



## REMITTANCE INFLOW AND GDP GROWTH: EVIDENCE FROM BANGLADESH, INDIA AND PAKISTAN



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### ABSTRACT

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This paper examines the impact of remittance on economic growth. In this study, we utilize the secondary time series data for the span of 1981-2015 in case of Bangladesh, India, and Pakistan. The study uses Augmented Dickey-fuller (ADF) test to check whether a series suffers from a unit root problem and Granger causality Test under the Vector Autoregressive Regression (VAR) framework to check the causal link. The Johansen Cointegration test is employed to check whether the long-run relationship or equilibrium exists between the time series variable. By using ADF test we find that the series is stationary in the first difference of the original series. The Granger causality establishes that remittances lead to economic growth while economic growth does not lead to remittances flow in Bangladesh that means there is a one-way causal relationship between the two variables running from remittances to economic growth. The study finds a bi-directional significant link between remittances and economic growth in India which means a two-way directional causality, indicating that remittances flow leads to economic growth and the economic growth also facilitates flow in remittances. However, there is only a one-way causal relationship in Pakistan where economic growth leads to remittance growth. The result of Johansen cointegration shows that there is a long run relationship among the variables.

**Contribution/ Originality:** This study is one of few studies which have examined the impact of remittance and economic growth in case of Bangladesh, India and Pakistan.

## 1. INTRODUCTION

The importance of remittances is increasing gradually. In developing countries, they are becoming one of the main significant sources of foreign financial flows both in size and growth rate. The original size of remittances, as well as unrecorded flows through formal and informal channels, is significantly large. The remittances that are recorded more than twice as large as official aid and about two-thirds of foreign direct investment (FDI) flow to developing countries. The vast upward movement in remittances payments may be attributed hugely to two factors, namely; immigration between developing and developed countries has grown in a dramatic manner in the past 20 years and reduce the transaction costs as technological advantages among the individuals. Remittance is distinct from the several external capital inflows like foreign direct investment, foreign loans and aids due to its static nature. In developing countries, the impact of remittance on the economic system is more profound because they

receive \$307.1 billion of the total remittances, which is about 74 percent and in these countries 27 percent of the GDP is coming from GDP. According to World Bank, the flows of remittances to the developing world have reached \$414 billion in 2013 (up 6.3 percent over 2012), and at present, it becomes the second largest source of external financial flows to developing countries. Given the 232 million global migrants and the almost 70 million internal migrants, migrants generate and transfer earnings and it is expected to reach \$540 billion by 2016.

According to the World Bank (2006) among the other types of private capital inflows like as official development aids (ODA) and foreign direct investment (FDI) remittances are more stable and are counter-cyclical. Remittance act as a significant macroeconomic stabilizer in the developing countries. The countries of South Asia has been a momentous source of migrant workers while the countries are suffering from labor shortages and migrant workers' remittances have become an increasingly important source of export income for this region. Like other South-Asian countries Bangladesh, India, Pakistan etc. are also in a position of surplus manpower with a combination of the professional, skilled, semi-skilled and less-skilled labor force. The huge low skilled and less educated workforce cannot be absorbed by the local wage employment. It is necessary to engage this large volume of the workforce in employment to ensure their participation in the economic development of the countries as well to improve their living standard.

Foreign exchange reserve is essential to pay the import bills but there is a problem of shortage of foreign exchange in developing countries. Like other developing countries Bangladesh, India and Pakistan are not exceptional countries but these countries depend more on remittances to meet the problem of payment of the import bills. Chimhowu *et al.* (2005) show that if remittances are spent on consumption or real estate, there will be a positive multiplier effect on GDP.

In figure 1, 2 and 3, the GDP appears somewhat insulated from the short-term fluctuations in remittances. India requires some further explanation as its remittances do not trend as smoothly as Bangladesh and Pakistan. Apart from some violation, there is a clear positive trend relationship between Remittances and GDP with the final exception to this being a spike in remittances per capita in 2003. An interpretation for this positive spike in 2003 is Resurgent India Bonds, which were put on in 1998 and matured in 2003. A large share of these bonds was acquitted and retained in India, instead of being repatriated abroad in foreign currency. That amount retained was thus acknowledged as remittances, resulting in the 2003 spike. Having access to credit can help raise investment convenience in areas of developing countries that previously produced little, leading to growth and a positive trend relationship between GDP and remittances.

