The Macroeconomic Determinants of Remittances in Bangladesh: An Empirical Analysis

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Abstract- Conventional wisdom in the economics of migration holds that remittance receipts may be a more stable source of capital for developing countries than official Development Assistance or private financial capital. We use national accounts data to analyze movements in remittance flow to Bangladesh from 1975- 2010 against these series, as well as GDP at current price, Remittances, Oil Price, Foreign Exchange Rate and Number of Migrant. The paper applied Augmented Dickey Fuller and Phillips-Perron to check the stationarity of the time series, and then we find the long run stable relationship by Granger Residual Based and Johansen's cointegration test. Applying the error correction mechanism has stable relationship in Bangladesh in the short as well as in the long run.

Key Word- Remittances, Migration, National Accounts, Stationarity, Cointegration, Error Correction,

Introduction

The global completion of exporting manpower is increasing day by day. The demand for skilled and professional personal is increasing. But Bangladesh is far behind to export skilled and professional personal than some other top remittance recipient countries. As a huge labor surplus country from 1976 to 2007 total 4824072 people migrated temporarily from Bangladesh, according to a statistics of Bangladesh bureau of manpower, employment and training (BMET).

Remittances are not a new phenomenon in the Bangladesh. This country is dependent on remittances received from their emigrants during the 20th centuries. Remittances are playing an increasingly large role in the economies of many countries, contributing to economic growth and to the livelihoods of less prosperous people (though generally not the poorest of the poor). As remittance receivers often have a higher propensity to own a bank account, remittances promote access to financial services for the sender and recipient, an essential aspect of leveraging remittances to promote economic development Remittances have emerged as a key driver of economic growth and poverty reduction in Bangladesh, increasing at an average annual rate of 19 percent in the last 30 years (1979-2009). The total workers remittance sent from 2001-2009.

From 1979 to 2010 the remittance inflow is being gone day by day by the in conregement of government policy and has a great tendency to migrate of people. In various developed and developing countries demand for labor is being increased for their own development. Foreign countries are offering more facilities to Bangladesh skilled labor.

The number of expatriate was only 192263 in 1993-94 Fiscal year. Now it stands at 427180 expatriate in 2009-10 fiscal year.

In 2001-02 fiscal year the amount of remittance sent was 2501.13 Millions of dollar. But it has been increased to 9681.78 Millions of dollar in 2008-09 fiscal year.

Because of increasing lobar demand, labor efficiency, establishment of new institution, Government facilities the new labor market has been created over the years. The total contribution of remittance to our GDP is 7.12 in Fiscal year 2008-09.So Bangladesh is importantly depended on receiving remittance than before.

2. Literature

A growing literature on migration and remittances, evaluated at both the international and national levels, provides some insight into the relationship between remittances and shifts in the global macro-economy. Looking solely at developing countries, Kapur (2004) plots net and gross remittances against other private and public capital flows. His study shows that while other capital flows (such as FDI) exhibit notable fluctuations over time, remittances were the most stable capital flow during the period 1990-2001. Another study by Ratha (2003) complements that of Kapur. Ratha argues that remittances are generally a less volatile, more dependable, source of funding than private capital flows and foreign direct

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investment. Sayan (2006) looks at remittance and output data for 12 lower and middle income countries from 1976-2003. He finds that, although the aggregate country data exhibits counter-cyclicality vis-à-vis GDP, within countries the result is ambiguous as remittances can be pro-, counter-, or even a-cyclical.

Other papers consider the impact that migrant-hosting economies have on remittance flows. A recent working paper by Roache and Gradzka (2007) evaluates the impact of the US business cycle on remittances to Latin America. Looking at data from 1990-2007, the authors use three approaches simple correlations, cointegration tests, distributed lag tests, and dynamic factor modeling .to estimate the relationship between 19 US economic indicators and remittances to various Latin American countries. They find on average, no correlation between US economic indicators and remittances to the LAC. However, the results from Engle-Granger and Johanson cointegration tests provide some evidence that GDP is the most likely to have a long run relationship to remittances. Of import to our study here is that when using a dynamic factor model methodology to estimate the US-LAC relationship, the authors find that Mexico is the sole country which shows some relationship between remittances and the US business cycle. This is especially pronounced for the more recent years.

