.877
Sudan	-0.683	0.028	34.662	20.690	12.718	-0.231	0.689	31.46	17.38	13.07
Swaziland	0.121	5.194	21.151	12.084	8.653	-0.108	6.730***	3.397	1.908	1.244
Vanuatu	-0.431	18.95**	26.998	13.824	9.185	-0.121	2.1342	27.34	16.33	11.62

(B): Exchange Rate and Exports Causality Results (Lower-Middle Income)

	EXR does not cause EXP					EXP does not cause EXR				
Countries			*Critical values*					*Critical values*		
Low Income	**C**	**Wald test**	**1%**	**5%**	**10%**	**C**	**Wald test**	**1%**	**5%**	**10%**
Benin	-0.117	2.924	21.36	11.94	8.149	0.167	10.305**	21.09	9.706	7.201
Burkina Faso	-0.218	3.245	23.38	13.55	8.597	-0.630	0.194	13.44	8.023	5.910
Ethiopia	0.302	12.80**	24.66	12.10	8.862	-0.416	57.99***	21.93	12.40	8.270
Guinea	0.048	2.033	21.25	11.53	7.972	-0.115	0.728	15.12	8.592	5.773
Guinea-Bissau	0.280	18.29**	19.00	8.341	5.886	-0.092	2.139	21.30	11.32	7.345
Madagascar	0.249	13.24**	16.35	9.605	6.841	-0.089	0.301	20.77	9.935	7.105
Mali	0.188	4.319	20.98	10.89	7.204	-0.082	5.025	29.98	19.54	13.54
Mozambique	0.059	2.157	27.41	15.69	11.49	0.0441	0.295	25.87	12.76	9.085
Tunisia	0.048	0.493	22.41	13.17	8.884	0.0350	0.125	21.41	11.24	7.928
Togo	0.162	6.180	23.27	11.19	7.500	-0.314	23.33***	9.319	6.220	4.501

(C): Exchange Rate and Exports Causality Results (Middle Income)

	EXR does not cause EXP					EXP does not cause EXR				
			Critical values					*Critical values*		
	C	**Wald test**	**1%**	**5%**	**10%**	**C**	**Wald test**	**1%**	**5%**	**10%**
Algeria	0.037	1.042	25.37	12.77	8.861	-0.200	4.834	27.45	11.25	7.457
Belize	0.281	17.20**	19.66	10.55	7.691	0.086	0.200	18.51	9.749	7.158
Botswana	-0.017	0.189	17.05	9.960	6.593	0.131	1.712	20.69	11.09	7.396
Brazil	0.002	0.026	24.33	12.12	8.725	-0.046	0.0259	28.74	14.15	10.37
China	-0.185	3.317	23.38	12.57	8.592	-0.199	20.954**	22.72	12.70	8.724
Colombia	-0.019	0.574	22.15	11.16	7.655	-0.217	2.192	16.58	9.042	6.123
Costa Rica	-0.052	4.267	32.45	19.74	14.81	0.079	2.407	16.40	9.015	5.958
Dominica	0.452	0.093	19.74	10.29	6.808	-0.012	2.774	16.34	8.230	6.109
Dominican Republic	-0.176	23.71***	22.71	12.64	9.050	-0.207	4.889	23.13	11.14	7.427
Ecuador	0.354	7.979	23.73	12.40	8.251	0.222	5.330	15.67	8.206	5.972
Fiji	0.049	0.379	16.74	10.33	7.139	0.070	0.283	19.96	12.00	8.721
Jamaica	-0.135	21.05**	21.68	13.25	9.461	-0.106	0.590	19.51	9.693	7.102
Jordan	-0.581	6.003	21.48	11.16	7.362	0.031	1.593	21.04	11.48	7.850
Malaysia	-0.150	2.061	15.94	8.630	6.313	0.039	0.294	28.58	17.12	11.62
Mexico	0.251	8.038	27.70	14.84	10.76	-0.289	2.437	19.55	11.62	7.887
Paraguay	-0.058	0.049	15.59	8.352	6.095	-0.580	16.981**	17.14	9.314	6.581
South Africa	0.119	5.509	19.38	12.44	8.505	0.101	0.208	22.56	11.80	7.839
Suriname	-0.027	3.636	16.11	9.664	7.027	-2.233	11.031*	24.30	11.80	8.019
Thailand	-0.055	0.519	18.55	9.113	5.811	0.113	1.695	22.83	12.82	8.747
Turkey	0.060	11.03*	22.02	11.13	7.424	-0.393	2.108	22.23	12.59	8.634