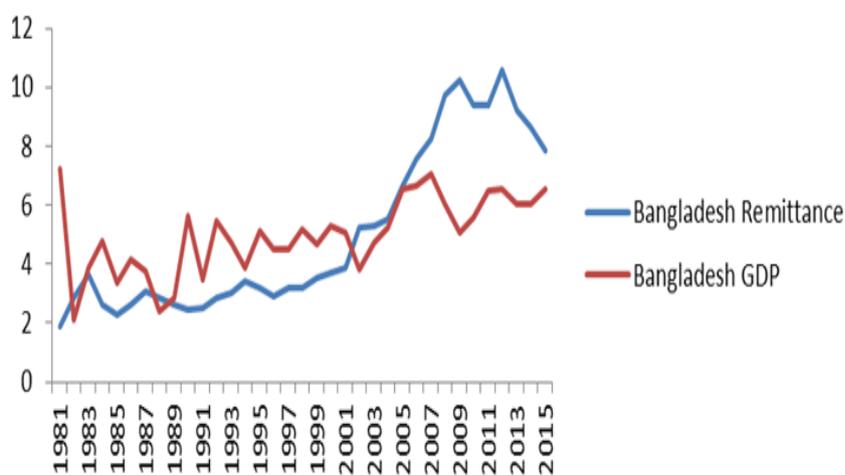


Figure-1. Personal received of remittance and GDP growth rate: Bangladesh; 1981-2015  
Data Source: World Development Indicator, World Bank

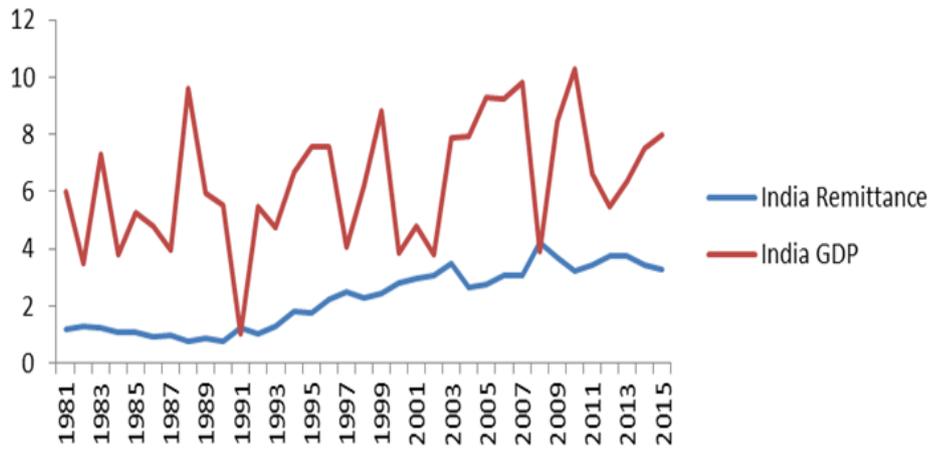


Figure-2. Personal received of remittance and GDP growth rate: India; 1981-2015  
Data Source: World Development Indicator, World Bank

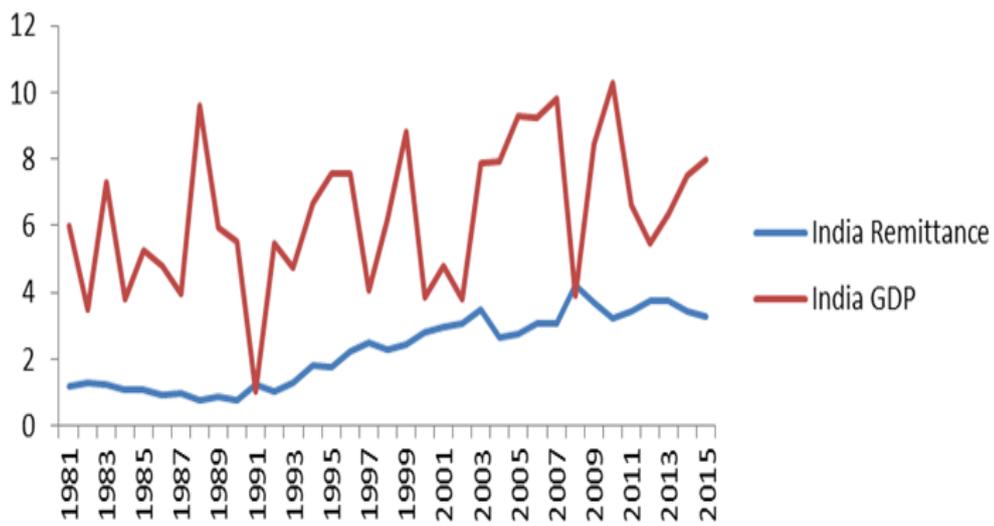


Figure-2. Personal received of remittance and GDP growth rate: India; 1981-2015  
Data Source: World Development Indicator, World Bank

