

## **Does Foreign Remittances Reduce Government Spending? Response from Bangladesh**

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*In this era of globalization, remittance has become a major issue as it effects the economies of developing countries from different channels. Though remittance have significant impacts on the economy of Bangladesh, no studies have been conducted to explore how remittance effects government spending and so, the core objective of this paper is to empirically analyze the impact of remittance on government spending with the help of time series data ranging from 1980 to 2015. Johansson's cointegration tests reveal that, variables are cointegrated and Granger causality test result shows a unidirectional causality is running from remittance to government spending but not vice versa. For short run analysis, we used Vector Error Correction Model (VECM). According to the VECM result, no causality is found among the variables of interest. Dynamic OLS (DOLS) results show that remittance and government spending are positively related. Results of this paper may give direction to the policy makers to come up with guidelines to improve socio economic activities in Bangladesh.*

**Field of Research:** Economics

### **1. Introduction**

The world economies are growing faster and coming closer by the grace of rapid movement of Globalization. They are becoming much more independent as well. One of the results of globalization is the rapid cross border movement of migrants for employment, due to the growing demand of developed and industrialized countries for the expansion of foreign labor. Labors of the developing nations are more willing to move to developed nations, only due to the better working environment and opportunities at higher benefits and compensation. Such earnings are named as remittance-earnings that are sent back to their home by the domestic workers working abroad. In other word, remittances are financial resource flows arising from the cross-border movement of nationals of a country apart from foreign loans, aids and FDIs. Remittance inflow started to rise in Bangladesh during British rule when some people migrated to UK and also USA for trade and higher study. But after the independence of Bangladesh in 1971, the

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Flow of migration to other countries and remittance inflow also increased. The Kingdom of Saudi Arabia is the most important source of remittances. Its share is about 29 percent of the aggregate remittances received in Bangladesh. The US, accounts for the second largest source nearly 15 percent of the total.

In the recent decade, remittance have become a major component of the economy in Bangladesh. The trend of remittance inflow in Bangladesh in the years 2013, 2014, 2015, 2016 and 2017 are respectively USD 1.23 billion, USD 1.01 billion, USD 1.09 billion, 1.01 billion, 1.16 billion approximately (WDI 2017). The Bangladeshi diaspora sent home \$1.16 billion in October 2017, up 14.85 percent from a year earlier and 35.83 percent from the previous month, according to data from the central bank. Remittances in Bangladesh arise as a poverty alleviating policy tool. It contributes directly in broadening the opportunities to increase incomes. It allows households to increase their consumption of local goods and services. Remittances from migrants have positive impacts on poverty reduction and development in Bangladesh substantially contributing to the achievement of the Millennium Development Goals.

The initial motivation behind this research was the idea that since Bangladesh is historically opening up to engaging in raising remittance inflow through migrant workers, such moves should ideally result in increasing surplus for the country in terms of income generation and employment and as a result greater standard of living. Reducing the need for more Government spending in the economy in areas like education, healthcare, agriculture and so on. If we see, the trend of government spending in Bangladesh in the years 2013, 2014, 2015 and 2016 are respectively BDT 3.7 billion, BDT 4 billion, BDT 4.3 billion, and BDT 4.8 billion approximately. Government Spending in Bangladesh increased to 478173 BDT Billion in 2016 from 431921 BDT Billion in 2015. Government Spending in Bangladesh averaged 418848.00 BDT Billion from 2013 until 2016, reaching an all time high of 478173.00 BDT Billion in 2016 and a record low of 368135.00 BDT Billion in 2013 (BBS 2016). These two crucial macroeconomic variables are of utmost importance when it comes to attainment of economic growth. The variables used were Remittance Inflow (REM), Government Spending (GS). Hence, Remittance Inflow-Government Spending was inspected in an empirical model. To the best of our knowledge, there had been no work done regarding this topic in context of Bangladesh. Thus, this paper has been aimed to fill in that gap. In this paper the following questions have been answered: What are the short run and long run causalities between remittance inflow and government spending? What is the estimated coefficient of remittance with respect to government spending?

