IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Unveiling The Dynamic Impact Of Remittances On GDP In India: An Empirical Analysis

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Abstract: The trajectory of growth is often not linear, relationship between macroeconomic variable changes a number of times before we can actually ascertain the actual impact of remittances on the GDP. This study employs threshold regression analysis to identify the threshold limit beyond which remittances significantly impact GDP growth in India. Furthermore, the dynamic relationship between remittances and GDP growth has been studied by incorporating structural breaks in remittance inflows as dummy variables in interaction with remittances which was done using ARDL. The study aims to identify various points in the timeline of remittances inflow in India and their respective impacts on the GDP. The results suggest that remittances can drive secular growth in the long run, subject to certain exogenous and endogenous factors. The analysis covers the time period from 1975 to 2023 and the data has been extracted from World Bank.

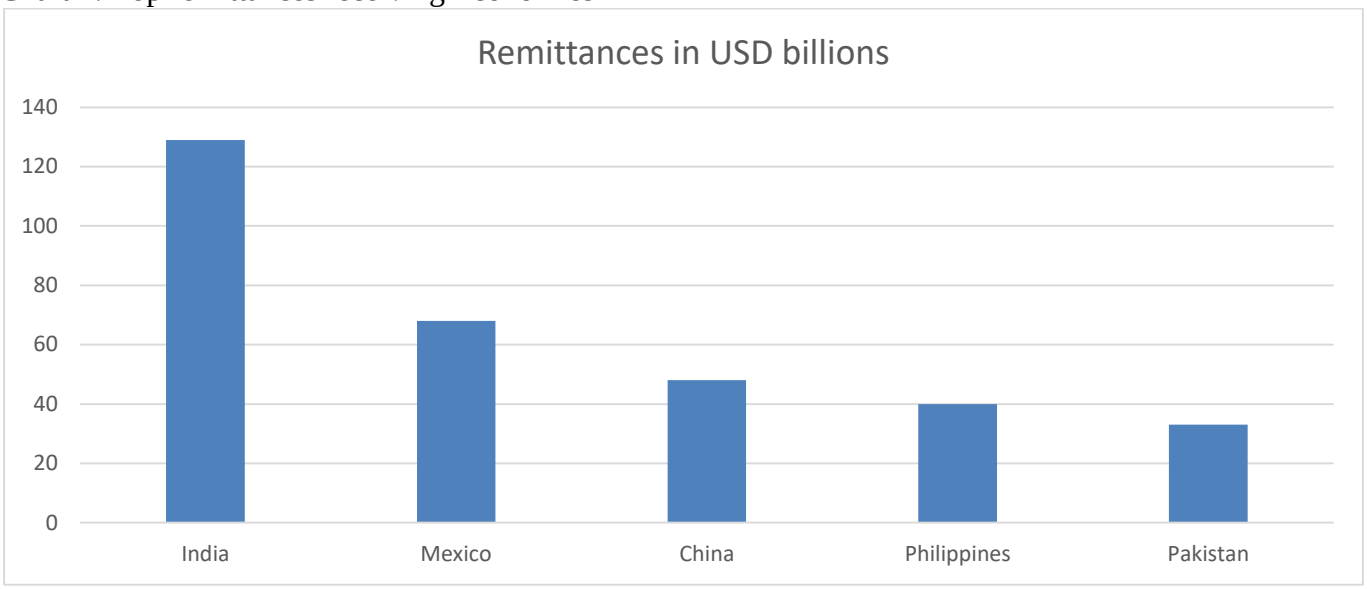
Keywords: Remittances, GDP, India, Threshold Regression, Structural Break, ARDL

I. INTRODUCTION

Indian diaspora around the globe is a testament of India's rich cultural heritage, entrepreneurial spirit, and the resilience of its people. They have their roots in the colonial era, when Indians were transported to various parts of the world as indentured laborers. Many were taken to the Caribbean, Africa, and Southeast Asia to work on plantations, railways, and other infrastructure projects. After India gained independence in 1947, the diaspora continued to grow, with many Indians migrating to countries like the United States, United Kingdom, Canada, and Australia for better economic opportunities.

With such a huge network of diaspora, India has been receiving remittances worth billions of dollars, making it one of the largest recipients of remittances globally, which has significantly contributed to the country's economy and helped improve the standard of living for many families. And at the macroeconomic level remittances help bridge the trade deficit and stabilize the balance of payments. It also contributes to India's foreign exchange reserves, enabling the country to meet its external obligations. Remittances increase disposable income, leading to higher consumption and investment in sectors like real estate, education, and healthcare.