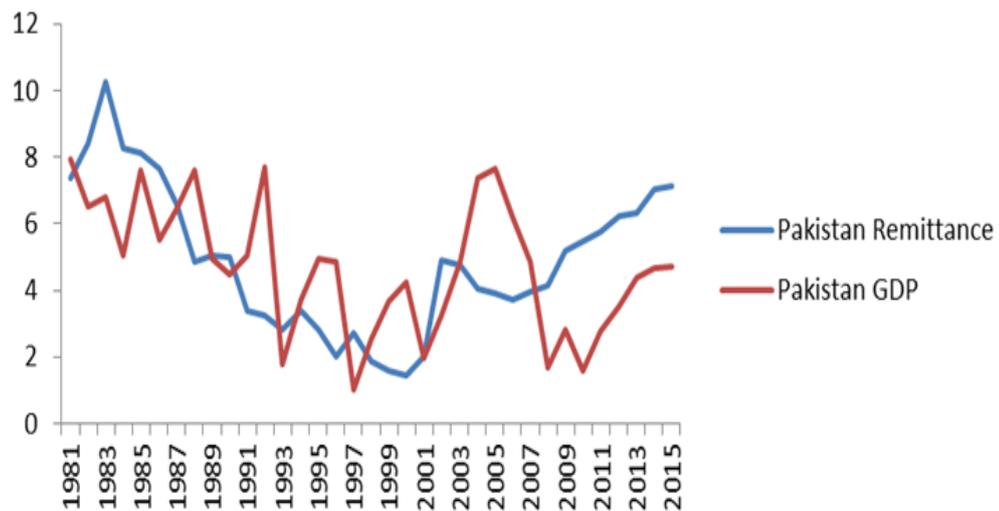


Figure-3. Personal received of remittance and GDP growth rate: Pakistan; 1981-2015  
Data Source: World Development Indicator, World Bank

Here we describe the importance of remittances in the three economies which is under our investigation. In Bangladesh, the highest GDP was recorded in 1981 and the lowest was 1997, in India the highest GDP was

recorded in 2005 and lowest was 1991, in case of Pakistan the highest was 1981 and lowest was 2008. It can be seen that over this period GDP growth rate fluctuate in these three identical countries. Growth in remittances across these countries appears to have stabilized somewhat over the last two decades with the variance of fluctuations reducing dramatically relative to the period 1993– 2003. This retrenchment in the variance of remittance growth could be connected to the stabilization of government policy and currencies over time. An example of such instability affecting remittance flows in the countries are national election system, exchange rate system, currency devaluation are a cause of led to a change in migration policy, causing a surge in labor exports and thus remittances. According to [WB \(2004\)](#) an economic boom in the labor-scarce oil producing economies of the middle east, and the push factors of prolonged ethnic conflict and slow growth in the rural economy, expound the spoiling nature of remittances in the late 1970's and growth thereafter. Stagnation in remittance growth between 1980 and 1991 is explained by the transfer of formal and informal remittance channels. Money paddled from place to place by individuals or couriers, or, hawala service network are informal remittance channels and cash payouts across the borders are formal methods.

[Sander and Mainbo \(2005\)](#) find formal networks channels which consist of banks and foreign exchange bureaus are more popular in strong and liberalized economies with rigid financial sectors. [Jha et al. \(2009\)](#) show until the 1990's as India was not financially liberalized when multiple exchange rate controls were elate, there would have been an incentive to use informal means of remittance transfer up to this point. Because of using informal the transfer methods in India would cause an under-reporting of remittances in India up to the 1990's. [Siddiqui \(2004\)](#) identifies with nearly one half of Bangladesh's offshore labor employed in Saudi Arabia, Bangladesh too experienced the advantage from growth in West Asia during the 1970's. This illustrates their massive growth in remittances during the late 1970's in line with the rising oil prices of the time. During the period of Gulf war from 1988-1991 remittance growth was a significant balk. This was redressed however with Bangladesh workers involvement in post-war reformation which is reflexed by unwavering remittance growth from 1992-94.

GDP does not influence the remittance because GDP includes all the final goods and services produced in the countries broader, but remittance influence the GDP growth because remittance increases our export earnings which include our national GDP. Remittances help to promote growth in less financially developed countries by providing a substitute for inefficient or nonexistent credit markets. It allows consumers to reduce credit constraints and find an alternative way to finance investment. However, If the remittances are used for financing children's education and welfare expenses such as health care, it will encourage economic growth. Investing in child education and welfare will raise labor productivity in the long term which in turn impacts positively on growth. Even if the remittances are exhausted on consumption or real estate, there are still multiplier effects. It rises in demand for goods and shows the positive link between remittances and GDP.

## 2. LITERATURE REVIEW

Many researchers have investigated the effect of remittances inflow on economic growth. There are controversial opinions on the impact of remittances on economic growth.

