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RESEARCH PAPER

Migrant Remittances and Dutch Disease: Evidence from India

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Abstract
This study deals with the question of whether the inflow of migrant remittances causes Dutch Disease or not in India. For this purpose, the study employs the Autoregressive Distributed Lag Model (ARDL) to examine the influence of migrant remittances on the real effective exchange rate spanning the period from 1975 to 2018. In the long run, the study finds a positive relationship between migrants' remittances and the real effective exchange rate, meaning that evidence of Dutch Disease risk in India. The study also checks the moderating effect of inflation on remittances and real effective exchange rate relationship and finds a negative effect. The study recommends that the government of India would implement and design the policies for the diversification of remittances flow toward priority areas of investment.
Keywords: Migrant Remittances, Dutch Disease, ARDL, India.
JEL Classifications: F31, E49, O11, Q43.

Introduction

Migrant Remittances inflows are rapidly increasing in recent years and amounted to 529 billion dollars in 2018 to low and middle-income countries as compared to US$483 billion in 2017 that is an increase of 9.6 percent over the previous record (World Bank, 2019). Indeed, migrant remittances have enabled economic prosperity in many remittances recipient countries through its impact on human capital, consumption, investment, unemployment, economic growth, poverty and other macroeconomic variables (Urama et al., 2019; Olayungbo and Quadri, 2019; Ogunwole, 2016; Pekovic, 2017; Chowdhury, 2016; Glytsos, 2005, Adams, 1991; Balde, 2011). However, many studies provoked the effectiveness of migrant remittances that may, in fact, be detrimental to the economy. It extensively remains interesting and debatable in research by sociology and political science and economics researchers (Adams, 2011).

A plethora of studies in previous literature shows remittances and macroeconomic indicators relationship. Majority of them illustrate the positive effect of remittances inflow with growth that is direct or indirect (Sobiech, 2019; Meyer and Shera, 2017; Nsiah, 2007; Cooray, 2012) and some illustrate the adverse effect (Karagoz, 2009; Chami et al., 2005) and few studies find no effect or mixed results (Barajas et al., 2009; Senbeta 2013). Other studies analyzed migrant remittances effect on investment and financial development: (Adams, 1998; Glytsos, 2005; Faheem et al., 2019): on household expenditure pattern or domestic consumption (Mahmud, 1989; Quartey and Blankson, 2004). Others studies explained the relation of remittances inflows with poverty: (Adams and Page, 2005; Qayyum et al., 2008; Yoshino, 2017); with income inequality (Quibria, 1997; Taylor, 1999; Docquier and Rapoport, 2003); with the productivity of labour (Bayangos and Jansen, 2011; Al Mamun et

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al., 2015); with the supply of the labor (Posso, 2012; Urama et al., 2017) and sustainable development (Gupta, Pattillo, and Wagh, 2009; SIddiqui and Kemal, 2006).

Indian economy is in the list of the fastest-growing economies of Asia, which remains its top position related to remittances recipient country in the world (World Bank, 2018). Following graph shows the trend of personal remittances from 1980 to 2017. The increase in personal remittances shows upward trends with time.