Chart 1: Top remittances receiving Economies

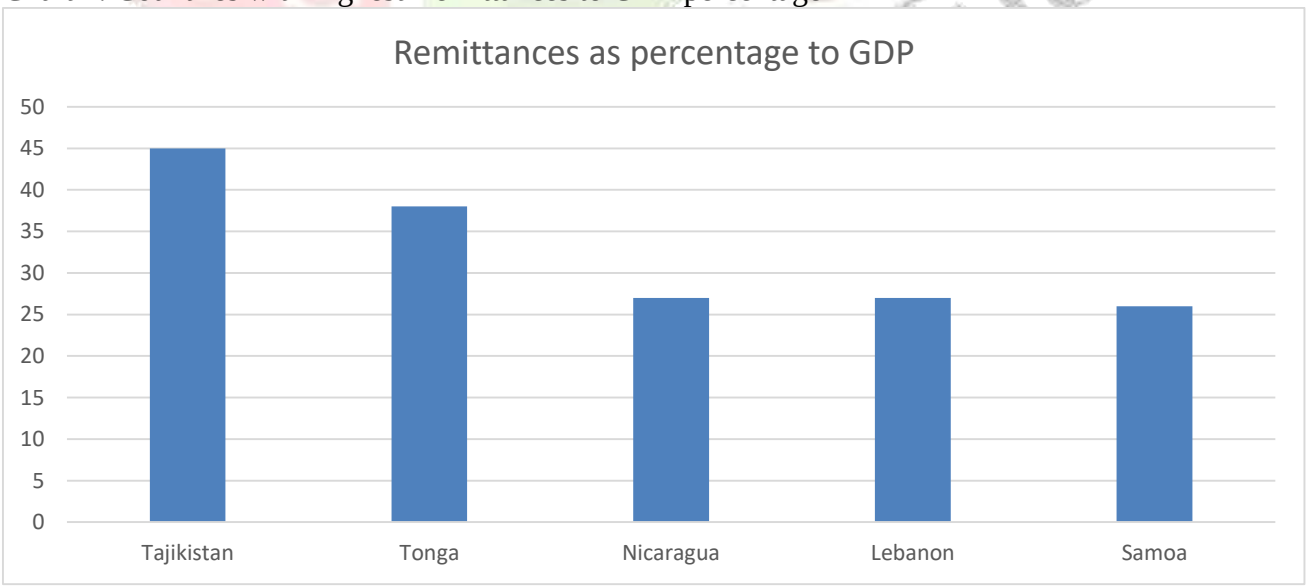


Source: Based on the data published by World Bank

In the year 2024, India received an estimated $129.1 billion in remittances, the highest ever for a country in any year. As per Reserve Bank of India's 6th Remittances Survey on Inward remittances (2023-24), remittances have surpassed FDI and has been proved to be helpful in covering trade deficit. Of the total remittances received by the country, United States have been proved to be a major source country. The report also states that about 73.5% of the total remittances transactions take place through digital channels. It also provides insights suggesting that 1.4% of the senders send above 5 lakh but this fraction of transaction makes up for 29% of the total money sent. Meaning thereby more than one fourth of the remittances are received in bigger amounts rather than in chunks. The average cost of sending remittances to India is 4.9% for every 200 USD which is better than the global average of 6.65%. But the same is still higher than what United Nation Sustainable Development Goal has targeted i.e., 3%.

Despite everything, there is a huge difference in receiving the highest amount of remittances and being dependent on it. And India is certainly not a remittances dependent economy. While remittances play a significant role in supporting household incomes and contributing to foreign exchange reserves, India's economic growth is driven by a diverse range of factors.

Chart 2: Countries with highest Remittances to GDP percentage



Source: Based on the data published by World Bank

The total proportion of remittances to GDP as percentage is considerably low to call India a remittances dependent economy. Remittances account for around 3-3.4% of India's GDP, while (as seen in graph 2) the given economies are largely dependent on remittances. These countries rely heavily on remittances to support their economies, whereas India's economy is driven by a broader range of factors, including domestic consumption, investment, and exports. Countries like Tonga and Samoa often run trade deficits, which are partially offset by remittances. India also runs trade deficits, but its economy is more resilient due to its size and diversification. India's economy is driven by a combination of domestic consumption, investment, and exports. In contrast, these countries often rely on remittances, foreign aid, and external factors to drive growth.