[Meyer and Shera \(2017\)](#) observe the impacts of remittances on economic growth. They use panel data set of six high remittances receiving countries, Albania, Bulgaria, Macedonia, Moldova, Romania and Bosnia Herzegovina over the period 1999–2013. The results recommend that remittances have a positive impact on growth. The positive impact surges at higher levels of remittances relative to GDP. [Jouini \(2015\)](#) conducts a study on the causal relationship between economic growth and remittances for Tunisia over the period 1970-2010. The results support the evidence of unidirectional causal nexus running from remittances, GDP, financial development and investment and bidirectional causal links among the variables, in particular between remittances and economic growth in short-run. [Lim and Simmons \(2015\)](#) study on the economic importance of remittance flows to the Caribbean Community and Common Market (CARICOM). He employs panel cointegration tests. The findings show that there is no long-

run relationship between remittances and real GDP per capita or investment. They also find that there is a long-run relationship between remittances and consumption. Siddique *et al.* (2012) investigate the causal relationship between remittances and economic growth in Bangladesh, India and Sri Lanka. The Granger causality test under a VAR framework over 25 years is employed and finds that remittances lead to economic growth in Bangladesh. In India, there is no causal relationship between growth in remittances and economic growth and there is a two-way directional causality in Sri Lanka. Pontarollo and Mendieta Muñoz (2018) study on the effects of remittance on substantial economic growth temporarily and permanently in Ecuador. The results conclude that both effects are statistically significant. Cooray (2012) investigates the impact of migrant remittances on economic growth in South Asia. He employs panel data over the 1970–2008 periods. The results show that migrant remittances have a significant positive effect on economic growth. Nyamongo *et al.* (2012) examine the role of remittances and financial development on economic growth for 36 African countries over the period 1980–2009 using a panel econometrics framework. The findings show that remittances are an important source of growth for these countries in Africa and there is a negative relationship between the volatility of remittances and the growth of countries in Africa. They also find that the importance of financial development in enhancing economic growth is weak. Kumar (2013) explore the short- and long-run effects of remittances, aid and financial deepening on growth in Guyana using annual data for the period 1982–2010. He uses an augmented Solow framework and an ARDL bounds test for cointegration, and Granger-causality. The results show that remittances have a positive and significant effect both in the short and the long run on growth. They also reveal that capital stock, aid and financial deepening cause remittances inflow in Guyana.

Ratha (2003) shows that remittances increase the consumption level of rural households. It has a multiplier effect because they spend more on domestically produced goods. Giuliano and Ruiz-Arranz (2009) identify that remittances enhance economic growth in less developed countries and provide an alternative way to finance investment and help overcome liquidity constraints. Gapen *et al.* (2009) identify that remittances expand the number of funds through the banking system and this enhance financial development and economic growth through increased economies of scale in financial intermediation and a political economy effect. Most lately, Fayissa and Nsiah (2011) show a positive relationship between remittances and economic growth through panel data of 64 different countries of African, Asian, and Latin American-Caribbean from 1987–2007 using panel unit root and panel cointegration tests. Pradhan *et al.* (2008) show that remittances have a small, positive impact on growth using a linear regression model for 36 countries. Aggarwal *et al.* (2006) reveal that remittances have a positive effect on bank deposits and credit to GDP. Ahmed *et al.* (2011) present evidence using bounds testing approach for Pakistan to suggest that remittances have a positive impact on economic growth in both the long run and short run. Das and Chowdhury (2011) find that there is a positive long-run relationship between remittances and GDP found in 11 developing countries by using panel co-integration and pooled mean group (PMG) approach. Dilshad (2013) finds the positive and significant relationship between remittances and economic growth both in the long-run and short-run in case of Pakistan. Taylor (1992) and Faini (2001) also shows a positive association between remittances and economic growth. Taylor (1999) investigate that every dollar Mexican migrants send back home or bring back home with them increases Mexico's GNP from anywhere between US\$2.69 and US\$3.17. Adams and Page (2003) studying 71 developing countries finds that the level, depth, and severity of poverty in the developing world are significantly reduced by remittances. Al Khathlan (2012) and Dilshad (2013) find a positive and significant relationship between worker remittances and economic growth in the long-run and short-run in Pakistan is found during the period 1976-2010. Conversely, Amuedo-Dorantes and Pozo (2004) find that remittances can appreciate the real exchange rate in recipient economies. It generates a resource allocation from the tradable to the non-tradable sector. Rodrik (2008) finds that real exchange rate overvaluation destabilizes long-term economic growth for developing countries because of weak institutions and market failures. Lipton (1980), Ahlburg (1991) prove that remittances diminish productivity and growth in low-income countries because of more spending on foreign goods