Note: We obtain these results running TSP codes in GiveWin software.

Table 5 (A, B, C)

(A): Remittance - Export Causality Results (Low Income)

Countries	REM does not cause EXP					EXP does not cause REM				
			Critical values					*Critical values*		
Low Income	**C**	**Wald test**	**1%**	**5%**	**10%**	**C**	**Wald test**	**1%**	**5%**	**10%**
Benin	0.077	3.245	20.69	11.06	7.774	-0.236	1.022	21.61	10.97	7.544
Burkina Faso	-0.019	0.101	26.74	15.27	10.75	0.020	0.097	26.10	15.57	9.737
Ethiopia	0.074	3.587	23.31	12.59	9.093	0.060	0.066	22.96	13.92	10.58
Guinea	0.054	7.729	18.23	11.05	7.383	-1.430	1.457	20.76	12.21	8.264
Guinea-Bissau	0.191	9.41*	19.30	11.25	6.766	0.311	3.763	23.75	12.98	9.632
Madagascar	0.034	1.533	19.31	10.79	7.559	1.326	11.313*	24.70	12.46	9.055
Mali	-0.024	0.181	19.15	10.26	6.934	0.074	0.285	22.01	12.95	9.712
Mozambique	-0.182	10.44*	23.44	13.38	9.592	0.020	0.051	26.97	14.39	10.55
Tunisia	-0.097	1.000	20.46	11.24	7.087	0.430	11.531*	21.12	13.30	9.136
Togo	0.101	12.48**	22.48	12.35	8.872	-0.493	1.320	23.86	13.73	9.311

(B): Remittance - Export Causality Results (Lower-Middle Income)

	REM* does not cause *EXP					***EXP* does not cause *REM***				
			Critical values					*Critical values*		
Lower-Middle	**C**	**Wald test**	**1%**	**5%**	**10%**	**C**	**Wald test**	**1%**	**5%**	**10%**
Bangladesh	0.146	4.459	32.28	16.05	11.78	0.132	1.638	42.91	22.02	16.33
Bolivia	0.013	1.570	41.78	21.87	15.59	0.177	0.369	34.30	19.83	14.25
Congo, Rep.	0.036	0.013	22.80	11.71	7.482	0.464	0.582	23.18	12.80	8.322
Cameroon	-0.011	0.336	28.86	16.93	12.21	1.147	10.890	28.44	16.91	11.27
Cote d'Ivoire	0.071	0.019	23.76	13.60	8.803	-0.224	0.426	27.04	14.41	10.29