The rest of the paper is organized as follows. The next section provides the literature review followed by the section that discusses the attributes of data and the methodology of research. Moving on, the subsequent sections provide discussions on econometric results and finally followed by concluding remarks and policy recommendations.

## **2. Literature Review**

Increases in foreign remittances are almost always likely to reduce public expenditure, as has been proven by several studies. Researchers so far have also come to the

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conclusion that an increase in remittances increases household consumption. The underlying positive correlation between the ratios of household to government consumption directs us to understanding that there is a bigger share of private expenditure among households now. This reduced share of government expenditure leads to households relying less and less on the government hence reducing the level of obligations it has on the people; this is mainly because people have reduced their level of expectation from the government. Therefore, as a matter of fact, the advantages due to the increase in household consumption, encourages the government to replace its expenditure with remittances, because it too, wants to increase the possibility of increased advantages through free riding, in a way. We will observe some of the cases in a few different countries as to how the government has reacted following an increase in foreign remittance inflow.

Montiel et al. (2008) have found out that the States require the countries which are receiving the aid reduce their quality because more remittances for developing countries mean that the government of the receiving countries' bargaining power has increased without having to present the entire costs the government has to bear, and this eventually leads to increased rates of corruption and this has been empirically proven in a cross section analysis of 111 countries. More foreign remittances mean that the government has more funds to itself now and this can be used for purposes other than the ones they have been sent for. The study they have conducted discloses that an increased rate of foreign remittances to GDP has plummeted ratios of corruption, government actions and the state law and rules.

Lubambu's (2014) findings are that the government of Oman should impose taxes on the earning of the international workers within its country and sending back these amounts as remittances for the receiving country. This offer has been particularly made as a response to the fiscal policy problems arising in the United Arabs. It has also been stated that the rising expenses to incur on these workers who are working in Oman will lead to more Omani workers be employed in the future so that there are no pressures from the state that represents that Omani citizens are not given enough work and hence giving rise to the national level of unemployment. Imposing taxes on the income earned by foreign workers which act as a remittance for their home countries have been a practicing policy ever since in many different nations although the purpose of each of these nations to tax the remittances may be very different from one another.

Ratha et al. (2010) in their paper have found that the country on the receiving end also tends to tax the foreign remittances influxes every year in the country. Usually it has been observed that the state law demands the foreign remittances be taxed when the money needs to be converted into the national currency at exchange rates that are far cheaper than their actual values, which has been an exemplary case for countries like Venezuela, India and Ethiopia. Having said that, the usual practice is to excuse taxes imposed on foreign remittances, as has been in the Philippines where the government body has come to a conclusion that the Filipino workers outside of the country be excused from any kind of documentary- stamp taxes.

Molina et al. (2007) has found that in Pakistan, the inflow of foreign remittances has been a source for the nation to flourish, which helped boost the macro economic

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objectives of the country. The reason behind this is that if a nation has a strong inflow of foreign remittances it helps build a stronger human capital growth and economic planning which leads to a methodical and established growth. (Giuliano and Ruiz, 2005) also found that because of the fact that Pakistan is still in its growing phase in its financial sector development, foreign remittance inflows can be considered as a form of moderating the financial pressures faced the less fortunate ones in the economy.