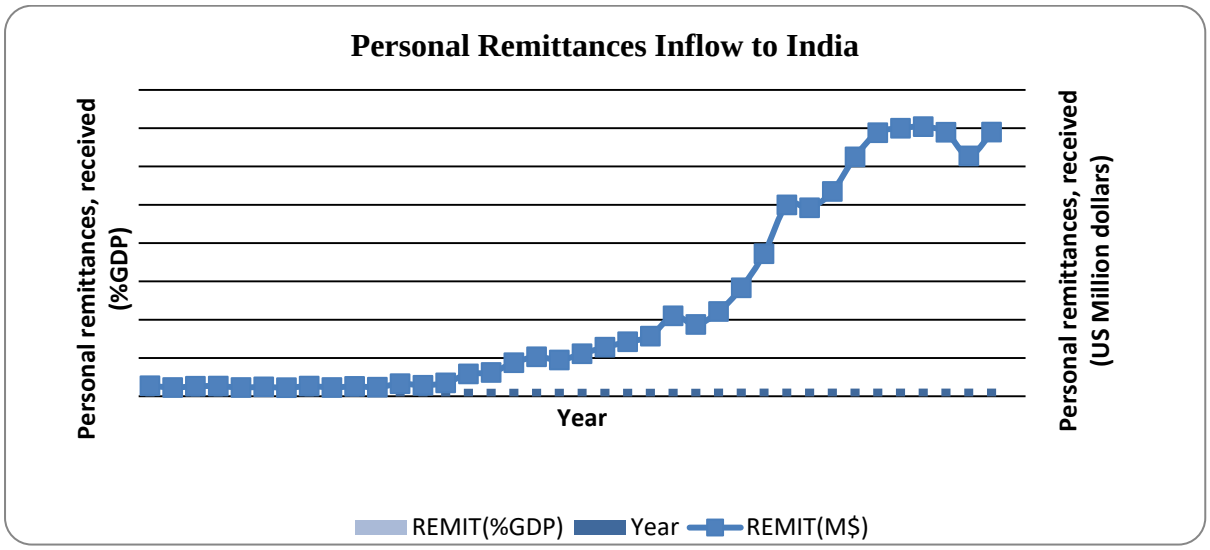

Figure 1. Personal Remittances Inflow to India
Source: Authors' own computation with data from WDI.

One of the most haunting questions in development economics is whether personal remittances[1] promote or hamper economic growth, and it has any relation with the exchange rate. On the theoretical ground, a huge inflow of migrant remittances may cause flow of foreign currency into a country that affects recipient country exchange rate and export competitiveness that theory known as "Dutch Disease". In other words, to confirm whether is there any Dutch disease effect on the home country due to large inflow of inflow remittance. The Salter-Swan-Corden-Dornbusch model displays a mechanism through which real exchange rate appreciate due to massive capital inflows in the form of remittances. And due to this capital, inflow increases the household income that increases aggregate demand that impacted non-tradable goods (Lopez et al. 2007). In the response of this spending effect resources move away from the tradable sector, and this leads to Dutch Disease Phenomenon. Using the data for the Republic of Moldova, Ito (2017) analyzed the confirmation of Dutch disease that is a decline in exports and appreciates the real exchange rate in response to a huge inflow of remittances. For Ghana, the findings of Ouattara and Strobl (2008) are in favor of the Dutch Disease hypothesis. In the same context, a massive inflow of remittances causes appreciation in real effective exchange rate leads to an adverse effect on domestic economy competitiveness in Tajikistan (Sultonov, 2011).

Theoretically, there are many factors through which remittances may affect the exchange rate in both short-run and long run. Firstly, since international remittances affect real exchange rate directly and increase country's net foreign asset position though remittances are perceived as the transfer of foreign currency with no any obligation (Lopez et al., 2007; Brahim et al., 2017). Secondly, it is argued that remittances affect the real exchange rate via its impact on growth and that occurs in appreciation or depreciation of the exchange rate in

1. The transmitted money and goods by migrant workers to households from their places that either in abroad or urban areas (Adams, 2011)

short-run ((Lopez et al., 2007). The situation is different in the long run; the effect of remittances on the real exchange rate is vague, that is small or depreciated (Chami et al., 2010). The real exchange rate also affects the remittances but the motivation of the study to test the Dutch Disease risk. Along with, our study fills this gap in the current literature by analyzing the effect of migrant remittances on the exchange rate in India, which causes the Dutch disease effect, or not.

Section 1 is about introduction. Section 2 explains the review of literature of existing studies on migrant remittances and Dutch Disease. Section 3 includes an overview of the methodology and estimation procedure. Section 4 deals with a discussion about the findings of the analysis. Section 5 deals with concluding remarks and recommendations.

Literature Review

The prior literature has been reported concerning the relationship between migrant remittances and the exchange rate. This is evidence in empirical studies that carried out on various countries or a specific country, region. A plethora of studies that found results in favor of Dutch disease phenomenon that is migrant remittances cause real exchange rate appreciation (Osigwe and Obi, 2016; Bourdet and Falck, 2006; Chowdhury and Rabbi, 2011; Roy and Dixon, 2016; Saadi-Sedik and Petri, 2006; Acosta et al., 2007; Hyder and Mahboob, 2006; Bussolo et al., 2007; Ito, 2017); scarce literature showed results that are not in favor of Dutch Disease effect in recipient economies (Ogun, 1998; Sackey, 2001; Brahim et al., 2017; Mongardini and Rayner, 2009; Rajan and Subramanian, 2005; Ito, 2019).