	REM* does not cause *EXP					***EXP* does not cause *REM***				
			Critical values					***Critical values***		
El Salvador	-0.867	1.730	16.82	8.511	6.061	-0.012	2.664	24.98	14.05	8.440
Ghana	-0.093	0.097	48.40	19.84	11.99	0.934	3.087	24.72	14.65	10.35
Guatemala	0.050	2.234	28.76	14.50	9.835	1.760	109.3***	42.12	18.64	13.45
Guyana	-0.060	17.37*	34.38	20.84	16.34	0.449	2.151	32.53	20.24	13.18
Honduras	-0.014	0.661	27.78	16.07	11.87	0.999	23.76**	28.95	14.12	9.977
India	0.013	0.094	33.77	16.59	11.45	0.286	5.507	34.49	19.19	14.15
Indonesia	-0.041	1.267	23.28	13.71	8.017	0.169	0.258	41.93	16.07	9.145
Kenya	-0.090	1.985	32.23	15.23	11.44	-0.050	0.106	34.42	18.22	11.90
Lao PDR	0.015	1.061	24.63	14.40	10.33	-0.276	0.425	40.98	18.89	10.61
Lesotho	0.009	0.015	24.98	17.12	12.36	-0.055	0.806	47.15	22.55	15.67
Morocco	-0.022	0.054	27.20	12.33	8.331	0.072	0.200	34.84	17.43	11.54
Nigeria	-0.015	0.369	25.73	13.07	9.714	-0.674	1.711	29.00	15.65	9.980
Pakistan	0.031	0.932	27.89	13.96	9.762	-1.090	17.91**	31.14	16.56	11.65
Papua New Guinea	0.065	12.21*	28.67	16.09	11.44	-1.393	12.27*	28.52	15.27	10.21
Philippines	-0.056	1.948	46.48	20.04	13.76	0.044	0.163	36.47	20.16	13.75
Senegal	-0.013	0.103	18.10	10.32	6.928	0.076	0.959	29.56	15.53	10.13
Sri Lanka	-0.330	18.13*	37.64	20.57	14.43	-0.064	1.934	21.78	10.32	7.468
Sudan	0.127	4.790	34.93	16.28	11.90	0.075	0.203	30.06	16.52	12.33
Swaziland	-0.045	2.359	28.61	13.70	9.808	0.387	6.438	28.77	11.42	7.825
Vanuatu	-0.018	2.383	27.21	13.24	8.528	0.462	0.364	28.73	16.98	11.03

(C): Remittance - Export Causality Results (Middle Income)

	REM* does not cause *EXP					***EXP* does not cause *REM***				
			Critical values					***Critical values***		
Middle Income	**C**	**Wald test**	**1%**	**5%**	**10%**	**C**	**Wald test**	**1%**	**5%**	**10%**
Algeria	0.025	2.939	22.45	13.76	9.897	-1.038	7.383	28.95	15.15	10.05
Belize	0.160	10.85*	24.80	10.68	8.078	0.368	0.769	21.14	11.22	8.327
Botswana	0.037	3.106	22.45	11.15	7.769	0.546	0.711	19.47	10.75	7.134
Brazil	0.019	0.288	17.31	10.58	7.346	-0.124	0.293	18.36	11.82	7.889
China	0.053	3.724	20.10	11.35	8.179	-0.211	0.684	22.96	13.07	9.390
Colombia	-0.012	0.171	24.17	13.07	8.519	-0.664	2.488	18.58	10.43	7.689
Costa Rica	-0.014	0.618	19.86	10.42	6.539	0.846	1.652	25.92	14.49	10.275
Dominica	0.032	0.342	15.17	9.28	6.068	-0.010	0.061	19.71	11.16	7.738
Dominican Republic	-0.172	8.314	24.63	12.90	8.345	-0.046	0.172	25.05	13.07	9.328
Ecuador	0.016	1.617	22.04	10.43	7.090	0.041	0.014	16.74	9.16	6.890
Fiji	-0.041	4.825	22.75	12.39	8.737	1.183	4.986	21.98	11.88	7.797
Jamaica	-0.211	18.56**	22.10	12.43	9.190	-0.636	14.79**	20.29	12.36	8.660
Jordan	0.039	1.048	22.80	12.48	9.288	-0.123	0.307	16.20	9.18	6.888
Malaysia	-0.068	13.13**	18.17	10.17	6.862	0.502	6.074	26.64	15.87	10.789
Mexico	-0.010	0.011	23.95	12.90	9.393	0.107	0.442	23.19	13.36	9.871
Paraguay	-0.027	1.141	19.91	9.52	7.279	0.961	6.723	21.05	12.27	7.366
South Africa	0.091	7.988	24.56	13.21	9.196	0.866	8.782	24.53	13.75	8.973
Suriname	-0.059	0.054	18.57	10.78	7.636	1.032	2.164	18.08	8.94	6.281
Thailand	0.039	1.21	20.12	10.46	7.483	-0.074	0.211	26.08	11.82	8.415
Turkey	-0.040	3.104	21.88	11.70	8.210	-0.555	5.928	22.50	13.42	9.580

