



THE DETERMINANTS OF WORKER REMITTANCE IN TERMS OF FOREIGN FACTORS: THE CASE OF BANGLADESH

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Abstract:

The aim of this study is to investigate the determinants of worker remittance of Bangladesh. Instead of traditional approach of estimating the remittance determinants, here we propose to use foreign macroeconomic indicators as a proxy determinant to avoid endogeneity. We also used panel estimation technique in our study to incorporate country specific heterogeneity of remittance inflow of Bangladesh. According our study any changes in the number of labor force, consumer price index, export, import, government expenditure and devaluation or appreciation of host countries (origin of the remittance income) currency can significantly influence the inward remittance income of Bangladesh.

Key words: *Remittance, Panel study, Endogeneity Bangladesh*

1. Introduction

International migration has become an important aspect of globalization and a major issue in international relation. Income received from the migrant workers has also become one the most important source of income for many developing countries like Bangladesh, where the remittance income to total export ratio is more than 40%. Over the last 24 years, remittance inflow to Bangladesh has amplified from \$779 million in the year 1990 to \$15316 million in the year 2014-15 (Foreign Exchange Policy Department, Bangladesh Bank). Moreover, in recent years the inflow of remittance income has exceeded the foreign direct investment to the country. Recent studies have found that remittance inflows help low income countries like Bangladesh to have adequate foreign reserve. A study conducted by Ratha et. al. (2010) stated that the current account deficit as a percentage of gross domestic products in the absence of remittance income could have been doubled in recent years. In a

developing country like Bangladesh remittance income helps to maintain a current account surplus.

Against the background provided above this paper analyzes the determinants of remittance in Bangladesh in terms of foreign factors. The paper will mainly focus on the external factors that affect Bangladeshi remittance income. The variables we have taken are changes in FDI, labor force, export, import, consumer price index, consumption expenditure, government expenditure, and exchange rates of the host countries. We have included 13 countries as host country from which Bangladeshi workers send remittance based on the availability of the data and Bangladesh is considered as the home country.

Most of the models that so far have been developed are from the micro based point of view and home country's macroeconomic factors. An individual's remitting behaviour is in general characterized by a combination of individual attributes defining socio- demographic variables like education, age, family status, profession as well as some domestic macro-economic variables like interest rate differentials, domestic inflation and unemployment rate, domestic growth etc. The problem of this approach is in evidently there is a higher possibility of endogeneity. On the other hand, while discussing about the macroeconomic factors of the determinants of remittance researchers mostly concentrated on variables like living standard, interest rates volatility, insurance motives and length of stay in the host country. This is not to disagree that these variables does not affect remittance inflow in general; because remittance inflow will certainly depend on his utility function in accordance with his altruistic behaviour as well as his family's living standard, socio-economic status, debt etc. on home country. But, as we have mentioned before, this will in general cause endogeneity and consequently run the risk of biased estimation. Instead of such approach we focus on the macro variables of host countries labour market conditions and standard of living which explains workers earnings potential and saving behaviour which in turn we argue influences worker's remittance inflow. Since, foreign countries macroeconomic variables are exogenous to inflow of remittance to Bangladesh by default the remittance inflow will give us an unbiased estimation.

The objective of this paper is to find out which macroeconomic conditions in the host countries have significant impact on the income of the migrant workers in those countries. Researchers have shown that the internal factors like age, education level, family background, home country interest rate, exchange rates and cost of migration have considerable impact on home country remittance income. The remittance recipient country can influence them to increase the flow of remittance. On the other hand, Bangladesh as a remittance recipient country cannot influence the external dynamics like host countries economic growth, consumption expenditure, export, import, population growth etc. Meaningful researches are necessary to determine the unsystematic factors that have an effect on the remittance inflow in Bangladesh.

2. Literature review

Workers from low income countries like Bangladesh generally migrate to rich countries so that they can have access to better income to support their family. Most of authors while discussing about the motives of sending remittance pointed out altruism (Schiopu and Siegfried, 2006, Bouoiyour and Mifat, 2015). Strong attachment to the family left behind in the home country is one of the main internal determinants of remittance. Measuring the determinants of remittance has been a very popular field of study for the researchers especially, in countries where remittance income plays an essential role in social and economic development.

