

# Workers' Remittances and Economic Growth: Evidence From Bangladesh

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## Abstract

Workers' remittances are assuming a significant function as a wellspring of foreign exchange earnings for developing countries. As a result, these countries inflows are growing rapidly. This study inspects the relationship between worker's remittances and economic growth of Bangladesh using the data set for the period 2007-2018. The results using the Granger-causality test show that the workers' remittances and economic growth show a bi-directional causal relation. There is a bi-directional causal relation between capital and economic growth. The relationship is negative when the study considers number of workers growth and economic growth. The used growth model shows that economic growth of Bangladesh is remittances-dependent. Hence, it provides evidence to support those remittances is a regulating issue of economic growth of Bangladesh.

**Keywords:** economic growth, Granger-causality, remittances

## 1. Introduction

Remittances are unit the monetary or in-kind transfers created by migrants to relatives and friends back in communities of origin. Workers' remittances are enjoying as associate degree progressively vital instrument for the transfer of resources from developed to developing countries (Russell, 1992). Consequently, a large number of studies are conducted on the effect of workers' remittances on economic activities. In fact, some have contended that remittances show a positive effect on economic development (Guha, 2013; Rath, 2004). In spite of apparent achievement, a few investigations have discovered that remittances can deleteriously affect financial development (Barajas et al. 2009). Toward the beginning of the century, it was assessed that around 175 million individuals—generally 3% of the total population—lived and worked outside the nation of their introduction to the world (United Nations, 2002). The worldwide settlements sent back home by these migrant workers profoundly affect the developing nations of Africa, Asia, Latin America, and the Middle East (Adams and Page, 2005). Worldwide remittance streams into developing nations are pulling in extensive interest in light of their growing volume and effect on birthplace nations. In 2014, the worldwide remittances to non-industrial nations are assessed to have arrived at \$436 billion (World Bank, 2014). In 2019, yearly remittances stream to Low and Middle Income Countries (LMICs) were probably \$554 billion (World Bank, 2020). Remittances toward the region of East Asia and Pacific (EAP) and the South Asia Region (SAR) represent the first and second-biggest bits on the planet (Yoshino et al. 2017).

Like other developing nations remittances turned into an essential factor for the economic advancement of Bangladesh.

The history of workers' migration and overseas remittances of Bangladesh is not new. As far back as in 1942 Bangladeshi nationals has migrated to the United Kingdom (UK) as a result of the British regime's scheme of issuance of employment voucher to overseas workers seeking work abroad. After the birth of Bangladesh, most of the Bangladeshi migrated in the countries of Middle East as well as selected EU landing places (mainly Germany). During the 1990s and ahead, there was an inclination to secure position in developed countries like Canada, USA, Italy and in some Asian nations like Malaysia, Japan and Singapore. The process of migration of Bangladeshi to abroad from Bangladesh is continuing strongly till now (Figure 1). The yearly migration of labour was 16,908 in 1977 and 8,80,037 in 2017 (Bangladesh Bank, 2020). Bangladesh is one of the major remittance beneficiary nations on the planet and it is the consequence of the colossal expansion in outward movement.

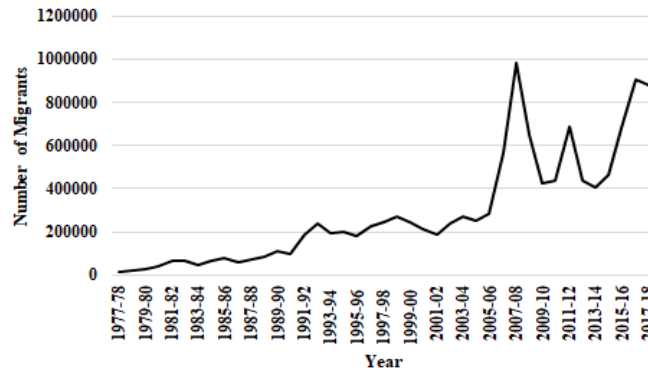


Figure 1. Number of migrants from Bangladesh from 1977 to 2017

However, based on descriptive approaches a few investigations have been directed on the effect of workers' remittances on economic development of Bangladesh. Therefore, from the point of view of keeping up a reasonable turn of sustainable development as well as economic growth rates, it is necessary to recognize the behavior of workers' remittances in relation to the economy of Bangladesh. Our examination endeavors to address this issue with regards to Bangladesh. This paper inspected whether remittances is a statistically significant measurement in deciding economic growth, then whether the connection between remittances and economic growth with regards to Bangladesh is causal. This study performed empirical tests to find relationships between remittances and economic growth of Bangladesh over the period of 2007-2018.