The study of Bourdet and Falck (2006) concludes the negative effect of remittances on the tradable sector competitiveness and find evidence of Dutch disease in Cape Verde. Amuedo-Dorantes and Pozo (2004) concluded that 22% real exchange rate increase in 13 Latin America and the Caribbean countries due to doubling of remittances. Similarly, another study on Latin American countries, Lopez et al. (2007) found that the real effective exchange rate appreciated due to inflow migrant remittances by using panel analysis. Similar results also found in the study of Saadi-Sedik & Petri (2006) for 1964-2005 for Jordan. Similarly, in the case of Bangladesh, the study of Chowdhury and Rabbi (2011) concluded the significant effect remittances on the real exchange rate (appreciate) and deterioration in external trade competitiveness.

Similarly, by applying the fixed-effect model, the study of Roy and Dixon (2016) concludes positive association of remittances with the exchange rate in Pakistan, Sri Lanka, India and Bangladesh. Hyder and Mahboob (2006) also found the same result that is evidence of Dutch disease for the period of 1978-2005 in Pakistan. In the same context, several studies results are in support of the Dutch disease effect in Pakistan (Chisti, 1993; Shahbaz et al., 2008).

Lartey et al. (2008) results are in support of the Dutch disease effect by investigating the spending effect of increasing remittances in the panel of 109 selected economies. Another study of Owusu-Sekyere et al. (2014) is consistent in favor of Dutch disease for 34 sub-Saharan African countries. Osigwe and Obi (2016) explored results in favor of Dutch Disease by using the Error Correction Model from 1980 to 2012 in Nigeria. The similar conclusion found for Tunisia, in the study of Chnaina and Makhlouf (2015) for 1975-2009. More recently, Urama et al. (2019) showed evidence of Dutch disease by using the ARDL estimation technique in Nigeria. Hassan and Holmes (2013) revealed a positive association of remittances with the real exchange rate by applying a panel vector error correction model in less-developed economies during the period 1987–2010.

However, some studies provide no evidence of Dutch disease. Brahim et al. (2017) carried out the study in nine selected MENA countries by using different econometric models, and

the conclusion is in favor of no evidence Dutch disease in this region. Supporting this view, Mongardini and Rayner (2009) performed Pool Mean Group method for 1980-2006 and concluded that remittances do not constitute a reason to appreciate real effective exchange rate in 29 sub-Saharan African countries. Barrett (2014) empirically revealed no evidence of Dutch disease and found depreciation in the exchange rate in Jamaica. The study of Izquierdo and Montiel (2006) found no evidence Dutch disease in case of Nicaragua, Honduras and Jamaica. Similarly, in the same context, studies of Sackey (2001) for Ghana and Nyoni (1998) for Tanzania concluded the absence of Dutch disease in these countries.

Another part of the literature showed mixed results in different economies. Nikas and Blouchoutzi (2014) concluded different results in the case of Albania and Moldova by applying OLS fixed effect. The results showed remittances Dutch disease effect in Albania but the absence of this effect in Moldova. Similarly, a study of Taguchi and Lama (2016) applied Vector autoregressive approach for Nepal, and Bangladesh found different results in both economies. The findings concluded that in Nepal, remittances showed Dutch disease effect but reverse case in Bangladesh. However, Barajas et al. (2010) study for the panel of a large set of countries showed a weak association between remittances and exchange rate appreciation as restricted domestic factor mobility and openness. It is clear from the literature related to the association between remittances and the real exchange rate in South Asian economies is sporadic.