Schiopu and Siegfried (2006) examined the importance of altruistic motives for remitting money using panel data set from 7 European countries. The study concluded that altruism is an important motive for sending money to home country and it also concluded that migrant workers skills has positive relationship with remittance income. Furthermore, Jackman (2013) carried out an empirical study to find the macroeconomic determinants of remittance volatility. The panel data analysis declared that dependency ratio, economic shocks, natural disaster, interest rate volatility, exchange rate volatility, economic volatility and migrant workers skill have significant impacts on remittance income. Again, Nishat and Bilgrami (1993) analyzed the determinants of remittance income for Pakistan from the gulf region. They found that one of main determinants of remittance income was supporting family members and the migrant's motivation towards accumulating property and starting a new business. The study also concluded that variables like age, education level and urban outgoing migrant's have positive correlation with the remittance income. Similar views were expressed by Miotti, Mouhoud and Oudinet (2010) who showed in their research that the first come and unschooled migrants tend to send more remittance than recently migrated workers. Their research found that the oldest migrants have more attachment to their country and society but the motive of the recent migrants are explained by repulsiveness and insecurity factors.

In another study Hasan (2008) conducted a time series econometric analysis of the determinants of the remittance inflow in Bangladesh. He found that inflation rate negatively affects the remittance inflow on the other hand interest rate and exchange rate have positive impact on the remittance income for Bangladesh. In a comparable research, Aydas, Neyapti and Ozcan (2005) also worked on a paper to analyse the determinants of workers remittance in Turkey. The study examined a various range of variables like income levels, black market premiums, inflation and growth in home country. The empirical evidence of the paper shows that black market premiums and inflation negatively influence the remittance inflow. But variables like political and economic stability; exchange rate has positive impact on the remittance inflow in the Turkish economy. The paper also concluded that improving financial intermediation and preventing exchange rate fluctuations can increase the remittance inflow.

Studying various research papers we have found interesting information on the relationship between the impact of GDP growth and remittance income. Buch and

kuckulnez (2004) found that economic growth in the source/host country have no effect on the remittance income of the host country but Gupta (2005) in her paper reported that India receives more remittance when the economic growth is low in the home country. Again, Lin (2011) in his study for the IMF working paper found that that GDP growth and lower unemployment rate increases the remittance inflow of Tonga. He also found the remittance income of Tonga falls with an appreciation of the currency of the country. Omeje and Asogwa (2013) calculated the determinants of remittance for 21 African countries using GMM estimation. The estimation result showed that GDP per capita, tax revenue and real exchange rate of the home country have negative effect on remittance income. However, age dependency ratio, lending rate and inflation are positively related to on remittance receipt. Elkhider et al (2008) conducted an empirical study on the determinants of remittance of Morocco. The authors concluded that exchange rate has a negative effect on remittance and agricultural GDP has positive effect on inflow of remittance. A very intersecting finding of their research is that migrant workers who had strong attachment with their family and country sent more remittance than other migrants. The authors concluded that most credible explanations for remittance from the migrants of Morocco were altruism and solidarity. Furthermore, Elbadawi and Rocha (1992) studied on the determinants of remittance for six countries. The empirical result of the research demonstrates some macroeconomics variables as the key to determinants of remittance. Those variables are number of workers working abroad, level income of the host country, length of stay, and inflation of the host country, exchange rate premium and interest rate differentials. According to Arun and Ulku (2011) variables such as income, employment, education of the migrant worker, linkages to the home country and host country are important determinants of remittances. In addition, Bouoiyour and Miftah (2015) stated in their study that remitting money back home is strongly associated with workers personal characteristics such as, migrant income, gender and age. Likewise, Emmanuel et.al (2012) in their empirical research found that personal characteristics like, education level, being a male and type of employment have significant positive impact on remittance inflow to the home country.

On a different note, some of the earlier studies focused on finding the impact of macroeconomic factors on remittance income. Katselli and Glytsos (1986) established that though remittance is related to interest rate change it is not related to the macroeconomic environment of the home country and Wahba (1991) in his research also suggested that good government policy and sound financial intermediation system has positive impact on the remittance inflow of a country.

3. Model

The specification of the model used in the analysis is given below:

Let r_{it} be the remittance that individual i will remit at time t . So, We define

$$R_{it} = \sum r_{it} = f(\varphi, L, g, c, e, m, t, r, z) \dots\dots\dots (1)$$

Where, R_{ct} is the total remittance from country C at time t , p is the cost of living at the host country, l is the labor force, g is the government expenditure, c is the consumption expenditure, e is export, m is import, i is the FDI of the host country, r is the exchange rate and z is all other variables.