Sharf (2014) analyzes the long term causal relationship between remittances and output level in Egypt from the year 1977 to the year 2012. He had figured out a very notable causal relationship between foreign remittances and output. Elseoud (2014) also ensures a causal relationship between foreign remittances and major macroeconomic variables in the economy of Egypt from the year 1991 to the year 2011, with results that show the existence of a bidirectional causal relationship between foreign remittances and economic growth. Glytsos (2005) has found that increases in remittances in countries like Jordan and Egypt leads to positive effects on investment, consumption, imports and output growth. Although, if remittances are to increase which leads to an increase in the level of economic growth it is likely that it has also risen the level of government expenditure in Egypt, but this is yet unambiguous from the literatures Ebeke (2011) has found that in the case of many developing countries, an increase in foreign remittances leads to a decrease in the level of government expenditure. For these developing countries, it has often been observed that the government tends to reduce its status of acting as the insurer of the last resort. Cross country analysis has been conducted to find these results. These increased remittances not only plummet the level of government expenditure but also to some extent, moderates the burden of political pressures off of its shoulders.

Saad (2015) found that the foreign remittances in countries like Jordan, Albania, Lesotho and Haiti consists of up to 15% of the GDP. The increases in the level of remittances has led to an increase in the price level of oil in the 2000s, however this has not led to some kind of increased level of centralized governance in these countries, even if it happened, it was not as much as the increase in the price level of oil. The increase in foreign into these countries suggest that these countries have ended up being heavily dependent on these flows; however, whether they have political effects on the economy is not sure. The fact that is ensured is that government expenditure is not necessarily increased by a significant level following a significant rise in the level of foreign remittances.

Montinola et al.(2014) used survey data to find out that in Sub Sahara Africa, those who receive foreign remittances from their sources are more likely to take part in protests but less likely to participate in other more productive political involvements like voting, compared to those who do need receive any kind of foreign remittances. In a more organized bureaucratic system, remittances have the ability to provide financially for the opposition party and hence raise their probability of winning the election. This hinders the level of government expenditure within the country and ends up being not as much at a growing rate compared to the increase in foreign remittances inflow.

After the wide discussion of different literatures, we can set our hypothesis relevant to our research question. The considered a set of null hypothesis as follows,  $H_1$ :

remittance does not cause government spending and H<sub>2</sub>: government spending does not cause remittance. Additionally, we will also estimate the coefficient of remittance with respect to government spending. In this case, we do not need any hypothesis testing.

### **3. Methodology and Data Set**

To check the stationarity of the variables, existence of unit root has to be tested. Macroeconomic and financial data are well known because of their non-stationarity. There are several ways to find out the existence of unit root of the variables. For example, Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) test are broadly employed. For our study, we have performed the (ADF) test to test the existence of unit root and found that all of the variables are non-stationary at levels and thus cannot be regressed without making them stationary. After the ADF test, we performed cointegration test to investigate possible linear combination of the variables that can be considered stationary. If cointegration is established, then we ran the causality test to check the possible direction of causality between the variables of interest.

Non stationary data may lead to spurious regression in the context of time series analysis unless there is at least one cointegration relationship. The Johansen technique is employed to test for cointegration. A unified framework of estimation and testing cointegration relations are provided in the context of Vector Autoregressive (VAR) error correction models. Here one has to estimate Unrestricted Vector of Autocorrelation of the form:

$$\Delta x_t = \alpha + \theta_1 \Delta x_{t-1} + \theta_2 \Delta x_{t-2} + \theta_3 \Delta x_{t-3} + \dots + \theta_{k-1} \Delta x_{t-k+1} + \theta_k \Delta x_{t-k} + u_t \quad (1)$$

In the equation above,  $\Delta$  is the difference operator,  $x_t (n \times 1)$  is a vector of non-stationary variables (in levels) and  $u_t$  is the vector of random errors. The information on long run relationship is articulated by the matrix  $\theta_k$  the variables are not cointegrated, if the rank of  $\theta_k = 0$ . Nevertheless if rank (usually represented by  $r$ ) is equal to one, there exists one cointegrating vector and in conclusion if,  $1 < r < n$  there are multiple cointegrating vectors. Johansen & Juselius (1990) have derived two tests for cointegration, which are trace test and the maximum Eigen value test. The trace statistic assesses the null hypothesis that there are at most  $r$  cointegrating vectors while the maximal eigen value test, estimates the null hypothesis that there are  $r$  exactly cointegrating vectors in  $x_t$

If two variables are cointegrated, then there is at least one direction of causality. Granger-causality is one of the important issue that has been enormously studied in empirical finance of macroeconomics. Granger-causality is introduced by Granger (1969, 1980 & 1988). Engle & Granger (1987) asserted that the presence of non-stationary can lead to distorted conclusions in Granger-causality test. In this test, we

can only infer long run relationship between non stationary time series when the variables are cointegrated.