consumption than on productive investments. Das (2012) examine a study on Bangladesh, Egypt, Pakistan, and Syria over the period 1975–2006. They conclude that remittances have a positive impact on economic growth in Pakistan and Syria but a negative impact in Bangladesh and Egypt. This negative relationship between remittance and growth coefficients in those two countries suggests a counter-cyclical relationship. In contrast, Spatafora (2005) shows that there is no direct link between per capita output growth and remittances. Nevertheless, Gapen *et al.* (2009) exhibit that the more profoundly coordinates an economy is with world budgetary markets, and the more exceedingly created the household money related framework, the less likely it is that settlement receipts will fortify speculation by unwinding credit limitations. Glytsos (2005) investigates the impact of remittances on consumption, investment, imports and output for eight countries including Algeria, Egypt, Greece, Jordan, Morocco, Portugal, Syria and Tunisia for the period of 1969–1993 using estimated dynamic simultaneous Keynesian type model. He extends it for the period of 1969–1998. The findings from both studies point out those remittances affect growth negatively. Chami *et al.* (2005) show that migrant’s remittances have a negative impact on growth in per capita incomes. They also show that remittances may indirectly affect the real exchange rate where remittances inflow causes a real appreciation or postpones depreciation of the exchange rate by leading to the “Dutch Disease” phenomenon and appreciating exchange rates in countries with large remittances will hurt the economic growth. Rao and Hassan (2011) estimate Total Factor Productivity (TFP) for Bangladesh and analyze its key determinants using the Solow growth model. The results show that trade openness, foreign direct investment, and development of financial sector increase total factor productivity.

There are a lot of macros and micro levels of studies have been published which are related to this study. Stahl and Habib (1989) provide the multiplier effect of remittances in economics. They prove that remittances increase savings which increase the growth through the multiplier. They calculate the multiplier for Bangladesh over the period of 1976–1988. The capita output growth studying in 101 developing countries. Hasan (2006) finds remittance has a significant macroeconomic impact at the household level and the poorer the household, the more impact or benefits remittance income can have to alleviate poverty. Jongwanich (2007) proves that remittances have a positive but marginal impact on economic growth in Asia and Pacific countries. As opposed to Pradhan *et al.* (2008) find a positive impact on growth in their work with 39 developing countries over the 1980–2004 periods. Fayissa and Nsiah (2011) find that remittances boost growth in countries where the financial systems are less developed. He uses an unbalanced panel data from 1980 to 2004 for 37 African countries. Vargas-Silva *et al.* (2009) find that a 10 percent increase in remittances as a share of GDP leads to a 0.9–1.2 percent increase in GDP growth using, data for more than 20 Asian countries for the 1988–2007 samples. On the other side, Gapen *et al.* (2009) show that remittances have no impact on economic growth. Catrinescu *et al.* (2009) conclude that although remittances have risen, so many times research has not come to a conclusion whether remittances have a positive or negative impact on long-run growth. Raihan *et al.* (2009) find that remittances affect the economy positively and reduce poverty. On the contrary, Rahman (2009) explains that remittance seems to have insignificant and ambiguous effects on Bangladesh’s GDP. Chami *et al.* (2005) accomplish that remittances have a negative effect on economic growth of 113 nations. Adams and Page (2005) and various other published studies in relation to remittances have focused specifically on the alleviation of poverty rather than the overall economic growth of the country.

### 3. DATA SOURCE AND ECONOMETRIC METHODS

#### 3.1. Data Sources

In this paper, the personal remittance of the share of GDP and GDP growth rates of the three countries against the percentage is obtained from the over the sample period from 1981 to 2015. In some cases, the aggregate amount of remittance is used in US million dollars which is also obtained from the World Development Indicators (WDI).

### 3.2. Methodology

#### 3.2.1. Unit Root Test

We apply Augmented Dickey-Fuller (ADF) unit-root test to the per capita remittances and economic growth series separately to check stationary.

Therefore, the null and alternative hypotheses are:

H<sub>0</sub>: δ = 0; the residual series has a unit root

H<sub>A</sub>: δ < 0; the residual series has no unit root

Rejection of the null hypothesis means that per capita remittances and economic growth series, are co-integrated.

#### 3.2.2. Granger Causality Test

For determining the relationship between remittance and GDP growth rate we use the Granger Causality test. The interactions in the short-run fluctuations may, therefore, be described by a VAR system in first differences. We determine the optimal lag length for the VAR system by using the Final Prediction Error (FPE) and the Akaike Information Criterion (AIC) and Hannan-Quinn Information Criterion (HQIC). We used a VAR system of k lags and estimate it for various lag lengths and found that the optimal lag lengths for both series such as remittance and GDP growth rate.