*Note: Results obtained by running TSP codes. ***, ** and * mean the significance at 1, 5 and 10% levels.*

4. Conclusions

This study builds on the previous contribution found in Khurshid *et al.* (2016) and aims to investigate the remittance-export relationship with a newly constructed remittances series for the LI, LMI, and MI groups, using *SGMM* and dynamic bootstrap panel Granger causality approach for a period lasting from 1988 to 2014. In all groups, we noticed both cross-sectional dependencies and slope homogeneity. This might be natural, because the countries in these income groups have common economic characteristics and are influenced by globalization. Apart from this, we notice that fundamental economic relationships in one state will not diffuse towards other states. The results of the *SGMM* reveal that remittances have a negative and insignificant impact on the exchange rate in the LI and MI. Despite this fact, remittances positively affect the MI countries. On the other hand, the flow of remittances negatively affects the competitiveness of the LMI and MI countries, but helps in boosting exports in the LI group. In addition to this, consumption adversely affects competitiveness, whereas growth in manufacturing sector assists in consolidating exports. Furthermore, savings and the expansion of the services sector rend a positive impact on the exports of LI and MI countries, but negatively affect the LMI group.

The main findings of the bootstrap panel Granger test are as follows. Remittances do Granger-cause exchange rates mainly in the LMI countries, in one-fifth of MI and about half of the LI countries. It is noticeable that remittances are negatively affecting the exchange rates in the LI group, while apart from Lesotho and Swaziland causing positive effects in other countries of the LMI and MI groups. Conversely, exchange rates positively cause exports in one-third of the LI countries, while we find mixed evidence in the LMI and MI countries. Furthermore, the adverse effects of remittances on exports are more prominent in the MI group. The outcomes are consistent with the *SGMM* approach, but do not hold for all the countries. The results of this empirical work show that the relationship between the remittances, exchange rate and exports varies from country to country. Remittances are a key variable, but not the only variable that can influence the exchange rate and export dynamics of the recipient economy. Among other similar factors that might influence this relationship we identify: financial constraints, production factors, labour force, exchange rate regime, unemployment, institutional corruption. These factors play a major role in the fluctuating results, especially for the LI group. The mixed results for all the income groups (both negative and positive) are strong evidence to conclude that the relationship between remittances and *Dutch disease* relationship is country-specific. Future work should be oriented to the estimation of remittances inflow deriving from informal sources. This will help in designing concrete policies to address the *Dutch disease* issue in a better way.

Given these results, an important question resides in the handling of the *Dutch disease*. Few monetary measures, such as strict money laundering laws and channelling towards investment, may mitigate the problem of fall in competitiveness. The authorities should promote small scale industries, soften rules and adopt new procedures that help in quickly starting a new business, especially in the LI countries. The effectiveness of remittances can be enhanced in the presence of a solid financial system that channels them through the banking sector, which reduces costs procedures, the time span of transfer and enhances financial awareness. At macroeconomic level, the monetary policy for the remittance-dependent economy should be different from the one with no significant remittances (Chami *et al.,* 2006). Furthermore, the judicious use of fiscal policy may also control the remittances effect on competitiveness. The LI, LMI and MI countries are labour-rich; therefore, skill enhancement programs can improve productivity domestically. This enhanced productivity can be translated into providing services abroad, which earn more foreign currency for the countries of origin.

References

Acosta, P.A., Lartey, E.K. and Mandelman, F.S., 2009. Remittances and the Dutch disease. *Journal of international economics*, *79*(1), pp.102-116.

Adams, R.H. and Page, J., 2005. Do international migration and remittances reduce poverty in developing countries?. *World development*, *33*(10), pp.1645-1669.

Amuedo-Dorantes, C. and Pozo, S., 2004. Workers' remittances and the real exchange rate: a paradox of gifts. *World development*, *32*(8), pp.1407-1417.