If x and y are variables of interest, they by applying Granger-causality test we can determine whether past value of y augment the explanation of present values of x given that by information in past values of x itself. y does not Granger cause x if changes past values of y does not explain changes in x values at present. Likewise, we can probe whether x Granger causes y. There are four probable outcomes in the Granger causality test:

- a. neither variable Granger cause each other
- b. y causes x but not otherwise
- c. x causes y but not otherwise
- d. both x and y Granger cause each other

Following two sets of equation will be estimated:

$$x_t = \alpha_0 + \alpha_1 x_{t-1} + \dots + \alpha_l x_{t-l} + \beta_1 y_{t-1} + \dots + \beta_l y_{t-l} + u_t \quad (2)$$

$$y_t = \alpha_0 + \alpha_1 y_{t-1} + \dots + \alpha_l y_{t-l} + \beta_1 x_{t-1} + \dots + \beta_l x_{t-l} + v_t \quad (3)$$

It is for all possible pairs of (x,y) series in the group. The stated F-statistics are the Wald statistics for the joint hypothesis  $\beta_1 = \beta_2 = \beta_3 = \dots = \beta_l = 0$ .

Engle & Granger (1987) asserted that a vector error correction model (VECM) is an appropriate method to model the long-run as well as short-run dynamics among the cointegrated variables. Causality inferences in the multi-variate framework are made by estimating the parameters of the following VECM equations.

$$\Delta Y = \alpha + \sum_{i=1}^m \beta_i \Delta Y_{t-i} + \sum_{j=1}^n \gamma_j \Delta X_{t-j} + \sum_{k=1}^0 \delta \Delta M^s + \sum_{l=1}^p \zeta \Delta N + \theta Z_{t-1} + \varepsilon \quad (4)$$

$$\Delta X = a + \sum_{i=1}^m b_i \Delta Y + \sum_{j=1}^n c_j \Delta X_{t-j} + \sum_{k=1}^0 d \Delta M^s + \sum_{l=1}^p e \Delta N + f Z_{t-1} + \xi \quad (5)$$

z t-1 is the error-correction term which is the lagged residual series of the cointegrating vector. Deviations of the series from the long run equilibrium relation is measured by the error-correction term. For instance, from equation (4), the null hypothesis that X does not Granger-Cause Y is rejected if the set of estimated coefficients on the lagged values of X is jointly significant. Furthermore, in those instances where X appears in the cointegrating relationship, the hypothesis is also supported if the coefficient of the lagged error-correction term is significant. Changes in an independent variable may be interpreted as representing the short run causal impact while the error-correction term provides the adjustment of Y and X toward their respective long run equilibrium. Thus, the VECM representation allows us to differentiate between the short- and long-run dynamic relationships. The Chi-Square test statistic is used to determine the short run causalities between pairs of variables in the model.

