Macro determinants of remittance: Relationship between remittance and economic growth in Bangladesh

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Abstract

This paper examine the relation from remittances and trade to economic growth. Study applied time series econometric techniques; unit root, cointegration and error correction mechanism (ECM) to examine long-run and short-run association between dependent and independent variables during the period of 1976 to 2016. The results confirms a long-run relationship between remittance, trade and economic growth whereas no short-run causal relationship exists between remittances and economic growth, but trade shows significant influence even in the short run in GDP during the study period. It is expected that the findings would be useful to government and policy makers for internal policy formation in the area of utilization of remittance management of migration from Bangladesh.

Keywords: Remittance, macro determinants, economic growth, migration.

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INTRODUCTION

Majority of empirical studies on macroeconomic dealt with both trade and worker remittances on economic growth (Abdulbagi, 2016), or the relationship between trade and economic growth (Jenish, 2013) or the relationship between remittance and economic growth (Shera & Meyer, 2013). Several studies concluded that remittances and trade promote economic growth, however, there is a huge debate about the contribution of trade and migrant remittance in economic growth. There are many empirical studies concluding that migrant remittances have significant and positive relation with economic growth (Mwangi & Mwenda, 2015) but many studies are raising the questions on the positive contribution on economic growth, development and income promotion (Detta & Sarkar, 2014). Similarly for the trade openness, it is concluded that trade openness has positive implication on economic growth (Wacziarg, 2001) and some concludes that the support of trade to growth is not free from debate (Yanikkaya, 2003). Most of the time impact depends on political, economic and geographical situations of a country so, however, the issue is no such debatable but universally accepted conclusions are rarely established in this area.

Migrant remittances play an important role to start new business, small capital for investment and learn skill for an individual but at national level that would be helpful to formulate capital which would help to promote growth (Giuliano & Arranz, 2009). For the last two decades the migrant remittances have grown rapidly in Bangladesh, and remittance remained as the second highest source of foreign currency earning for country. In terms of trade, that has been increased continuously and very speedy increase after liberalization. Government liberal policy increased both import and export and finally this helped to adopt new technology, get product at low price, increase consumer welfare and help to benefited from spillover effect of trade liberalization.

Despite the abundant literature on remittance, trade and economic growth in many developing countries, there is little empirical work on this subject in Bangladesh. Some regional and cross sectional countries relations studies were made (Azam, 2013) however, they are also not free from questions. There are several scholarly works done on microeconomic (Mannan & Fredericks 2015) determinants (Mannan & Farhana 2015) and socioeconomic impact (Mannan & Fredericks 2015) on remittances in rural households' level and also on

capital market (Mannan & Farhana 2015) in Bangladesh.

This motivates to investigate the relationship between migrant remittance, trade and economic growth in Bangladesh using time series data. Bangladesh is the developing country in South Asia sending large number of economically active population in foreign employment and receives high volume of remittances. This situation inspired to conduct research on impact of migrant remittance and trade on economic growth of Bangladesh. In addition to that, this study can contribute to the existing literature which provides either conflicting results concerning the relationship between variables. Government of Bangladesh is introducing the policy, law and institutional set up for the effective utilization of remittance in productive activities. Similarly Bangladesh government is giving high importance to trade liberalization. In these circumstances this study should be helpful to provide policy feedback to the Government of Bangladesh.

The main objective of this study is to examine the relationship between migrant remittance and economic growth in Bangladesh. This paper has a unique contribution to the literature in the context of Bangladesh being an important attempt to examine the impact of migrant remittances and trade on GDP by using the time series data for the period 1976 to 2016 using rigorous econometric techniques.