II. Review of Literature

By and large there have been studies that explored the impact of remittances on GDP in case of several countries including India. Ratha (2007) concluded that there is a multiplier effect of remittances. This theory provides a concrete base to assess further how can remittances potentially impact the economy. In their study, Iqbal and Sattar (2010) concluded that in the absence of remittances monetary policy, fiscal policy and exchange rate would come under pressure. As remittances enhances the foreign exchange reserve of the country. But remittances have a dynamic relation with macro-economic variables, remittances have a positive impact on the balance of payment and has direct impact on savings and investment leading to economic growth (Adams and Page., 2005 and World Bank., 2008[1]). Studies done concerning countries like Morocco, India, and Pakistan, as well as the Mediterranean region, have shown that remittances can boost disposable income, thereby stimulating consumption, investment, and savings (Ratha et al., 2011) (Global Economic Prospects 2006[2], 2005[3]). While remittances bring in valuable foreign exchange, they can also have negative implications for the economy. A surge in remittances can lead to currency appreciation, harming trade competitiveness (Ratha, 2013). Additionally, remittances can reduce labor supply, as increased non-labor income may lead households to demand more leisure time, particularly among female family members (Vargas-Silva et al., 2009; Adams, 1991). Research by Tumbe (2011) using NSSO data suggests India isn't heavily reliant on remittances. Further analysis by Mahapatro et al. (2017) using the same data found that households receiving remittances tend to allocate their spending differently, prioritizing investments over food and other consumables. This pattern was observed in states like Uttar Pradesh, Kerala, and Karnataka. Further, remittances can also impact social determinants as well. De Haas., (2007) in his study concluded that remittances can positively impact the school attendance and thereby adding to the human capital. Cox-Edwards and Ureta., (2003) in their study concluded that it can also reduce the probability of students leaving schools.
India is the largest recipient of remittances, exceeding other financial inflows and significantly influencing the country's macroeconomic landscape (World Bank, 2022[4]). While remittances play a substantial role, India's economy is not entirely reliant on them (Tumbe, 2011). Research based on National Sample Survey Organization (NSSO) data reveals that households receiving remittances tend to allocate less to food and more to investments (Mahapatro et al., 2017). The World Bank (2015[5]) notes that India's dependence on remittances is relatively lower compared to neighboring countries like Nepal, Bangladesh, and the Philippines. The economic impact of remittances in India differs from that of its neighboring countries, largely due to how remittances are utilized (NSSO, 2010[6]). According to the Reserve Bank of India (RBI, 2010[7]), remittances are primarily used for family maintenance, savings, and investments. The stable nature of remittances makes them a valuable tool for economic growth and development (Singh and Hari, 2011). Remittances have a positive impact on households, particularly in rural areas, by reducing poverty incidence (Dey, 2015) and improving household well-being (Mohanty et al., 2014). Studies specific to Kerala have found that remittances increase household per capita income and alter spending behavior, with recipients more likely to spend on non-food durable goods (Sunny et al., 2020). The majority of remittances to India originate from GCC nations, with Kerala receiving a significant proportion despite sending fewer migrants compared to states like Uttar Pradesh and Bihar (Mitra and Kasliwal, 2020).

[1] "Output for Remittance Flows 2008-2010" Migration and Development Brief. No. 8. Washington, D.C.: World Bank
[2] Global Economic Prospects 2006: Economic Implications of Remittances and Migration
[3] Global Economic Prospects 2005: Trade, Regionalism and Development
[4] Migration and Development Brief
[5] Migration and Remittances Factbook
[6] Household Consumer Expenditure in India
[7] Remittances in India: Concepts, Measurement and Macroeconomic Implications

III. Data and Methodology

This study utilizes annual data on GDP and remittances for India, they have been logged before running the regression model. The time period for the given variables is from 1975 to 2023. This study employs a threshold regression model to examine the non-linear relationship between remittances and GDP. A single independent variable (log(Remittances)) is used to model the relationship with the dependent variable (log(GDP)).

$$\log GDP = \beta_0 + \beta_1.\log R + \varepsilon$$

The primary objective is to investigate the specific relationship between remittances and GDP, making a bivariate model a suitable choice. By focusing on a single independent variable (remittances), the model can provide insights into the specific dynamics between remittances and GDP without the complexity introduced by additional variables.
Additionally, to investigate the relationship further, structural breaks have been identified using Bia Perron test and Chow test. Which have been used further as a dummy in interaction with the remittances.

$$\log GDP = \beta_0 + \beta_1.\log R + \beta_2.\ \log R*SBdummy1 + \beta_3.\ \log R*SBdummy2 + \beta_3.\ \log R*SBdummy2 + \ \varepsilon$$

Here in this model SB is the structural breaks in the remittances which have been used in interaction with the remittances to gain better understanding of the impacts of each structural breaks separately, where SBdummy1 is the dummy for first structural break point, SBdummy2 is the dummy for second structural break point and SBdummy3 is the dummy for third structural break points. And structural break points were found to be in the years 2000, 2007 and 2016 respectively.