## 2. Literature Review

Assessing the current literature is generally centered around the problems of financial development, economic growth and poverty alleviation impacts on remittances arrival for the remittances accepting countries. Wherefore, in this study the literature review begin with the panel data works and cross-country as well as end with the issues of Bangladesh.

Now-a-days, for a number of developing countries, remittances have been characterized as the significant wellsprings of foreign finances following foreign direct investment (FDI) (Adenutsi, 2011; Giuliano & Ruiz-Arranz, 2009; Rao & Hassan, 2011). Some studies have claimed that through smoothing the investment constraint, remittances promote economic growth (Giuliano & Ruiz-Arranz, 2005). Remittances show positive effect on economic growth using remittances with the end goal of youngsters' schooling and government assistance costs, for example, medical care. In the event that remittances import more capital products, it can expand the growth rate (Glytos, 2005).

As per Buch and Kuckulenz (2010), remittances positively affect government assistance improving impact, for example, utilization, capital investment, schooling and wellbeing. Anyanwu & Erhijakpor (2010) have guaranteed that remittances have indicated a progressive effect on poverty decrease in 33 African countries. Guha (2013) have indicated that remittances directly affect the miniature level family unit dynamic with respect to the utilization and work gracefully choices.

An examination has been conducted by Senbeta (2013) regarding the consequence of remittances on financial growth. The investigation has considered the causes of development as capital accumulation and total factor productivity (TFP) growth. The study has found that remittances show a significantly positive effect on capital accumulation, but the effect on TFP growth is not significant.

A few examinations have researched that remittances have impact on financial system of a specific nation with the economic growth. Through the elective method to finance investment and assisting with overcoming liquidity limitations, remittances can improve the economy for the country with less created budgetary frameworks (Giuliano and Ruiz-Arranz, 2009). Moreover, remittances inflow effects the development of budgetary improvement in non-industrial nations (Aggarwal et al., 2011). By guaranteeing accessibility of assets for loaning by business bank to the private area credit, remittances can be changed over into stores and this budgetary improvement upgrades

economic growth (Misati and Nyamongo, 2011). Kipyegon et al. (2012) have discovered remittance as a factor of development and financial advancement for the panel data for the time period 1980–2009 of 36 countries of Africa.

Then again, show impact can cause the negative influence of remittances on financial growth (Stahl & Arnold, 1986). The remittances beneficiaries' burn-through imported products because of the impact of exhibition. In this manner, the broad impact of exhibition can decrease reserve funds and ventures that lessen the development pace of the beneficiary nation. Oberoi and Singh (1980) have contended that the obvious utilization or ineffective utilization of remittances, for instance in agrarian area there would have negative effect on economic development. Again high reliance of the beneficiaries on the pain free income can diminish work market investments, and good risk issue may rise among remitters and beneficiaries. Along these lines, the negative impact of remittances can be found on financial development (Chami et al., 2003; Barajas et al., 2009).

Sometimes problem have been created in the recipient's country due to the volatility of remittances. Craigwell et al. (2010) have stated that remittances can diminish the effect of undesirable output but do not show significant effect on consumption as well as investment volatility. Bayangos and Jansen (2011) have explained that workers' migration and remittances inflow shows a significant effect on keenness that affect the traditional exchange rate in the Philippines. The authors also have argued that large number of emigration can cut the number of labor force and the receipt of remittances further reduce labor supply.

Again, the investigation on 113 nations Chami et al. (2003) has reasoned that remittances negatively affect development. The International Monetary Fund (2005) has discovered no statistical relationship between remittances and per capita yield development in their examination on 101 non-industrial nations. On the other hand, Pradhan et al., (2008) have contended that remittances show positive influence on growth in their work with 39 agricultural nations during 1980-2004. Jongwanich (2007) has reached the decision that remittances have a positive yet negligible effect on financial development in Asian and Pacific countries. As indicated by Barajas et al. (2009), remittances have no effect on financial development. The investigation of Catrinescua et al. (2009) has not reached a determination whether remittances have a positive or negative effect on since quite a while ago run development.