Amuedo-Dorantes, C. and Pozo, S., 2006. Remittance receipt and business ownership in the Dominican Republic. *The World Economy*, *29*(7), pp.939-956.

Amuedo-Dorantes, C., Sainz, T. and Pozo, S., 2007. *Remittances and healthcare expenditure patterns of populations in origin communities: evidence from Mexico (Working Paper ITD= Documento de Trabajo ITD; 25)*. BID-INTAL.

Arellano, M. and Bover, O., 1995. Another look at the instrumental variable estimation of error-components models. *Journal of econometrics*, *68*(1), pp.29-51.

Barajas, A., Chami, R., Hakura, D., Montiel, P. and Tressel, T., 2011. Workers' Remittances and the Equilibrium Real Exchange Rate: Theory and Evidence [with comment]. *Economia*, *11*(2), pp.45-99.

Barrett, K., 2014. The effect of remittances on the real exchange rate: The case of Jamaica. *Caribbean Centre for Money and Finance*.

Bourdet, Y. and Falck, H., 2006. Emigrants' remittances and Dutch disease in Cape Verde. *International Economic Journal*, *20*(3), pp.267-284.

Breitung, J., 2005. A parametric approach to the estimation of cointegration vectors in panel data. *Econometric Reviews*, *24*(2), pp.151-173.

Breusch, T.S. and Pagan, A.R., 1980. The Lagrange multiplier test and its applications to model specification in econometrics. *The Review of Economic Studies*, *47*(1), pp.239-253.

Chami, R., Cosimano, T.F. and Gapen, M., 2006. Beware of emigrants bearing gifts: optimal fiscal and monetary policy in the presence of remittances.

Chowdhury, M.B. and Rabbi, F., 2014. Workers' remittances and Dutch Disease in Bangladesh. *The Journal of International Trade & Economic Development*, *23*(4), pp.455-475.

Combes, J.L., Kinda, T. and Plane, P., 2012. Capital flows, exchange rate flexibility, and the real exchange rate. *Journal of Macroeconomics*, *34*(4), pp.1034-1043.

Edwards, S., 1989. Exchange rate misalignment in developing countries. *The World Bank Research Observer*, *4*(1), pp.3-21.

Frankel, J., 2011. Are bilateral remittances countercyclical?. *Open Economies Review*, *22*(1), pp.1-16.

Grabel, I., 2008. The Political Economy of Remittances: What do we know? What do we need to know?. *PERI Working Papers*, p.172.

Granger, C.W., 1969. Investigating causal relations by econometric models and cross-spectral methods. *Econometrica: Journal of the Econometric Society*, pp.424-438.

Granger, C.W., 2003. Some aspects of causal relationships. *Journal of Econometrics*, *112*(1), pp.69-71.

Hassan, G.M. and Holmes, M.J., 2013. Remittances and the real effective exchange rate. *Applied Economics*, *45*(35), pp.4959-4970.

Hassan, G.M. and Holmes, M.J., 2015. Do Remittances Facilitate a Sustainable Current Account?. *The World Economy*. doi:10.1111/twec.12361

Hyder, Z. and Mahboob, A., 2005. Equilibrium Real Effective Exchange Rate and Real Exchange Rate Misalignment in Pakistan. *State Bank of Pakistan, mimeo*.

Izquierdo, A. and Montiel, P.J., 2006. Remittances and Equilibrium Real Exchange Rates in Six Central American Countries. *Inter-American Development Bank*.

Javaid, S.H., 2011. Dutch disease investigated: empirical evidence from selected South-East Asian economies. *Journal of Economic Cooperation & Development*, *32*(4), p.51.

Kar, M., Nazlıoğlu, Ş. and Ağır, H., 2011. Financial development and economic growth nexus in the MENA countries: Bootstrap panel granger causality analysis. *Economic modelling*, *28*(1), pp.685-693.