Some of the studies in Bangladesh (Salim, 1992; Matin, 1994) focused on the macroeconomic impact of overseas remittances in Bangladesh. As compared to the major macro variables of the country such as export, import, ADP allocations, etc., overseas remittances rank highly. Remittances were found to be equivalent to a significant amount of export earnings, covering the payments for the major imports of the country as well as having a dramatic effect on the balance of payment position. However, remittances are not devoid of adverse effects. Manpower exports are alleged to deprive the country of their services and upsetting the normal functioning of the economy (Mahmood, 1985)

The most of the studies on remittances concentrated on the trend and pattern of its uses both at the micro and macro level. Remittances have been bound to be beneficial in uplifting the socio-economic conditions of the migrant families as well as contributing to the various macro variables of the country positively. Remittances were able to significantly increase foreign exchange earnings and investible surplus. It is now considered as having great prospects to boost up numerous economic activities of the country, which in turn lead to higher job opportunities.

The main drawback of these studies is that they reached conclusions without taking into account any econometric technique in analyzing the data. The only exception was the study undertaken by Matin (1994) who estimated the trend growth rate of the migrant workers. However, estimations were done without examining the time series properties of the variables in the model. The standard regression results would be 'spurious' invalidating the t and F tests in the presence of non-stationary variables. Thus, it is crucial to check for stationarity of all the variables. A long run or equilibrium relationship exists if the variables turn out to be stationary as well as cointegrated. In the present study, we adopt the cointegration technique as well as the Granger and Error Correction Models with the purpose of ascertaining the short run dynamics of GDP at current price, Remittances, Oil Price, Foreign Exchange Rate and Number of Migrant within a long run as well as short run relationship in Bangladesh. In addition, we also investigate the relationship between the five variables for the macroeconomic determents, not attempted before.

Data

This study is based on secondary data collected from various published sources mainly Bangladesh Bank, Bangladesh Bureau of Statistics and Bangladesh Economic Review covering the period from 1975-2010,

Methodology and Result

Unit Root Test

In order to test for causality and cointegration among five variables, GDP at current price(gdpcp), Remittances(rmtnc), Oil Price(op), Foreign Exchange Rate(fer) and Number of Migrant(nm), the time series properties of each variable are examined by the unit root tests i. e., To test the stationary of the variables, Augmented Dickey-Fuller and Phillips-Perron method has been applied both on the first difference as well as on the Second Difference of the variables, the results of the tests are presented in Table 1 and Table 2

Table-1: ADF Test for stationary

Variables	With Trend	Without Trend

	First Difference	Lag	Second Difference	Lag	First Difference	Lag	Second Difference	Lag
remtnc	4.57*	7	2.43	7	5.27*	7	3.37*	7
nm	-7.80*	1	-7.38*	2	-7.68*	1	-7.58*	2
op	-3.97**	0	-6.64	0	-3.49**	0	-6.31	0
gdpcp	-8.95*	0	-7.76*	1	-7.95*	0	-6.80*	0
fer	-3.53*	0	-7.38*	1	-3.64**	0	-7.24*	1

Note: i) * and ii) ** indicate significance at 1% and 5% respectively.
ii) The optimal lag length has been considered to be according to the automatic SIC.

Table-2: The Phillips-Perron Test for stationary

Variables	With Trend				Without Trend			
	Newey-west Using Bartlett Kernel Bandwidth	First Difference	Newey-west Using Bartlett Kernel Bandwidth	Second Difference	Newey-west Using Bartlett Kernel Bandwidth	First Difference	Newey-west Using Bartlett Kernel Bandwidth	Second Difference
remtnc	0	3.53*	26	-1.17	2	-2.76***	30	-3.49*
nm	11	-4.54*	30	13.26*	9	-4.83*	26	8.84*
op	1	-3.95**	10	-5.87*	2	-3.46**	11	-6.58*
gdpcp	16	-14.35*	26	-46.75*	1	-8.05*	24	-40.56*
fer	2	-3.42***	17	-11.40*	2	-3.54**	10	-7.85*

Note: i) *, ii) ** and iii) *** indicate significance at 1%, 5% and 10% respectively.

It is evident from the ADF and PP results presented in the above tables that all variables contain unit root at their levels. This problem does not exist when they are differenced once. Therefore, it can be said that the order of integration for each of the variables considered is found to be one in both with trend and without trend cases.

Test for Cointegration

Since all the variables in the remittance determines model are found integrated of the same order, viz.,I(0), as well as in the graph-1 shows that all variables are cointegrated so the next step is testing for the existence of cointegration among the relevant variables. For this both residual based Engle-Granger two-step

method and systems based Johansen-Juselius method have been applied.