Mahmud (2003) has asserted that remittances significantly affect Foreign Direct Investment (FDI), economic growth. Again, outside remittances upgrade financial development and work in the short altercation Bangladesh (Rahman et al., 2006). Paul et al. (2011) have discovered a long-run connection among remittances as well as Gross Domestic Product (GDP) in Bangladesh for the period somewhere in the range of 1976 and 2010. Siddique et al., (2012) have found that remittances decidedly impact economic growth of Bangladesh while they utilized information on Bangladesh, Sri Lanka and India over a 25 year.

### 3. Research Methodology

#### 3.1 The Model

Causality analysis by Granger (Granger 1969; Granger 1980) provides a theoretical analysis for the study of relationships between variables. Empirically it is difficult to define causal relationships. The concept of causality is based on three important features as (1) for consistent time lag, instant causality cannot exist; (2) for the similar reasons mutual, instantaneous causal effect cannot exist; (3) future estimations of factors cannot be the reason for the previous (Granger 1969; Granger 1980).

Granger's definition alludes just to stochastic variables and depends on the supposition that the future cannot decide the past. It is assumed that variable  $x_t$  is the Granger-cause of variable  $y_t$  only when the current values of  $y$  might be depicted and conjecture all the more precisely with the use of the past values of  $x$  than without using them, given the unaltered arrangement of data.

Considering the above condition, it can be stated that the Granger significance test instructions whether the regression model

$$y_t = \alpha_0 + \alpha_1 y_{t-1} + \dots + \alpha_k y_{t-k} + \beta_1 x_{t-1} + \dots + \beta_{t-k} + \varepsilon_t$$

Explains as well as estimates the response variable better than the accompanying regression model.

$$y_t = \alpha_0 + \alpha_1 y_{t-1} + \dots + \alpha_k y_{t-k} + \varepsilon_t.$$

The F statistics is used to check the Granger-causality for the null hypothesis as  $H_0: \beta_1 = \beta_2 = \dots = \beta_k = 0$ , which indicates that  $x$  is not source  $y$  here, with the  $p$ -value = 0.05 (Kasperowicz, 2014).

This investigation had directed the pertinence Granger test to recognize the maximum leads of independent variables viewed as the reason for the comparing reference variable. The Granger test was done with the assumption of

short-term relationships between variables, for example the time interval of close to one year. Hence, the Granger-causality test feeling of the series of explanatory variables focused for the leads of 1, 2, 3, 4 quarters (Kasperowicz, 2014).

In this study the following GDP equation was used with the assumption that the random, seasonal, cyclical fluctuations and a longterm trend are present in the analyzed time series

$$GDP_t = \beta_0 + \sum_{i=0}^n \beta_{1i} R_{t-i} + \sum_{i=0}^n \beta_{2i} K_{t-i} + \sum_{i=0}^n \beta_{3i} L_{t-i} + \sum_{i=1}^4 \beta_{4i} q_i + \gamma_1 T + \varepsilon_t \quad (1)$$

Where,

$R$ = Remittances

$K$ = Gross Fixed Capital

$L$ = Total Worker

$n$ = maximum lag

$\sum_{i=1}^4 \beta_{4i} q_i$ = seasonal fluctuations

$T$  = trend (time) and

$\varepsilon_t$  = error term.

The stepwise regression for the above multiple regression to choose explanatory variables driving by n-times. Using the stepwise regression, it was conceivable to overhaul the evaluation of each variable's relevance at every phase of the estimation of the above model.

### 3.2 Data Collection

To analyse economic growth and workers' remittances in Bangladesh, a data set of workers' remittances for the period 2007-2018 was collected from the publications of Bangladesh Bank. Real GDP, gross fixed capital, total worker were composed from Bangladesh Bureau of Statistics (BBS).

## 4. Results and Discussion

### 4.1 Test Results for Unit Roots and Stationarity

At the beginning, the study tested the robustness of variables. Hence, Augmented Dickey-Fuller (ADF) was used to test the presence of a unit root and for stationarity test KPSS (Kwiatkowski et al., 1992). For ADF  $H_0$ : The variable has a unit root, where the  $H_a$ : The variable does not. The Akaike Information Criteria (AIC) was calculated for serial correlation in the residuals by first and higher order. Based on the AIC the lag-length was chosen.