Data and Methodology

The Dutch disease theory base on the concept that booms in specific sector cause high inflows of foreign currency from local currency appreciates relative to the other countries' currencies. Therefore, it is to test whether the Indian economy faces Dutch disease effect due to the huge inflow of remittances into India, which leads to appreciating in the real value of Indian rupee. This study uses migrant remittances is the main independent variable and the real effective exchange rate as the dependent variable. Real effective exchange rate explained more efficiently trade competitiveness and purchasing power that is most relevant and extensively used for the analysis of Dutch disease as compared to nominal and real exchange rate in different studies (Brahim et al., 2017; Sultonov, 2011 and others). The study also uses ODA (official development assistance), inflation and GDP per capita in this study. There are various studies that used the different methods including ARDL method to show the variable link in different countries (Aftab et al., 2015; Anwar et al., 2016; Chaudhry et al., 2019; Chaudhry et al., 2020; Faheem et al., 2020) but our study applies ARDL model to prove the Dutch Disease hypothesis. This study covered annual data ranges from 1975 to 2018 and sourced from WDI.

The following Equation (1) shows the econometric model.

$$LREER_t = \alpha_0 + \alpha_1 LREMIT_t + \alpha_2 X_t + \mu_i \quad (1)$$

Where,

LREER = Log of real effective exchange rate

LREMIT = Log of migrant remittances

x_i = Control variables like (GDP per capita, ODA and inflation and (LREMIT*LINFL) in case of interaction model to check the moderating effect of inflation in relation of remittances and real effective exchange rate).

μ_t = Error Term

t = 1, 2…44

The ARDL bounds approach specification adopted by using the following specified

models (without interaction and with interaction term):

$$\Delta LREER_t = \alpha_0 + \sum_{i=1}^{n-1} a_{1i}\Delta LREER_{t-1} + \sum_{i=1}^{n-1} \alpha_{2i}\Delta LREMIT_{t-1} + \sum_{i=1}^{n-1} \alpha_{3i}\Delta LGDPPC_{t-1} + \sum_{i=1}^{n-1} \alpha_{4i}\Delta LODA_{i-1} + \sum_{i=1}^{n-1} \alpha_{5i}\Delta LINFL_{t-1} + \beta_1 LREER_{t-1} + \beta_2 LREMIT_{t-1} + \beta_3 LGDPPC_{t-1} + \beta_4 LODA_{t-1} + \beta_5 LINFL_{t-1} + \mu_t \quad (2)$$

Δ and α_0 represent the first difference operator of the variables and the deterministic drift parameter and terms with β_s show the long-run multipliers. The unrestricted error correction model (ECM) estimated as follows:

$$\Delta LREER_t = \alpha_0 + \sum_{i=1}^{n-1} a_1\Delta LREMIT_{t-1} + \sum_{i=1}^{n-1} \alpha_2\Delta LGDPPC_{t-1} + \sum_{i=1}^{n-1} \alpha_3\Delta LODA_{t-1} + \sum_{i=1}^{n-1} \Delta LINFL + \lambda ECT - 1 + vt_t \quad (3)$$

Similarly, the specification for with interaction model interaction term of remittances and inflation (LREMIT*LINFL) included in the above specification in the long run and short run.

ARDL model has been applied under some key assumptions that are; there is no serial correlation that means error term must be free from serially independent (Pesaran et al., 2001). To test the serial correlation Breusch–Godfrey Serial Correlation (LM) test is used in this study. Other tests also include residual diagnostic tests related to normality, heteroskedasticity, and the Ramsey reset test. As the model is the autoregressive structure, the CUSUM test is used for the dynamic stability of the model.

Results and Discussion

The study employed unit root tests such as Augmented Dickey-Fuller (1979) (ADF) and Phillips-Perron (1988) (PP). Table 1 presents the results of unit root tests that all variables are nonstationary at the level and becomes stationary at the first difference the except ODA which is stationary on both.

Results of Unit Root Tests

Table 1. Results of Unit Root Tests

Level			First Difference	
Variable	**ADF**	**PP**	**ADF**	**PP**
REER	-1.6616	-2.4746	-5.8582***	-5.8166***
REMIT	-2.3084	-2.2922	-7.9755***	-7.8117***
GDPPC	-3.6840	-6.2252	-5.7808***	-5.8107***
ODA	-3.1829**	-3.1229**	-7.3287***	-9.0711***
INFL	-4.2248	-5.1738	-8.8761**	-8.7751***
(REMIT*INFL)	-1.29	-1.28	-7.65***	-7.58***

Note: ***, ** denotes significance level at 1% and 5% respectively.
Source: Research finding.