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The Dynamic OLS (DOLS) approach was proposed by Stock & Watson (1993). DOLS is an improvement version of OLS approach where we can deal with small sample size and dynamic sources of bias. It is a robust single equation approach corrects the regressor endogeneity by incorporating lags and leads. DOLS can estimate long run equilibrium where variables are integrated in same or different order. This is one of the major advantage of this approach. Moreover, it has the same kind of optimality like Johansen distribution. Since our sample size is small, we applied DOLS approach for avoiding false estimation. If  $Y_t$  is the dependent variable with regressors  $X_{i,t}, i=1,2,3,\dots,n$  then,

$$Y_t = \beta_0 + \beta_1 X_{1,t} + \beta_2 X_{2,t} + \dots + \beta_k X_{k,t} + \sum \alpha_{i\Delta} X_{1,t-i} + \sum \gamma_{i\Delta} X_{2,t-i} + \dots + \sum \delta_{i\Delta} X_{k,t-i} + \varepsilon_t \quad (6)$$

The paper is based on annual data covering the period of 1980-2015. Data of total personal foreign remittance earned (US\$) and government spending (US\$) are taken from (WDI). It should be mentioned here that as Bangladesh got her independence in 1971 and this research paper focusses over the period 1980-2015 for which 36 observations are available at most. Small sample size might be problematic in finding the long run relationship. We resorted to use of the EViews 9.5 software for carrying out all econometric tests in our paper. All the econometrics results are available on request.

### 4. Results and Discussions

Unit root tests are conducted to determine the order of integration of the data series. Optimal lag is chosen by *Schwartz Information Criterion (SIC)*. Table 1 shows the ADF statistics and corresponding critical values of all the variables in their level and first differenced forms. Unit root tests have non-standard and non-normal asymptotic distribution. These distributions are extremely affected by the inclusion of deterministic terms such as constant, time trend etc. An extraneous regressor whose inclusion reduces the power of the test is called time trend. Yet if the true data generating process were trend stationary, failing to include a time trend also results in a decline in power of the test. Additionally, this loss of power from without a time trend when it should be present is more severe than the reduction in power associated with including a time trend when it is extraneous. One of the main issues in unit root testing is lag length selection. Including a moderately long lag length and select the model by the usual t-test is one of the approach. When the t-statistics on lag  $p$  is insignificant at some stated critical value, the regression should be frequently assessed using a lag length  $(p-1)$  until the lag is significantly different from zero. From the unit root test, it is clear that all the variables are found to be stationary at their first differences.

**Table 1: Augmented Dickey Fuller Unit Root Test for the Variables**

<b>Panel 1: Levels</b>			
<b>Variable</b>	<b>ADF Statistics (Only Constant)</b>	<b>ADF Statistics (Constant &amp; Trend)</b>	<b>Decision</b>
LNGS	-2.999642	-1.007716	Non Stationary
LNREM	0.407222	1.598605	Non Stationary
<b>Panel 2: First Differences</b>			
<b>Variable</b>	<b>ADF Statistics (Only Constant)</b>	<b>ADF Statistics (Constant &amp; Trend)</b>	<b>Decision</b>
LNREM	-5.014649	-4.967504	Stationary
LNGS	-9.766603	-9.617242	Stationary

**Table 2: Mackinnon Critical Values for Rejection of Hypothesis of Unit Root**

<b>Critical Value</b>	<b>Levels</b>		<b>First Differences</b>	
	<b>No Trend</b>	<b>With Trend</b>	<b>No Trend</b>	<b>With Trend</b>
1%	-3.632900	-4.243644	-3.639407	-4.252879
5%	-2.948404	-3.544284	-2.951125	-3.548490
10%	-2.612874	-3.209699	-2.614300	-3.207094

From the table it is clear that the variables would yield spurious results unless the variables are cointegrated. The results, however, allow to proceed to the next stage of testing for cointegration. The Johansen cointegration test results indicates that our variables have cointegrating relationship. Maximum Eigen value test and the trace test (Table 3a and 3b) both point out cointegrating relationships at 95%. After the Cointegration test, we performed Granger Causality Test at lag 2.