Engle-Granger Residual Based Test

It is suggested that OLS gives super consistent result if the variables under consideration are cointegrated. Therefore, as a first

step of Engle-Granger method OLS is applied on the levels of the variables and the residuals are obtained. Then the stationarity of the residuals are tested applying the ADF and PP test. Cointegration among the variables involved in the analysis requires, according to the Engle-Granger Method, the residuals to be stationary, i.e.I(0). The Engle-Granger residual based test results are given in Table 3

Table- 3: ADF Test for stationary

Variables	With Trend				Without Trend			
	First Difference	Lag	Second Difference	Lag	First Difference	Lag	Second Difference	Lag
Residual	-6.67*	0	-7.64*	1	-6.70*	0	-7.76*	1

Note: i) * indicate significance at 1%.
ii) The optimal lag length has been considered to be according to the automatic SIC.

The residual based test results presented in the above table suggest that exists among the relevant variables in all the cases at least at the 1% significance level. However, to confirm the results and determine the rank of the cointegrating vector Johansen-Juselius method of cointegration is applied in the next section.

Johansen's Cointegration Test.

In this section the Johansen method of cointegration has been applied to the employment variables taking linear deterministic trend in the test. Since all the variables are I(1), then it is necessary to test out cointegration test. The presence of cointegration implies the existence of a stable long run relationship among GDP at current price, Remittances, Oil Price, Foreign Exchange Rate and Number of Migrant. We relied on the Johansen's approach to establish the cointegrating vectors. The result is presented in table 4

Table 4: Johansen's Cointegration Test.

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	Log Likelihood	5 Percent Critical Value	1 Percent Critical Value
None **	0.854520	145.3849	-1217.098	87.31	96.58
At most 1 **	0.681713	83.69809	-1198.781	62.99	70.05
At most 2 *	0.529612	47.06439	-1186.714	42.44	48.45
At most 3	0.387896	22.93006	-1178.860	25.32	30.45
At most 4	0.202051	7.222732		12.25	16.26

Trace test indicates 3 cointegrating equation(s) at the 5% level

Trace test indicates 2 cointegrating equation(s) at the 1% level
*(**) denotes rejection of the hypothesis at the 5%(1%) level

Table- 4, reports the eigen-value and trace test of Johansen and Juselius (1991).This result indicates the existence of a stable long run relationship among the variables.

Error Correction Models

In this section error-correction models have been estimated following the Engle-Granger general to specific method. The general error-correction model for employment estimated for the macroeconomic determinants.

The presence of cointegration implies that there are stable long run relationships among the variable. However, in the short run they may be disequilibrium. The process of equilibrium can be obtained through the error correction mechanism. The error correction mechanism shows that there exist short run adjustments towards long run relationship among the considered variables implying that the GDP at current price, Remittances, Oil Price, Foreign Exchange Rate and Number of Migrant as the significant determinates of Remittance Determinates for Bangladesh.

Error Correction:	D(FER)	D(GDPCP)	D(NM)	D(OP)	D(RMTNC)
CointEq1	0.053498 [0.60689]	23263.39 [0.87219]	7.649137 [1.71764]	-0.013585 [-0.95679]	-115021.0 [-0.13300]
D(FER(-1))	0.468317 [1.77365]	59724.17 [0.74755]	-13.22188 [-0.99122]	-0.007133 [-0.16773]	-2129278. [-0.82197]
D(FER(-2))	-0.248401 [-0.96021]	79816.32 [1.01969]	-19.23131 [-1.47153]	-0.010916 [-0.26198]	1050030. [0.41372]
D(GDPCP(-1))	6.96E-07 [0.54083]	-0.382255 [-0.98232]	0.000110 [1.68910]	-2.00E-08 [-0.09662]	4.957469 [0.39291]
D(GDPCP(-2))	4.93E-07 [0.52661]	-0.148353 [-0.52374]	8.59E-05 [1.81548]	1.66E-07 [1.09781]	13.61986 [1.48293]
D(NM(-1))	-0.008078 [-1.01413]	240.1513 [0.09964]	-0.522007 [-1.29718]	-0.001381 [-1.07644]	-92351.67 [-1.18172]
D(NM(-2))	-0.006651	-358.3577	-1.362841	-0.002776	-202685.8