The computed value of F-statistic shows the confirmation of the association between real effective exchange rate and the rest of the independent variables like migrant remittances, ODA, inflation and GDP per capita exist in the long run because the computed value is higher than the upper bound values in both models with and without the interaction term. The selection of this model proves the Dutch Disease hypothesis.

Table 2. ARDL Bound Testing Co-integration Analysis

Model	**F-statistics**	**Result**	
LREER/(LREMIT, LGDPPC, LODA, LINFL)	8.82	Cointegration	
LREMIT/(LREER, LGDPPC, LODA, LINFL)	6.11	Cointegration	
LGDPPC/(LREMIT, LREER, LODA, LINFL)	5.49	Cointegration	
LODA/(LREMIT, LREER, LGDPPC, LINFL)	7.08	Cointegration	
LINFL/(LREMIT, LREER, LGDPPC, LODA)	1.13	No Cointegration	
	1%	5%	10%
Lowe bound I(0)	3.74	2.86	2.45
Upper bound I(1)	5.06	4.01	3.52
LREER/(LREMIT, LGDPPC, LODA,	3.41	2.62	2.26
LINFL, (LREMIT*LINFL) F-statistics=8.23	4.68	3.79	3.35

Source: Research finding.

Further, for the estimation of the short-run and long-run parameters, the ARDL estimation technique after the confirmation of co-integration should be used. For the optimal lag selection, AIC criterion is used. The study retains the following optimal lag orders ARDL (1, 1, 1, 1, 0) that is based on the above criteria.

ARDL Estimation and Diagnostic Checks

Tables 3 and 4 show the long-run and short-run dynamics. The diagnostic residual tests results show that there is no evidence of serial correlation, heteroskedasticity, specification and normality problems in our model.

The ARDL model (without interaction term) result express the positive link between migrant remittance and real effective exchange. The remittances coefficient values are 0.81 that is significant at 5 percent level in the long run while insignificant in the short run. This result confirms the existence of Dutch disease in India in the long run. The other variable like LGDPPC, LODA and LINFL are significant in the short and long run.

Table 3. Long-run Coefficients and Diagnostic Checks

Regressors	**Coefficients (Without Interaction Term)**	**Coefficients (With Interaction Term)**
LREMIT	0.81**[0.31]	2.36**[1.12]
LGDPPC	1.45***[0.35]	2.63***[0.80]
LINFL	-1.15***[0.24]	-1.49***[0.36]
(LREMIT*LINFL)	----------	-0.43*[0.25]
Intercept	-10.57***[3.03]	-17.12***[5.75]
R-Squared	0.95	
F-Statistic	206.93(0.00)	
J.B Test	1.49 (0.47)	1.34(0.51)
Serial Correlation	1.16(0.33)	0.81(0.45)
Functional Form	0.05(0.82)	0.34(0.56)
Heteroscedasticity	1.09(0.39)	1.53(0.18)
CUSUM	Stable	Stable
CUSUMSQ	Stable	Stable

Note: *,**, *** shows 10%, 5% and 1% significance level; the values in [], () are std error and p-values.

Source: Research finding.

The ARDL model (with interaction term) result presents the positive affiliation between migrant remittance and real effective exchange. The remittances coefficient values are 2.36

and 0.28 that is significant in LR and SR. This result confirms the existence of Dutch disease in India in LR. The other variable like LGDPPC, LODA and LINFL are significant. The interaction term is significant, with a negative sign that shows the negative effect on the real effective exchange rate. The coefficients -0.19 and -0.18 of the error correction term (ECT) are negative and significant explained the surety of adjustment of variables towards long-run dynamics.

The findings are akin to the study of Urama et al. (2019) that concludes migrant remittances leads to Dutch disease.

Table 4. Short-run Coefficients

Regressors	Coefficients (With Interaction Term)	Coefficients (With Interaction Term)
D(LREMIT)	0.015 [0.043]	0.28** [0.12]
D(LGDPPC)	0.78** [0.29]	0.47*** [0.12]
D(LODA)	0.05** [0.02]	0.04*[0.022]
D(LINFL)	-0.22*** [0.06]	-0.27***[0.06]
D(LREMIT*LINFL)	----------	-0.08** [0.03]
ECT(-1)	-0.19*** [0.06]	-0.18*** [0.06]

Note: *,**, *** shows 10%, 5% and 1% significance level; the values in [], () are std error and p-values.
Source: Research finding.