METHODOLOGY AND ANALYSIS

This paper uses a log-log econometric model to test cointegration and causality from remittances to economic growth. It is possible that there could be unidirectional causality from remittances to economic growth, and it is also possible that there is no dependency of GDP in remittance (Baker et al. 2015). To test the significant influence of remittance in economic growth, the analysis yields a general model as;

$$LgG_t = \mu_0 + \mu_1 LgRim_t + \mu_2 \sum_{i=1}^{n} LgY_{it} + \alpha_i \quad \dots\dots(i)$$

Where, 'Lg' represent natural log, 'Gt' stand for GDP, μ is are coefficients, 'Rim' stand for remittance, 'Y' is are complementary series for growth and α_i represent

error term. And the equation for this study becomes;

$$\mathbf{LgG_t = \mu_0 + \mu_1 LgRim_t + \mu_2 LgTrade_t + \alpha_i} \dots\dots(ii)$$

To complete the econometric procedure, unit root test was performed for stationary to avoid spurious regression. In a second step, to determine the long run association, series were tested for cointegration. The cointegration test result determined the presence of correction term in the model and then used in the next step. In this third step, if the series are cointegrated of the same order, the error-correction model (ECM) is applied to find the relationship. Following the Engle-Granger approach, residual series generated from following equation is tested for presence of cointegraion in the model.

$$\hat{\alpha}_i = \mathbf{LgG_t - (\mu_0 + \mu_1 LgRim_t + \mu_2 LgTrade_t)} \dots\dots(iii)$$

If there is no cointegration among series in step 2, the multiple regression method with variables in first difference is applied to test relationship as the standard model (Toda and Phillips, 1993). Further residual tests were performed for the accuracy of prediction of the model.

To analyze the relationship between remittances and economic growth, this paper uses annual time series data from 1976 to 2016 from Bangladesh. To this study gross domestic product (GDP) is used as proxy of economic growth. GDP is taken as dependent variable. Remittance and trade is independent variables and remittance is the interest variable to this study. GDP and Trade data are obtained from Bangladesh Bureau of Statistics (BBS), Bangladesh. Remittances data of Bangladesh is publicly available in Bureau of Manpower, Employment and Training (BMET).

Unit Root Test

Stationary test is prerequisite for both causality and cointegration (Gyanwaly, 2012). It is essential to test for non-constant mean, variance and auto-covariance over time i.e. non-stationary for all series those considered in the analysis. If a non-stationary series becomes stationary after differentiating 'n' times, then the series is said to be integrated of

order 'n'. This is the first step in finding causation between variables in time series econometrics and for the causality, series should be free from time trend and as majority of macroeconomic series are non-stationary (Nelson & Plosser, 1982). When series are found integrated of the same order, the next step is to examine for the presence of cointegration i.e. the long run association between variables. To verify this preliminary condition, series of GDP, remittance and trade were tested for a unit root by using augmented Dickey–Fuller (ADF) test (Dickey & Fuller, 1979).

Time Series Cointegration Test

All series; economic growth, remittances and trade are said to be cointegrated when all series are found to be integrated in the same order. For the robustness of cointegration test, Engle-Granger method of cointegration (Engle &

Granger, 1991) based on autoregressive representation is applied here. For this computed test statistic is compared with Engle-Granger five percent critical value.

Error Correction Mechanism (ECM)

To examine the relationship between GDP and remittances the ECM mechanism is used in this study, as cointegration tests detailed in previous section revealed that the variables in our analysis are cointegrated of order one, i.e. the long-run causality. Engle-Granger critical value indicates that there exists long run association in the model, based on that, equilibrium-correction mechanism (ECM) is used to test the relationship in equation (ii). The ECM can examine long-run causal relationships based on the error-correction term Ect_{t-1} and can be express as:

$$f\text{LgG}t = \mu_0 + \mu_1 f\text{LgRim}_t + \mu_2 f\text{LgTrade}_t + \mu_3 Ect_{t-1} + w_i \ldots\ldots\text{(iv)}$$

Where f denote the first difference of variables which capture their short-run disturbances over periods t = 1,2,. . .,T; w_i is the white noise error term and Ect_{t-1} is the error correction term (ECT) that is resultant from the long-run cointegration association.