	[-0.81406]	[-0.14495]	[-3.30166]	[-2.10972]	[-2.52847]
D(OP(-1))	0.278021	374191.2	-67.57670	-0.108590	-13924960
	[0.11866]	[0.52780]	[-0.57090]	[-0.28774]	[-0.60577]
D(OP(-2))	-3.489698	-346999.9	409.4771	-0.053864	78089218
	[-1.71543]	[-0.56374]	[3.98439]	[-0.16439]	[3.91264]
D(RMTNC(-1))	7.46E-08	0.020938	2.96E-06	-1.35E-08	-0.465666
	[1.25196]	[1.16130]	[0.98459]	[-1.40637]	[-0.79654]
D(RMTNC(-2))	3.30E-08	0.017528	8.88E-06	1.18E-08	1.370278
	[0.49535]	[0.86920]	[2.63773]	[1.09625]	[2.09563]
C	0.227231	-611389.5	-123.8497	0.364312	5491467.
	[0.11294]	[-1.00430]	[-1.21849]	[1.12421]	[0.27820]

t-statistics in [ ]

Summary and Conclusions

The paper applies cointegration and error-correction models to explain the macroeconomic determinates in Bangladesh. The major contribution of the paper is to address the issue of the short run dynamics of the long run relationship among the considered variables. The study found that GDP at current price, Oil Price, Foreign Exchange Rate and Number of Migran are significant for macroeconomic determinants as well as stable long run and short run relationship.