Table 1. Unit roots and stationarity test results

	GDP	R	K	L	$\Delta$ GDP	$\Delta$ R	$\Delta$ K	$\Delta$ L
ADF	0.72736	-1.6452	0.0031293	-1.7942	-3.7178	-6.6921	-3.4943	-2.3156
p-value	0.99	0.71	0.99	0.65	0.03	0.01	0.05	0.0421
KPSS	1.1751	1.013	1.1625	0.37991	1.0597	0.19827	1.0136	0.28509
p-value	0.1	0.1	0.1	0.08	0.1	0.1	0.1	0.1

GDP = Gross Domestic Product; R= Remittances; K= Gross Fixed Capital; L= Total Worker

Table 1 shows the results for unit root test as well as stationarity test for the used data set and their first difference. For the original data the  $H_0$  of ADF test cannot be rejected as p-value > 0.05. After calculating the first difference, through ADF test it was found that all the variables are stationary for the 95% confidence interval. Under the KPSS test  $H_0$  cannot be rejected, for the p-value 0.05.

### 4.2 Granger-Causality Results

In this study, Granger-causality was used under the assumption that the significant relationships is present between the independent variables and the reference variable. R programming was used to calculate statistically significant causality using the highest lag for each pair of variables (Table 2).

Table 2. Pairwise granger causality tests

H <sub>0</sub>	lag	F-statistics	p-value
ΔR does not Granger cause ΔGDP	3	3.14	0.04
ΔGDP does not Granger cause ΔR	3	6.75	0.03
ΔK does not Granger cause ΔGDP	4	5.32	0.02
ΔGDP does not Granger cause ΔK	2	4.79	0.01
ΔL does not Granger cause ΔGDP	4	5.42	0.01
ΔGDP does not Granger cause ΔL	3	8.55	0.01

Table 2 shows that for the 95% confidence interval, Granger causality is present in both together directions between Remittances and GDP, in both directions between Gross Fixed Capital and GDP and in both directions between Total Worker and GDP. The calculated consequences for Bangladesh are reliable with the view that remittances causally affect economic growth.

4.3 The Estimation of the GDP Model

The study found that all of the used independent variables are significant through the Granger-causality tests of short-term relationships. Therefore, based on the obtained test results the equation (1) can be written as

$$GDP_t = \beta_0 + \sum_{i=0}^3 \beta_{1i} \Delta R_{t-i} + \sum_{i=0}^4 \beta_{2i} \Delta K_{t-i} + \sum_{i=0}^4 \beta_{3i} \Delta L_{t-i} + \sum_{i=1}^4 \beta_{4i} q_i + \gamma_1 T + \varepsilon_t \quad (2)$$

Where,

ΔGDP= Growth rates of Gross Domestic Product

ΔR= Growth rates of Remittances

ΔK= Growth rate of Gross Fixed Capital

ΔL= Growth rate of Total Worker

The model in Equation (2) defines the relation between GDP and independent variables- whether it will be positive or negative, which is critical for the economic importance of the model. Table 3 shows the results of the estimations using the equation (2).

Table 3. OLS estimates using observations 2007-2018

Regressor	Coefficients	t-value	p-value
Constant	-1.59	-15.42	0.00
ΔR	1.96	3.73	0.00
ΔK	1.72	28.64	0.00
ΔL	-0.15	-4.76	0.00
time	79.28	15.45	0.00
R <sup>2</sup>	0.99		
F-statistic (5 and 34 DF)	530.10	p-value (F):	0.00
Residual standard error: (34 DF)	251.10		
Log-likelihood	-458.76		
Akaike criterion	931.51		
Residual diagnostic test			
Normality test	0.94	p-value	0.67
Autocorrelation (Durbin-Watson)	2.59		
Heteroscedasticity	10.56	p-value	0.35
Ramseys RESET test	2.23 (DF 10, 24)	p-value	0.18

Stepwise elimination of variables for multiple regressions was utilized to diminish the number of independent variables to the most relevant variables (Table 3) (Groebner et al., 2003; Lucchetti, 2013).

The value of coefficient of determination is 0.99 which represents that 99% changes of the dependent variable can be explained by the used independent variables of model.  $F$ -statistic with  $p$ -value  $< 0.05$ , which affirms that the present linear regression is significant.

Normality test of residuals was conducted under the  $H_0$ : The error has a normal distribution. The test statistic is 0.94 with 2 DF and  $p$ -value is 0.67, therefore we cannot reject the null hypothesis (Figure 2).