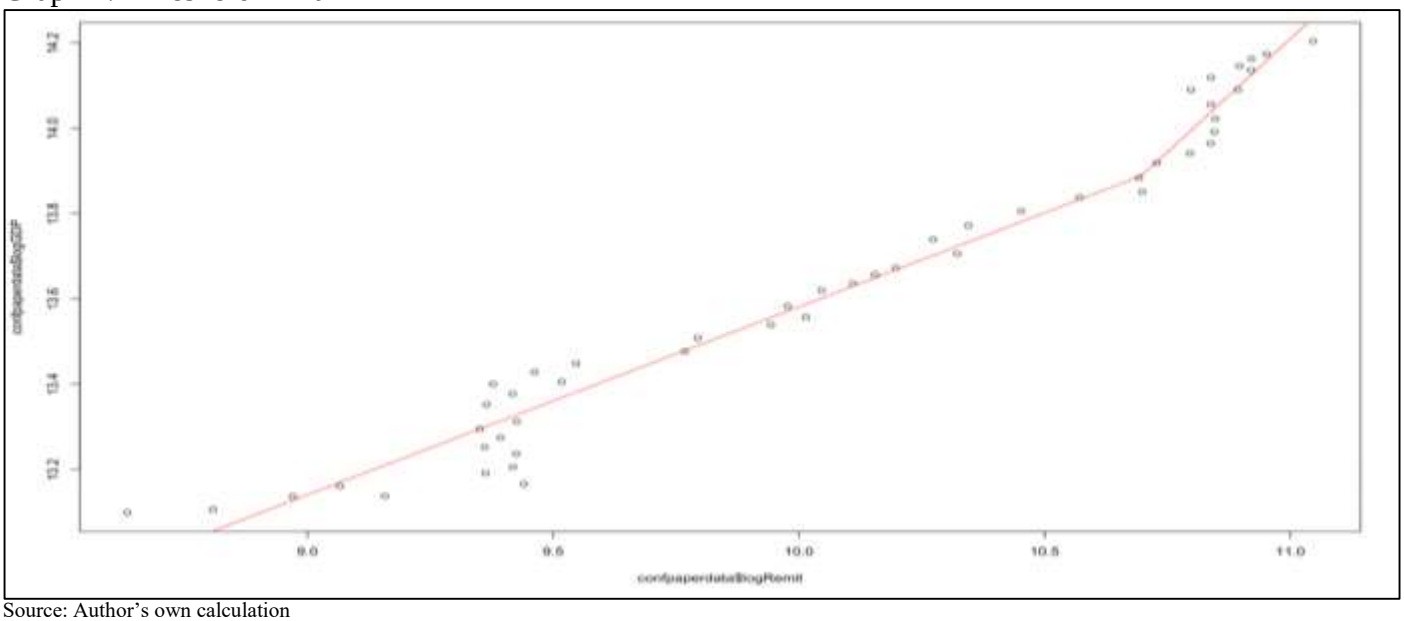
IV.Results and Discussion

The study comprises of three stages in the analysis process, in the first stage threshold limits have been identified where the relationship between the given two variable shifts. That forms to be the base from where the study starts to take shape and further analysis include better understanding of the trend by using structural breaks and ARDL with dummies for each structural break.

I. Regression Model with Segmented Relationship(s)

As shown in Table 1, remittances can be seen to have a positive impact on the GDP. As also claimed in a number of studies that remittances add to the disposable income of the receiving household and apart from that it also adds to the foreign exchange reserves. But the segmented relationship of the remittances with GDP highlights its non-linear nature and gives an insight so as to when and after what limit does the relationship shifts and if that shift is consistent with the previous slope or not. As can be seen in Graph 1, after the point 10.5 the slope becomes steeper signifying enhanced impact of remittances on the GDP. However, the kind of impact remittances depends on a number of factors, but the objective here is only to analyse the slope and direction of the impact in the given course of events.

Graph 1: Threshold limit



Source: Author's own calculation

Table 1: Coefficients

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	9.17436	0.1944	47.193	<2e-16***
logRemit	0.44067	0.02005	21.975	<2e-16***
U1.logRemit	0.62403	0.18332	3.404	NA

Source: Author's own calculation

Table 2: Diagnostics

Residual standard error: 0.05926 on 45 degrees of freedom
Multiple R-Squared: 0.9734
Adjusted R-squared: 0.9716