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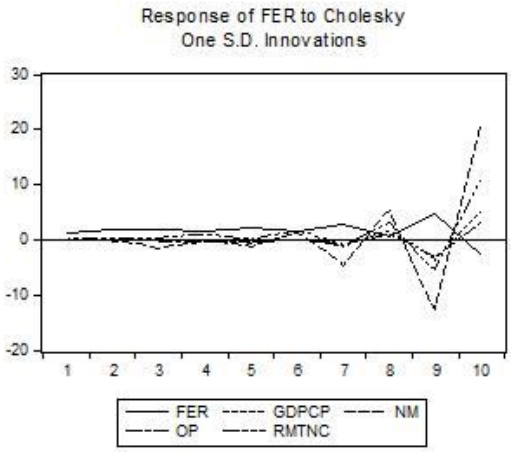
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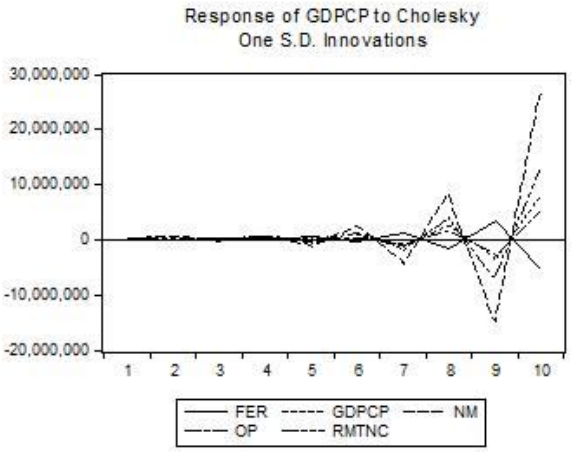
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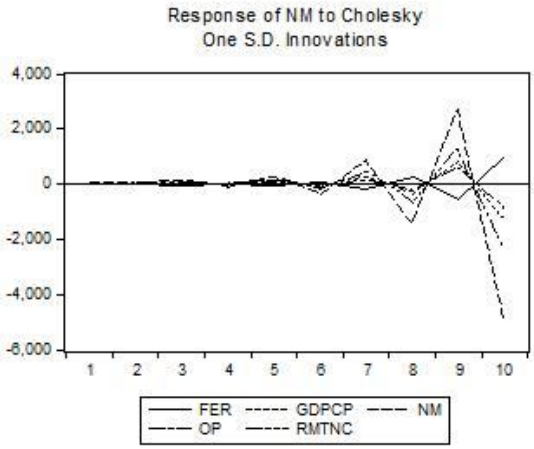
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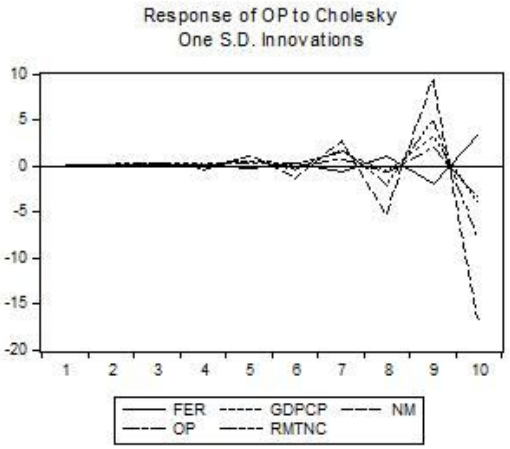
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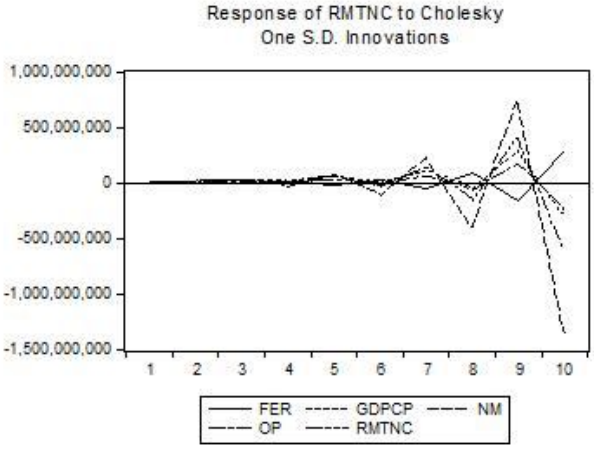
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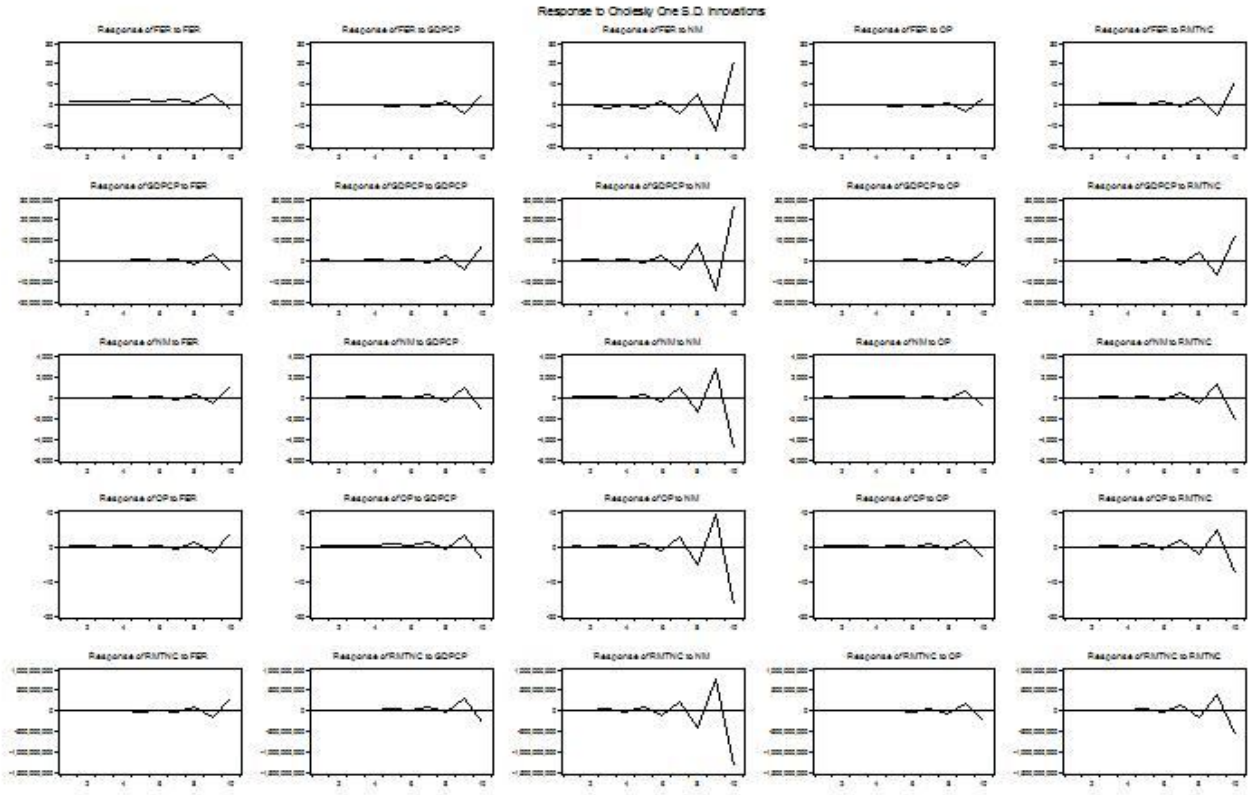
Response to Cholesky One S.D. Innovations
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