We estimate the following form with all variables in the first-difference form and test various hypotheses.

$$\text{Rem}_t = \alpha_{01} + \alpha_{11} \text{Rem}_{t-1} + \alpha_{21} \text{Rem}_{t-2} + \alpha_{31} \text{Rem}_{t-3} + \alpha_{41} \text{Rem}_{t-4} + \beta_{11} \text{Growth}_{t-1} + \beta_{21} \text{Growth}_{t-2} + \beta_{31} \text{Growth}_{t-3} + \beta_{41} \text{Growth}_{t-4} + e_{1t} \tag{3.2.1}$$

$$\text{Growth}_t = \alpha_{02} + \alpha_{12} \text{Rem}_{t-1} + \alpha_{22} \text{Rem}_{t-2} + \alpha_{32} \text{Rem}_{t-3} + \alpha_{42} \text{Rem}_{t-4} + \beta_{12} \text{Growth}_{t-1} + \beta_{22} \text{Growth}_{t-2} + \beta_{32} \text{Growth}_{t-3} + \beta_{42} \text{Growth}_{t-4} + e_{2t} \tag{3.2.2}$$

We test whether Growth<sub>t-1</sub>, Growth<sub>t-2</sub>, Growth<sub>t-3</sub> and Growth<sub>t-4</sub> do not appear in the Remittances<sub>t</sub> equation to test Growth does not cause Remittances, and Remittances<sub>t-1</sub>, Remittances<sub>t-2</sub>, Remittances<sub>t-3</sub> and Remittances<sub>t-4</sub> do not appear in the Growth<sub>t</sub> equation to test Remittances does not cause Growth.

So the null hypothesis to test ‘non-causality’ that ‘Growth does not cause Remittances’ is that

$$H_0: \beta_{11} = \beta_{21} = \beta_{31} = \beta_{41} = 0.$$

Likewise, the null hypothesis to test ‘non-causality’ that ‘Remittances does not cause Growth’ is that

$$H_0: \alpha_{12} = \alpha_{22} = \alpha_{32} = \alpha_{42} = 0.$$

Thus, a rejection of the null hypothesis indicates that Growth causes Remittances.

#### 3.2.3. Johansen Cointegration Test

Johansen proposes two different likelihood ratio tests of the significance of these canonical correlations and thereby the reduced rank of the Π matrix: the trace test and maximum eigenvalue test, shown in equations (5) and (6) respectively.

$$J_{\text{trace}} = -T \sum_{i=r+1}^n \ln(1-\gamma_i^{\wedge}) \tag{3.2.3}$$

$$J_{\text{max}} = -T \ln(1-\gamma_{j+1}^{\wedge}) \dots \dots \dots (6) \tag{3.2.4}$$

Table -1. ADF test results for a unit root on the original series

Model (Remittance)	Null Hypothesis	Critical Value	Bangladesh		India		Pakistan	
			Data based test statistic value	Result	Data based test statistic value	Result	Data based test statistic value	Result
Constant and without trend	$H_0=0$	-1.95	-0.910	Do not reject $H_0$	0.675	Do not reject $H_0$	-0.896	Do not reject $H_0$
Constant and with trend	$H_0=0$	-3.58	-2.223	Do not reject $H_0$	-2.546	Do not reject $H_0$	-1.111	Do not reject $H_0$
Conclusion			Has a unit root and the series is non- stationary		Has a unit root and the series is non- stationary		Has a unit root and the series is non- stationary	
Model (GDP)	Null Hypothesis	Critical Value	Bangladesh		India		Pakistan	
			Data based test statistic value	Result	Data based test statistic value	Result	Data based test statistic value	Result
Constant and without trend	$H_0=0$	-1.95	0.48	Do not reject $H_0$	-1.119	Do not reject $H_0$	-1.129	Do not reject $H_0$
Constant and with trend	$H_0=0$	-3.58	-4.409	Reject $H_0$	-5.686	Reject $H_0$	-3.035	Do not reject $H_0$
Conclusion			Has a unit root and the series is non- stationary		Has a unit root and the series is non- stationary		Has a unit root and the series is non- stationary	

Source: STATA software generated results

According to Table 1, the results of the Augmented Dickey-Fuller (ADF) test for the stationery of the two original series are non-stationary in case of Bangladesh, India, and Pakistan.

Table-2. ADF test results for a unit root on the first difference of the original series

Model (Remittance)	Null Hypothesis	Critical Value	Bangladesh		India		Pakistan	
			Data based test statistic value	Result	Data based test statistic value	Result	Data based test statistic value	Result
Constant and without trend	$H_0=0$	-1.95	-4.421	Reject $H_0$	-6.504	Reject $H_0$	-5.302	Reject $H_0$
Constant and with trend	$H_0=0$	-3.58	-4.408	Reject $H_0$	-6.516	Reject $H_0$	-5.781	Reject $H_0$
Conclusion			Does not have a unit root and the series is stationary		Does not have a unit root and the series is stationary		Does not have a unit root and the series is stationary	

Model (GDP)	Null Hypothesis	Critical Value	Bangladesh		India		Pakistan	
			Data based test statistic value	Result	Data based test statistic value	Result	Data based test statistic value	Result
Constant and without trend	$H_0=0$	-1.95	-3.817	Reject $H_0$	-4.53	Reject $H_0$	-5.302	Reject $H_0$
Constant and with trend	$H_0=0$	-3.58	-3.794	Reject $H_0$	-4.392	Reject $H_0$	-5.202	Reject $H_0$
Conclusion			Does not have a unit root and the series is stationary		Does not have a unit root and the series is stationary		Does not have a unit root and the series is stationary	

Source: STATA software generated results

Notes: Based on the lower value of FPE, AIC, and HQIC, lags is chosen for Bangladesh, India, and Pakistan and we take the decision of null hypothesis at 5% critical value.