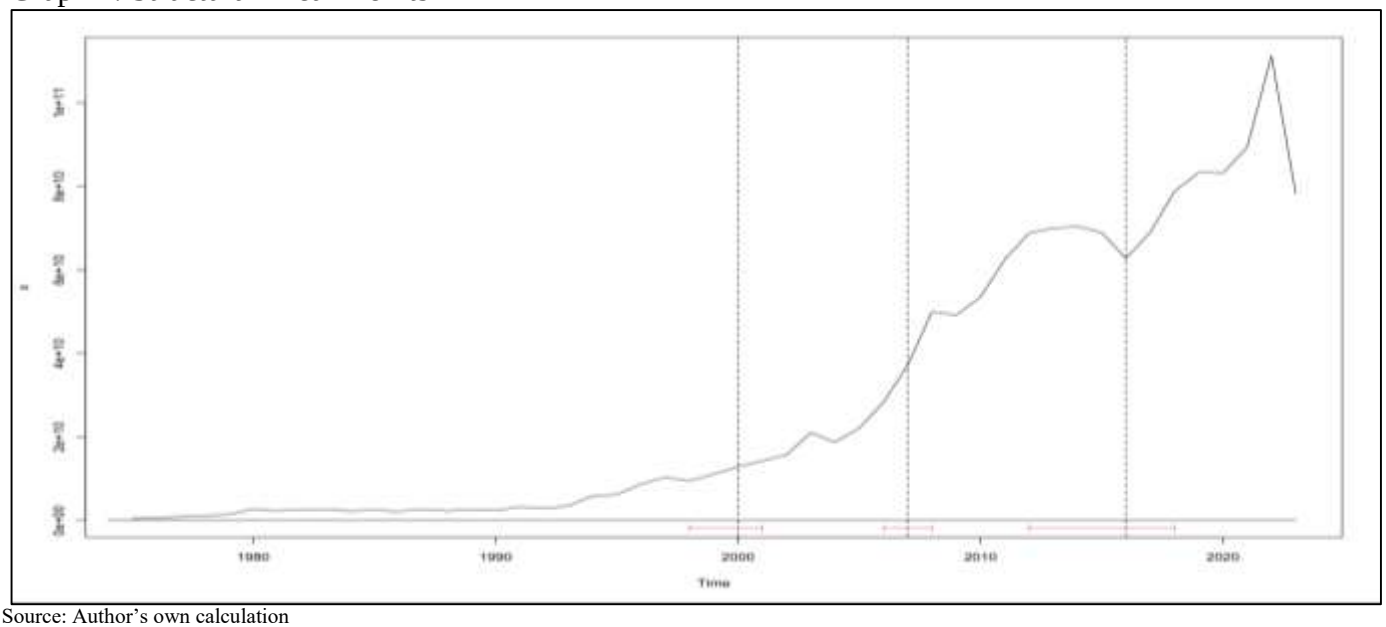
Source: Author's own calculation

II. Structural Breaks in Remittances inflow

As discussed, that the trajectory of remittances over the course isn't linear, so there can be a lot of sudden changes that might have had a huge impact on the overall remittances flow which in turn have influenced the GDP in totality. In order to proceed with the same, Bai-Perron test and Chow test have been used to detect the presence of structural breaks in the variable.

The results suggest that there are three structural breaks altogether in the time series for remittances ranging from 1975 to 2023. After going through the Bayesian Information Criterion and Residual Sum of Squares (Graph 3) it has been confirmed that there are break points in the data at time period 2000, 2007 and 2016. It means that there must have been some event that led to the changes and shifts in data at these points.