Khurshid, A., Kedong, Y., Calin, A.C. and Popovici, O.C., 2016. Do Remittances Hurt Domestic Prices? New Evidence from Low, Lower-Middle and Middle–Income Groups. *Romanian Journal of Economic Forecasting*, 19(4), pp.95-114.

Khurshid, A., Kedong, Y., Calin, A.C. and Khan, K., 2017. The Effects of Workers Remittances on Exchange Rate Volatility and Exports Dynamics-New Evidence from Pakistan. *Romanian Economic Journal*, *20*(63), pp.29-52.

Kónya, L., 2006. Exports and growth: Granger causality analysis on OECD countries with a panel data approach. *Economic Modelling*, *23*(6), pp.978-992.

Kugler, M. and Rapoport, H., 2007. International labor and capital flows: Complements or substitutes?. *Economics Letters*, *94*(2), pp.155-162.

Kapur, D., 2004. *Remittances: the new development Mantra. United Nations Conference on trade and development* (No. 19). G-24 discussion paper Series.

Lartey, E.K., 2007. Capital inflows and the real exchange rate: An empirical study of sub-Saharan Africa. *The Journal of International Trade & Economic Development*, *16*(3), pp.337-357.

Lartey, E.K. Mandelman, F.S. and Acosta, P.A., 2012. Remittances, exchange rate regimes and the Dutch disease: a panel data analysis. *Review of International Economics*, *20*(2), pp.377-395.

Lommatzsch, K. and Tober, S., 2004. What is behind the real appreciation of the accession countries' currencies?: An investigation of the PPI-based real exchange rate. *Economic systems*, *28*(4), pp.383-403.

Lopez, J.H. Molina, L. and Bussolo, M., 2008. Remittances, the real exchange rate, and the Dutch disease phenomenon. *Remittances and Development Lessons from Latin America. Washington DC World Bank*.

Mongardini, J. and Rayner, B., 2009. Grants, remittances, and the equilibrium real exchange rate in Sub-Saharan African countries.

Mtonga, E., 2011, March. Did it matter? Monetary policy regime change and exchange rate dynamics in South Africa. In *CSAE 25th Anniversary Conference*.

Mughal, M.Y., 2013. Remittances as development strategy: Stepping stones or slippery slope?. *Journal of International Development*, *25*(4), pp.583-595.

Owusu-Sekyere, E., Koekemoer Van Eyden, R. and Kemegue, F., 2014. Remittances and the Dutch disease in sub-Saharan Africa: a dynamic panel approach. *Contemporary Economics*, *8*(3), pp.289-298.

Pesaran, M.H. and Yamagata, T., 2008. Testing slope homogeneity in large panels. *Journal of Econometrics*, *142*(1), pp.50-93.

Pesaran, M.H., 2004. General diagnostic tests for cross section dependence in panels.

Pesaran, M.H., 2006. Estimation and inference in large heterogeneous panels with a multifactor error structure. *Econometrica*, *74*(4), pp.967-1012.

Pesaran, M.H., Ullah, A. and Yamagata, T., 2008. A bias-adjusted LM test of error cross-section independence. *The Econometrics Journal*, *11*(1), pp.105-127.

Rajan, R.G. and Subramanian, A., 2011. Aid, Dutch disease, and manufacturing growth. *Journal of Development Economics*, *94*(1), pp.106-118.

Roy, R. and Dixon, R., 2016. Workers' remittances and the Dutch disease in South Asian countries. *Applied Economics Letters*, *23*(6), pp.407-410.

Stark, O., Taylor, J.E. and Yitzhaki, S., 1986. Remittances and inequality. *The economic journal*, *96*(383), pp.722-740.

Swamy, P.A., 1970. Efficient inference in a random coefficient regression model. *Econometrica: Journal of the Econometric Society*, pp.311-323.

Taylor, J.E. and Wyatt, T.J., 1996. The shadow value of migrant remittances, income and inequality in a household-farm economy. *The Journal of Development Studies*, *32*(6), pp.899-912.

Yang, D., 2004. *How remittances help migrant families*. University of Michigan.