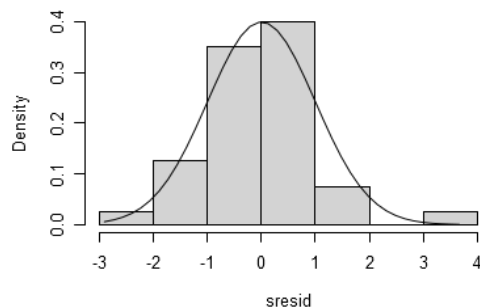


Figure 2. Normality of residuals

Note: Studentized Residuals = sresid

Typically, the residuals reveal serial correlation in time series. Such leftover terms are supposed to be autocorrelated. The bounds test of Durbin and Watson was used to test the autocorrelation of residuals (Dufour & Dagenais 1985; Gujarati 2003; Sargan & Bhargava 1983). The critical values for DW test statistic for the obtained model with 40 observations and 5 variables are calculated as,  $dL=1.23$  ( $4-dL= 2.77$ );  $dU=1.79$  ( $4-dU=2.21$ ). The DW statistic is 2.59 of the model is between the critical values, so it cannot be said that if autocorrelation is present or not. Therefore, the Breusch-Godfrey test was also used to test the autocorrelation (Gujarati, 2003). The Breusch-Godfrey test statistics is 1.59 (Chi-square, DF 2) with  $p$ -value 0.3 concluded that the residuals are uncorrelated.

The Breusch-Pagan test was used to test the heteroscedasticity of residuals under the  $H_0$ : heteroscedasticity is not present. The  $p$ -value is 0.35, therefore there is no reason to reject the  $H_0$ .

Ramseys RESET test (Thursby & Schmidt 1977; Ramsey 1969) was used to test the correct specification of Model. The test statistic  $F = 2.23$  (DF 10, 24) where  $p$ -value is 0.18 so there is no affirmed the right model determination to reject the  $H_0$  and it affirmed the right model determination.

In the last step, CUSUM test was conducted to test stability of the parameter for the defined regression equation (Borensztein et al., 1998; Hansen, 1992). It was observed that model confirms robustness having estimation fall within the boundary at 5% level of significance (Figure 3). These findings confirmed the parameter stability of model.

The defined model meets all the assumption of the OLS estimation. Residuals do not show autocorrelation. The residuals follow normal distribution with mean zero and constant variance. Estimation of the equation was done by using stationary variables.

Since the projected model of economic growth with the use of remittance encounters all the states of appropriate estimation, it without a doubt has reliable economic interpretation.

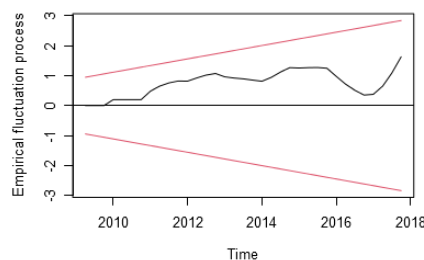


Figure 3. CUSUM plot for the model

## 5. Conclusion

Workers' remittances have an important effect on the economic growth of developing countries as Bangladesh. Bangladesh has a huge work to surplus the migrant workers to those nations which are have work deficiencies and can stand to recruit modest work. Along these lines, there is large Bangladeshi migrant workers who are working a large portion of the nations on the planet.

In the study it was tried to find the effect of the remittances on economic growth in Bangladesh. The study was depended on Granger-causality test, which showed that the Granger-causality runs both from remittances to economic growth and from economic growth to remittances.

OLS regression model coefficients for remittances shown positive impact toward economic growth in Bangladesh over the sample time interval of 2007 to 2018. The regression model for the used variables explains 99% variability of the economic growth in Bangladesh. All the statistical tests have demonstrated the right specification of the model. Remittances is a variable whose expansion causes the expansion of economic growth. In this model, Gross Fixed Capital also shows that the positive change of the capital growth rate causes the positive change in economic growth of Bangladesh. On the other hand, number of worker growth presents negative effect on economic growth. The reason behind this low quality institutional education which reduce the productivity of the workers.

To sum up, the results of the study show that there is a possibility of a relationship between remittances and GDP. The used model can be improved by a superior demonstrating for long-run and short-run to find the role of remittances to explain economic growth and take decision regarding the development of Bangladesh economy.

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