Graph 2: Structural Break Points



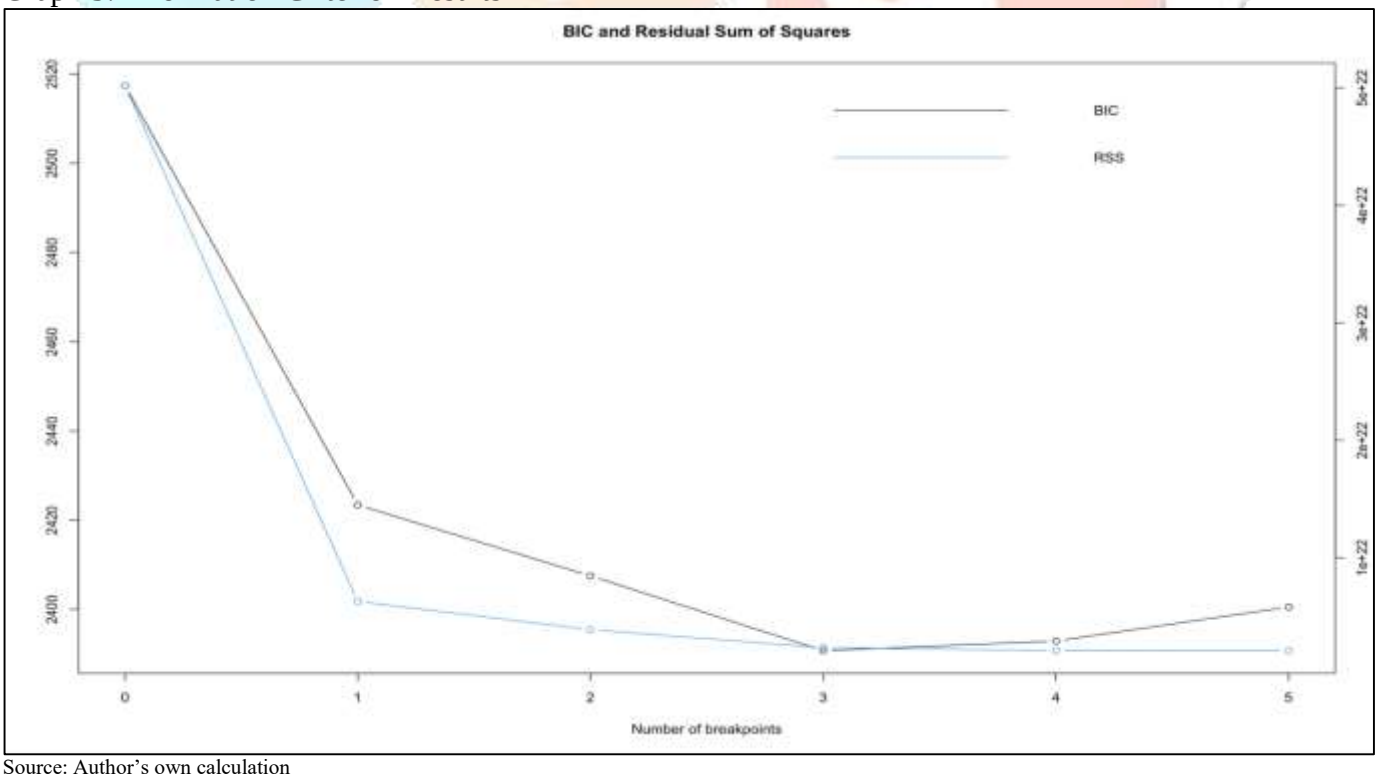
Source: Author's own calculation

Table 3: Structural break Results

m = 1				2007	
m = 2				2006	2016
m = 3			2000	2007	2016
m = 4		1993	2000	2007	2016
m = 5	1981	1993	2000	2007	2016

Source: Author's own calculation

Graph 3: Information Criterion Results



Source: Author's own calculation

These break points in the series have further been treated as dummy variables in the process to come, reason being these break points could have varied impact and needs to be analysed separately. To gather meaningful information pertaining to the magnitude and intensity of the impact that remittances have on GDP.

III. ARDL Results

The overall impact of remittances on GDP is negative in the first lag-period in short-run, while in the long-run the impact is positive in the first lag period. This clearly depicts that in short-run when the remittances are being received by the households, it is not immediately invested rather used for consumption purposes. This way apart from adding up to the existing foreign exchange reserve it also creates inflationary pressure in the economy. India is considerably a middle-income majority country. A remittance receiving household possibly uses the remittances to finance immediate needs, once that is done, they further move towards savings and investment. And highlights the underlying possibility as can be seen in the results that in the long-run the impact is positive. Together the results for the short as well as in the long-run show that in short-run the remittances are probably spent on education and healthcare as well apart from daily consumption needs and are further being saved and invested which is resulting into its positive impact on the GDP. In can be assessed that remittances do have the potential to bring about a secular-growth, "potential" because it is subject to certain exogeneous as well as endogenous factors.

In case of the first structural break occurred in remittances in the year 2000, impact of remittances on GDP can be seen to be negative but significant at 10 percent. While in the short-run the impact is insignificant. India's economy experienced significant changes around 2000, including economic reforms and globalization efforts. Remittances might have been primarily used for consumption purposes rather than investment, leading to a short-term negative impact on GDP. The decade of 1990 to 2000 is marked with structural reforms in various respects. After the Balance of Payment Crisis of early 90s, remittances have been made tax free, further attempts were made towards a remittances friendly economy by introducing India Diaspora Bonds, Millennial Development Bonds, etc. Not only that, reforms pertaining to foreign exchange also occurred during this phase (from FERA to FEMA). Amidst everything, the Indian economy was still recovering from the aftereffects of the BOP crisis and during the ninth five-year plan (1997 – 2002) the targeted GDP growth was 7 percent while the achieved growth rate was 5.4 percent. This was so because the economy faced challenges like inflation, which affected purchasing power and economic growth. Another objective of the ninth five-year plan was to develop infrastructure including public-private partnership and these projects take a lot of time before crystalizing. Though remittances grew during this phase but the impact could not have been prominent enough and a seemingly negative impact of this particular structural break can be attributed to the fact that the economy was transitioning through phases in the process of recovery.