Here,  $T$  is the sample size and  $\hat{\gamma}_i$  is the  $i$ th largest canonical correlation. The trace test statistics tests the null hypothesis of  $r$  cointegrating vectors against the alternative hypothesis of  $n$  cointegrating vectors. On the other hand, the maximum eigen value test statistics tests the null hypothesis of  $r$  co-integrating vectors against the alternative hypothesis of  $r+1$  co-integrating vectors. The critical values used for the maximum eigen value and trace test statistics are based on a pure unit-root assumption. So they will no longer be correct when the variables in the system are near-unit-root processes. For our study we use

$H_0$ :  $r=0$ ; There is no co-integration among the variables.

$H_a$ :  $r \leq 1$ ; There is one co-integration among the variables.

## 4. EMPIRICAL RESULT

### 4.1. Results of Unit Root Test:

We now test the stationary of the first difference of both series by applying the ADF test on the first difference series. The results are represented in Table 2. As can be seen, the results show that both series are stationary in their first difference form.

### 4.2. Results of Granger Causality Test

Table-3. Results of Granger causality test between Remittances and Economic Growth

Null hypothesis	p-value of the F-test	Conclusion at the 5% level
<b>Bangladesh</b>		
(1) $H_0$ : Growth $\not\Rightarrow$ Remittance ( $\beta_{11}=\beta_{21}=\beta_{31}=\beta_{41}=0$ )	0.117	Do not reject $H_0$ That is, economic growth does not cause remittance.
(2) $H_0$ : Remittance $\not\Rightarrow$ Growth ( $\alpha_{12}=\alpha_{22}=\alpha_{32}=\alpha_{42}=0$ )	0.016	Reject $H_0$ That is, remittance causes economic growth.
<b>India</b>		
(1) $H_0$ : Growth $\not\Rightarrow$ Remittance ( $\beta_{11}=\beta_{21}=\beta_{31}=\beta_{41}=0$ )	0.017	Reject $H_0$ That is, economic growth causes remittance.
(2) $H_0$ : Remittance $\not\Rightarrow$ Growth ( $\alpha_{12}=\alpha_{22}=\alpha_{32}=\alpha_{42}=0$ )	0.089	Reject $H_0$ That is, remittance causes economic growth
<b>Pakistan</b>		
(1) $H_0$ : Growth $\not\Rightarrow$ Remittance ( $\beta_{11}=\beta_{21}=\beta_{31}=\beta_{41}=0$ )	0.0462	Reject $H_0$ That is, economic growth causes remittance.
(2) $H_0$ : Remittance $\not\Rightarrow$ Growth ( $\alpha_{12}=\alpha_{22}=\alpha_{32}=\alpha_{42}=0$ )	0.359	Do not reject $H_0$ That is, remittance does not cause economic growth.

Source: STATA software generated results

Notes: Based on the lower value of FPE, AIC, and HQIC, lag 7 is chosen for Bangladesh, lag 1 is chosen for both India and Pakistan.

The result of Granger causality is represented in table 3 which can be found by using STATA. It can be seen from row 1 of Table 3, (for testing the null hypothesis,  $H_0$ : Growth  $\not\Rightarrow$  Remittances), the p-values are 0.117 for Bangladesh which is greater than the level of significance, 0.05 and the p-value for India is 0.017 and Pakistan is 0.0462 which is less than 0.05. Hence we are unable to reject the null hypothesis that 'Growth does not cause Remittances' at the 5% level of significance for Bangladesh, but reject for India and Pakistan means 'Growth causes Remittance'. Now looking at row 2 of Table 3 (for the testing of  $H_0$ : Remittances  $\not\Rightarrow$  Growth), the p-value for this test is 0.016 for Bangladesh, 0.089 for India and 0.359 for Pakistan. Therefore, we reject the null hypothesis  $H_0$ :

'Remittances does not cause Growth' in favor of the alternative that Remittances cause Growth, in the Granger sense at the 5% level of significance for Bangladesh and India, but are unable to reject it for Pakistan.