**Table 3a: Johansen Test for Cointegration (Trace Test)**

	<b>Null Hypothesis</b>	<b>Alternative Hypothesis</b>	<b>Statistics</b>	<b>95% Critical Value</b>
LNGS and LNREM	None	(At Most One)	19.16 (0.028)	0.0134 0.8662

**Table 3b: Johansen Test for Cointegration (Maximum Eigen Value Test)**

	<b>Null Hypothesis</b>	<b>Alternative Hypothesis</b>	<b>Statistics</b>	<b>95% Critical Value</b>
LNGS and LNREM	None	(At Most One)	19.12 (0.028)	0.0079 0.8662



**Table 4: Granger Causality Test Results**

<b>Variable</b>	<b>Null Hypothesis</b>	<b>F-Statistic</b>	<b>P-Value</b>	<b>Conclusion</b>
Granger Causality Test Statistics between LNGS and LNREM				
LNGS	LNREM does not Granger Cause LNGS	10.2741	0.0004	LNREM Granger Causes LNGS
LNREM	LNGS does not Granger Cause LNREM	0.17877	0.8372	

From the Table 4, we can see a set of hypothesis. From these two hypothesis, we can reject the first null hypothesis. However, we cannot reject the second null hypothesis as the probability value is higher than desired level. Thus, we can assert that there is unidirectional causal relationship running from remittance to government expenditure but not vice versa in the long run. This answers our research question (from the long run point of view).

After analyzing the long run causal relationship, we now move to investigate the short run causal relationship among the variables through VECM approach. (with the same set of hypothesis) The results from the VECM approach are given in the table 5. According to the VECM results, no causality was found between Remittance inflow and government spending which also answers our research question (from the short run point of view). One of the possible reasons for this is that the effect is subject to time lag.

**Table 5: VECM Test Results**

<b>Variable</b>	<b>Null-Hypothesis</b>	<b>Chi-Square Statistic</b>	<b>P-Value</b>	<b>Conclusion</b>
Causality Test Statistics between LNGS and LNREM				
LNGS	LNREM does not Granger Cause LNGS	0.06	0.95	No Causality
LNREM	LNGS does not Granger Cause LNREM	0.11	0.95	

After checking the short run causal relationship, now we move to investigate the long run estimation results. The DOLS estimation results are stated in the Table 4.6 below. For running the rest, fixed lag and lead option has been chosen (lag=1, lead=1).

**Table 6: Results of DOLS Estimation**

<b>Variable</b>	<b>Coefficient (Prob)</b>
LNREM	0.777926 (0.0001)
C	4.902625 (0.0264)
$R^2$	0.61
Adjusted $R^2$	0.60
SE of Regression	0.79
Long Run Variance	0.36

It can be noticed that the coefficient of remittance inflow is inelastic and significant. Moreover, the value is positive. This answers the second portion of the research question. It means that there is a positive relationship between government spending and remittance inflow. One of the possible reasons for having positive relationship is that still remittance inflow is not covering the expected expenditures regarding social activities of the households as discussed earlier. Therefore, government still spends for former stated events to achieve prosperity in the economy.

## **5. Conclusion**

In this paper our core objective was to investigate the relationship between remittance inflow in Bangladesh with the help of time series data covering from 1980 to 2015. We found that there is a unidirectional causality running from remittance inflow to government spending in the long run however, no causality was found in the short run. The estimated coefficient of remittance is positive and inelastic in nature as well as significant. The estimation result is different from Hussain et al (2008) where authors found a negative coefficient of remittance.

As we have seen that our variables are related so a careful policy framework is needed to create a higher degree of openness form for achieving attainments in the form of remittance. Such policy framework can reduce the pressure from government spending and the saved amount can be used where its mostly needed. Beside that awareness among the recipients has to be improved so that they can utilize the received remittance properly which will eventually reduce the pressure from governments spending schedule in the long run.

One of the limitations of this paper is that we have used a small data set which includes 36 observations at best. We have used a bivariate model and more control variables can be added to explore new dimensions as well. This paper can be further extended by analysing the same relationship for neighbouring South Asian countries for obtaining general policy framework. Both variables can be disaggregated and an analysis can be done to see how each variable effects each other as well.

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