The impact of second-lag period of second structural break which was in the year 2007, is insignificant throughout in the short as well as long run. This can be due to the fact that economy has now stabilized and was on the tract towards growth, service as well as industrial sector was growing. Agriculture sector too showed signs of growth and improvement. So, remittances remained a less prominent factor in the economy as it has still not grown in volume to significantly impact the GDP. During the third lag-period, which occurred in the year 2016, it can be seen that the impact of remittances on GDP growth is positive throughout in short as well as in the long run and across lags. Meaning thereby that the remittances has been facilitating growth of the GDP post the third lag period i.e., after 2016. The Indian economy has been highly dynamic, compared to the earlier break-points which occurred in 2000 and 2007, India has shown resilience when it comes to GDP growth, while remittances too out passed other forms of financial inflows after 2011 which indicated and supports the phenomenon of a consistent and positive impact of remittances throughout in the short and long run of the third break point.

The variations seen in the impacts of break points in the remittances and the remittances on GDP as a whole is a testament that the impact is not linear rather follows a highly dynamic trajectory. Ghosh and Dastidar (2022) in their study concluded that remittances do not exhibit growth effects in lower quantiles, but their impact increases monotonically as the quantile increases which provides an insight into the threshold effects of remittances on GDP. So, the impact is rather nuanced and nonsymmetric across the timeline to be called linear enough.

Table 4: Short-run Results

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	0.0968289	0.0179259	5.402	8.31E-06***
ec.1	-0.0468923	0.0080787	-5.804	2.73E-06***
dlogRemit.t	0.053016	0.0326121	1.626	0.114843
dlogRemit.1	-0.0878823	0.0349156	-2.517	0.017619*
dlogRemit.2	-0.0535922	0.0348349	-1.538	0.134777
ddOne.t	-0.0013886	0.001647	-0.843	0.406052
ddOne.1	-0.0001644	0.0015849	-0.104	0.918081
ddOne.2	-0.0029107	0.0015876	-1.833	0.077024.
ddTwo.t	0.0003387	0.0015719	0.215	0.830935
ddThree.t	0.0011316	0.0015113	0.749	0.460041
ddThree.1	0.0058668	0.0018412	3.186	0.003436**
ddThree.2	0.0057563	0.0018289	3.147	0.003794**
ddThree.3	0.0047074	0.0017875	2.634	0.013411*
dlogGDP.1	-0.6183913	0.2216412	-2.79	0.009218**
dlogGDP.2	-0.9237979	0.2099765	-4.4	0.000134***
dlogGDP.3	0.3580566	0.2264542	1.581	0.124692

Source: Author's own calculation

Table 5: Long-run Results

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	0.09682888	0.42357085	0.2286	0.8210384
logGDP.1	-0.0468923	0.04975244	-0.9425	0.3549502
logRemit.1	0.06115622	0.02842346	2.1516	0.0412814*
dOne.1	-0.0011866	0.00086764	-1.3677	0.1835882
dTwo.1	-0.0021686	0.00059016	-3.6745	0.001137**
dThree.1	-0.005608	0.00102004	-5.4978	1.03E-05***
dlogRemit.t	0.05301603	0.0324797	1.6323	0.1151541
dlogRemit.1	-0.0878823	0.03259061	-2.6966	0.0123564*
dlogRemit.2	-0.0535922	0.02490036	-2.1523	0.0412246*
ddOne.t	-0.0013886	0.00071605	-1.9393	0.0638287.
ddOne.1	-0.0001644	0.00054552	-0.3014	0.7655763
ddOne.2	-0.0029107	0.00068619	-4.2418	0.0002657***
ddTwo.t	0.00033865	0.00051183	0.6616	0.5142494
ddThree.t	0.00113161	0.00060963	1.8562	0.0752447.
ddThree.1	0.00586684	0.00098642	5.9476	3.29E-06***
ddThree.2	0.00575629	0.00103758	5.5478	9.10E-06***
ddThree.3	0.00470735	0.0009573	4.9173	4.62E-05***
dlogGDP.1	-0.6183913	0.23107754	-2.6761	0.0129537*
dlogGDP.2	-0.9237979	0.21196984	-4.3582	0.0001967***
dlogGDP.3	0.35805657	0.28381909	1.2616	0.2187496

Source: Author's own calculation

Table 6: PESARAN, SHIN AND SMITH (2001) COINTEGRATION TEST

F-test		
	I(0)	I(1)
10% critical value	2.614	3.746
5% critical value	3.136	4.416
1% critical value	4.306	5.874