#### 4.3. Results of Johansen Co-Integration Test:

Table-4. The results of Johansen Co-integration Test

Null Hypothesis (H <sub>0</sub> )	Trace Statistic	5%critical value	Max Statistic	5%critical value	Results
<b>Bangladesh</b> r=0	26.921	15.41	24.72	14.07	Reject H <sub>0</sub> The personal received remittance and GDP growth are cointegrated.
	2.2005	3.76	2.005	3.76	Do not reject H <sub>0</sub> The personal received remittance and GDP growth are cointegrated.
<b>India</b> r=0	25.36	15.41	24.717	14.07	Reject H <sub>0</sub> The personal received remittance and GDP growth are cointegrated.
	0.6433	3.76	0.6433	3.76	Do not reject H <sub>0</sub> The personal received remittance and GDP growth are not cointegrated.
<b>Pakistan</b> r=0	19.059	15.41	17.2665	14.07	Reject H <sub>0</sub> The personal received remittance and GDP growth are cointegrated.
	1.7924	3.76	1.7924	3.76	Do not reject H <sub>0</sub> The personal received remittance and GDP growth are cointegrated.

Source: STATA software generated results

The results of Johansen co-integration techniques are presented in table 4, which involves the use of max statistics values and the trace statistics. From the results, it can be understood that the max statistics value and the trace statistics value of Bangladesh are 26.92 and 24.72 respectively which are greater than the 5% critical values of 15.41 and 14.07 means reject the null hypothesis(r=0) and there is long run co-integration relationship between the variables. When the null hypothesis(r≤1)there is long run co-integration relationship exist between the variables because the max statistics value and the trace statistics value both are 2.2005 which is less than the 5% critical values of 3.76 that means do not reject the null hypothesis and existence of the long-run relationship in the situation of Bangladesh. In the case of India, the max statistics value and the trace statistics value are 25.36 and 24.717 respectively which are greater than the 5% critical values of 15.41 and 14.07 means reject the null hypothesis(r=0) and there is long run co-integration relationship between the variables. When the null hypothesis(r≤1)there is long run co-integration relationship exist between the variables because the max statistics value and the trace statistics value both are 0.6433 which is less than the 5% critical values of 3.76 that means do not reject the null hypothesis and existence of the long-run relationship in the situation of India. In case of Pakistan, there is a long run co-integration relationship exist between the variables because the max statistics value and the trace statistics value are 19.059 and 17.2665 respectively which are greater than the 5% critical values of 15.41 and 14.07 that means reject the null hypothesis(r=0). When the null hypothesis(r≤1)there is long run co-integration relationship exist between the variables because the max statistics value and the trace statistics value both are 1.792 which is less than the 5% critical values of 3.76 that means do not reject the null hypothesis and existence of the long-run relationship in the situation of Pakistan. It can be said that in the case of the identical three countries we get a long run co-integration relationship.

## 5. CONCLUSION

In this paper, we have observed the causal relationship between remittances and economic growth in Bangladesh, India, and Pakistan using data for the period 1981 to 2015. For this observation, we utilize several time series econometric techniques such as unit root test, co-integration, and causality. The analysis of ADF test discloses that the two-time series variables, such as remittances and economic growth both are unit root and non-stationary and both series are stationary in the first difference in case of three countries. The result of the Johansen co-integration test shows that there is a long run co-integration relationship among the variables in case Bangladesh, India, and Pakistan.

As we mention out that, there is much controversy over the role that remittances play in the economic development of less developed countries. Some argue in opposition that it's impact due to conspicuous consumption. The majority of remittance payments are in fact used for consumption purposes as opposed to investment and savings in the case of Bangladesh. There is a close and statistically significant correlation between remittances and consumption, the correlation coefficient between remittances and investment is conversely not significant which is found by IMF (2005). Besides, Demary, cited in Siddique *et al.* (2012) show that Bangladesh's current consumption in 2003 is estimated to comprise a large 50-60 percent of remittance spending while investment spending comprised a mere 10%. However, despite these facts, the result of Granger causality illustrate that remittances are a fact to contribute to economic growth in Bangladesh. There is a causal relationship between remittance and economic growth in Bangladesh because of the multiplier effect, whereby injected capital through consumption indirectly contributes to economic development and growth. Our empirical results elicit therefore that appropriate policy to explore more foreign employment and more efficient use of remittances would help the economic development of Bangladesh. Our results find that remittances play a significant role in the promotion of economic growth in Bangladesh. The results regarding the link between remittance and economic growth in the case of India are very convincing. There is a two-way directional causality indicating that remittances promote economic growth and vice versa. However, the result of Pakistan is inconclusive. It can be found that remittances are not important to the economy of Pakistan. Unfortunately, this important source of income and the expatriates who earn this income did not receive due attention from the policymakers in most of developing countries including Pakistan. Although in overall, it can be said that the countries benefit from remittances is closely related to the strength of domestic institutions and macroeconomic environment.

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