Long-Run and Short Run Relationship

The coefficient of ECT explains about the long-run relationship among dependent and independent variables and indicates the speed of adjustment. Size of coefficient of the ECT informs about deviation of the dependent variables from the long

run equilibrium and significance of coefficient suggests that in the long-run mechanism is deriving dependent variable in equilibrium relationship. The rule of thumb is that coefficient of the ECT should be significant and a negative number between 0 and -1, indicates about number of period the equilibrium is restored. At the same time, Short-run relationship is tested by evaluating the significance of the coefficients of the independent variables.

RESULTS

All three series are tested for unit root by using augmented dickey fuller (ADF) test to check the stationary of datasets in terms of whether they are integrated of the same order (Granger, 1988). Table 1.1 represents the results of the ADF test on stationary of the GDP, trade and remittances. Results of the two tests indicate that all three series are non-stationary at levels but are stationary in first differences.

Table 1.1: Unit Root Test

Variables	Deterministic	Level	First Difference
LgGDP	Intercept	-1.13	-5.51[***]
	Intercept and Trend	-1.01	-5.43[***]
LgRemit	Intercept	0.09	-5.64[***]
	Intercept and Trend	-2.08	-5.52[***]
LgTrade	Intercept	-1.25	-5.42[***]
	Intercept and Trend	-1.11	-5.21[***]

*Note: Lag length based on Schwarz information criterion (SIC) *p<0.10, ** p<0.05 and *** p<0.01, these represent significant p values.*

As all the series are stationary in first difference, here Engle-Granger cointegration tests should be performed to investigate cointegration among them. The result of cointegration test is shown in Table 1.2. ADF test statistics is presented in table with Engle-Granger critical value at five percent level significance. As absolute value of t-test statistics is greater than absolute value of Engle-Granger five percent critical value, indicate residuals from OLS estimation are stationary i.e. there is no unit root in the residual series at level finally suggest for long run relationship between GDP and other independent variables.

Table 1.2: Engle-Granger Cointegration Test

Variable	Engle Critical Value 5%	t-value	R^2	D-W Value
Ect	-3.75	-5.4337	0.6670	2.007

*Note: *p<0.10, ** p<0.05 and *** p<0.01, these represent significant p values.*

The error correction term from equation (iii) not only informs about the long-run relationship among variable series but also tells about the significance of the speed of adjustment, μ_3 the coefficient of correction term in equations (iv). A significant value between 0 and -1 suggest convergence of deviation from equilibrium in the long-run (Baker, Merkert & Kamruzzaman, 2015). The residual from equation (iv) follows CLRM assumptions for the model. Table 1.3 summarizes the outcome of ECM of Remittances-GDP relationships. The coefficient of ECT is negative and significant, indicate that there is a long run relationship between remittance and GDP. Probability and coefficient of the error correction term indicate that previous year disequilibrium is adjusted at the rate 43.25% annually. Coefficient of remittance shows no significant effect on GDP of the country, however trade showing influencing role for the country.

Table 1.3: OLS Estimation

Variables	Coefficient	Probability
fLgRim	0.0276	0.1534
fLgTrade	0.7453[****]	0.0000
Ect_{t-1}	-0.4325[***]	0.0021
Constant	0.139	0.1231
R^2		0.8177
DW value		1.6242
F-value		51.2643[***]
(Probalitity		(0.0000)

*Note: *p<0.10, ** p<0.05 and *** p<0.01, these represent significant p values.*

CONCLUSION

This paper analyzes the relation between remittances received and economic growth in Bangladesh. Unit root, cointegration and error correction technique of econometric procedure are applied for examination. The results from estimation suggest that there is a long run association between remittance, trade and economic growth. However, finding indicates that the relation between remittance and economic growth is not significant in the short run. The outcomes also suggest an absence of short-run causation from remittances to GDP, but there exist long-run relationship between economic growth and remittance earning. This indicates that the policy maker should implement appropriate policy to invest in infrastructure frameworks to accommodate the expected outcome. Future study should be done, including time varying covariates to improve the model presents here.

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