F-statistic = 4.926535807976

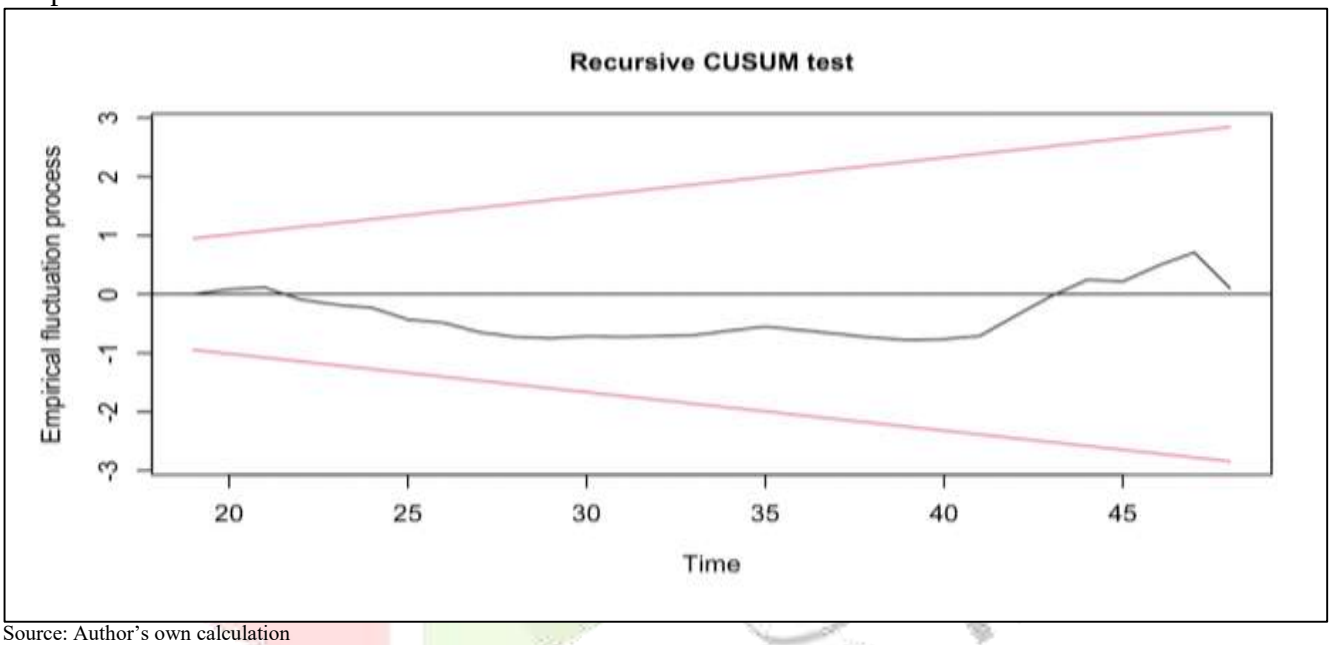
Source: Author's own calculation

Table 7: Diagnostic Test

Diagnostic Test	Test statistics	p-value
Breusch-Godfrey	0.031816	0.8599
Ljung-Box Test	0.023294	0.8787
Breusch-Pagan Test	25.367	0.1488
Shapiro-Wilk	0.95045	0.05281

Source: Author's own calculation

Graph 4: CUSUM test



Source: Author's own calculation

Conclusion

The perceived impact of remittances on GDP is supposedly positive, however the impact may occur in segments. These segments have been classified as structural breakpoints in the remittances and the impact of all the breakpoints are varied across the years. The study reveals that remittances have a dynamic impact on India's GDP growth, varying between short-run and long-run effects. While remittances are initially used for consumption purposes, leading to inflationary pressures, they eventually contribute positively to GDP growth in the long run through savings and investments. The analysis highlights the potential of remittances to drive secular growth, subject to certain exogenous and endogenous factors. The results suggest that remittances have reached that threshold limit from where it can start impacting GDP positively in the long-run. However, remittances have a direct impact on money supply, foreign exchange reserve, inflation, interest rate and they eventually facilitate further course of events. Apart from that, policy measures taken by the country also act as determining factor in case of the kind of impact remittances is going to have. The underlying impact of remittances is also varied as remittances inflow will enhance the money supply in the economy and this will initiate a number of other measures pertaining to interest rate, exchange rate, etc. to bring about stability in the economy. As a major source of foreign exchange inflow, remittances can appreciate the exchange rate and impact trade balances. It can increase aggregate demand, leading to economic growth, but also potentially causing inflationary pressures. So, the relationship is rather nuanced and overlapping to be called linear. And this has been discussed with the help of structural breaks and their respective impacts on GDP in India. This further emphasises on designing a policy framework which is accommodative of remittances at various levels.

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