Table 5. Marginal Effect

		Minimum	Average	Maximum
India	Inflation Rate (LINFL)	2.00	3.62	5.12
	Marginal Effect	2.2	2.07	1.95

Source: Research finding.

$$\delta LREER_t / \delta LREMIT_t = 2.36 - 0.08 LINFL_t$$

Moreover, Saudi Arabia, the marginal effect of interaction term analyzed at minimum, the mean and maximum level of LINFL is 2.2, 2.07 and 1.95 respectively.

Parameters' Stability Test

The uses the cumulative sum (CUSUM) and the cumulative sum of squares (CUSUMSQ) test to check the stability of the selected models (Brown et al., 1975) that shows overall models are stable.

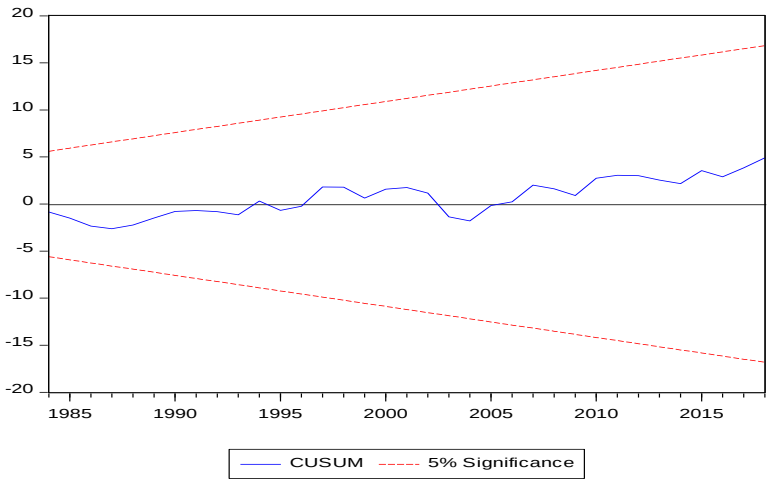

Figure 2. Graphical Plot of CUSUM
Source: Research finding.

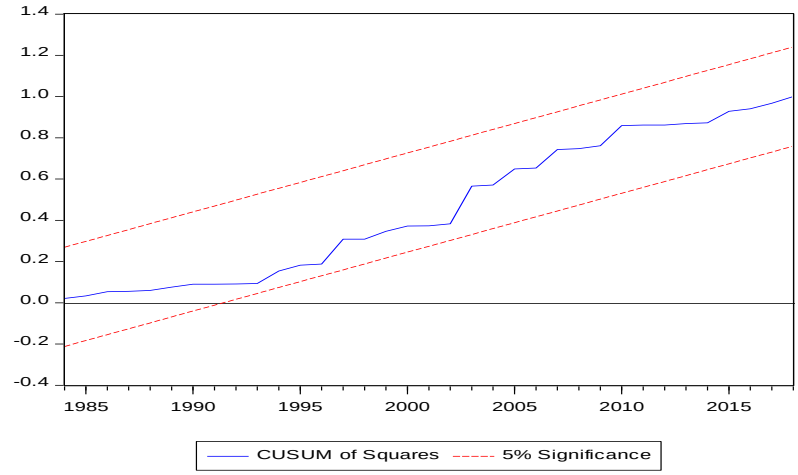

Figure 3. Graphical Plot of CUSUMQ
Source: Research finding.

Conclusion and Recommendation

This paper investigates the Dutch disease effect of remittances in India over the periods 1975-2018 by employing the ARDL model framework. The outcomes confirm that huge inflow of migrant remittances responds to Indian economy toward Dutch Disease risk in terms of appreciation in the real effective exchange rate. The study finds the positive relationship between migrants' remittances and the real effective exchange rate, meaning that evidence of Dutch Disease risk in LR in India. The study also ensures the moderating impact of inflation on remittances and real effective exchange rate relationship and finds a negative effect.

Based on results, this study concludes that high inflow of migrant remittances direct to Dutch Disease that means the appreciation of Indian currency relative to other countries encourage imports and discourage exports. The study recommends that the government of India would implement and design the policies for the diversification of remittances flow toward priority areas of investment.

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