The null hypothesis of this study is,

Hypothesis 1: H_0 = Host country FDI has no significant relationship on home country's inward remittance.

Hypothesis 2: H_0 = Host country FDI has no significant relationship on home country's inward remittance.

Hypothesis 3: H_0 = Host country labor force has no significant relationship on home country's inward remittance.

Hypothesis 4: H_0 = Host country Export has no significant relationship on home country's inward remittance.

Hypothesis 5: H_0 = Host country Import has no significant relationship on home country's inward remittance.

Hypothesis 6: H_0 = Host country Consumption Expenditure has no significant relationship on home country's inward remittance.

Hypothesis 7: H_0 = Host country Government Expenditure has no significant relationship on home country's inward remittance.

Hypothesis 8: H_0 = Exchange rate has no significant relationship on home country's inward remittance.

Hypothesis 9: H_0 = Host country Price has no significant relationship on home country's inward remittance.

In short the null hypothesis states that the host countries macroeconomic variables has no significant relationship on home country's inward remittance.

4. Empirical Framework, Data and Methodology

The purpose of this section is to present the empirical specification, data description and econometric strategies applied in this study. The first section outlines the empirical framework following the data description used in this study. The last section describes the methods and reasoning of estimation strategies.

4.1. Empirical Framework:

It has been discussed in the previous sections that most of the literature has focused on the worker specific characteristic data to analyze remittance inflow. Also the literatures have focused on home country macroeconomic indicators. Most of the studies have used either time series analysis over a period of time or estimated through a single point of time through worker characteristics. Most of these studies run the risk of endogeneity problem and biased estimates because of unobserved heterogeneity. Some studies tried to fix this problem with longitudinal data from surveys with panel estimation technique (Jackman, 2013 and Omeje and Asogwa,

2013). The advantage of using panel estimation technique is it takes care of unobserved heterogeneity of country specific data which also have more degrees of freedom because of more information. These advantages create more precise estimates. But these studies also focused on worker specific characteristic and not on the host country factors.

Thus, we propose the following general specification of the panel model:

$$\begin{aligned} \text{remittance}_{it} = & \beta_0 + \beta_1 \ln_FDI_{it} + \beta_2 \ln_Labor_Force_{it} + \beta_3 \ln_Export_{it} + \beta_4 \ln_Import_{it} \\ & + \beta_5 \ln_CPI_{it} + \beta_6 \ln_Consumption_Expenditure_{it} \\ & + \beta_7 \ln_Government_Expenditure_{it} + \beta_8 \ln_Exchange_Rate_{it} + \varepsilon_{it} \text{ for } i \\ & = 1, 2, \dots, N \text{ and } t = 1, 2, \dots, N \dots \dots \dots (2) \end{aligned}$$

Here, the subscripts *i* and *t* describes the cross-sectional and time series dimension respectively for each variables of host country. The error term is ε_{it} . The other variables are self-explanatory.

4.2. Data

This study has constructed a panel of 13 countries: South Korea, Japan, Germany, USA, UK, Singapore, Malaysia, Italy, Hong Kong, Australia, Iran, Kuwait and KSA, from the year 2000 to 2014, a total of 182 observations, from World Bank data set and other sources. The countries are chosen as the top 13 country from which Bangladesh gets her highest remittance on average in accordance with data availability. Because of data unavailability we had to exclude important countries like, UAE, Bahrain and Qatar. But we think these 13 countries will be representing enough for the remittance situation for Bangladesh as a whole.

The variables that we have used in this study are described below:

1. **Remittance:** The remittances data series are expressed in millions of dollars. The data series is constructed from the UNCTAD secretariat calculations, based on World Bank, *Migration and Remittances*. Migrants' remittances are the sum of workers' remittances, compensation of employees and migrants' transfers. Migrants' transfers cover for flows of goods and changes in financial items that arise from migration (change of residence for at least one year).
2. **Final consumption expenditure** (current US\$): Final consumption expenditure (formerly total consumption) is the sum of household final consumption expenditure (private consumption) and general government final consumption expenditure (general government consumption). Data are in current U.S. dollars. The data was collected from World Bank national accounts data, and OECD National Accounts data files.
3. **General government final consumption expenditure** (current US\$). General government final consumption expenditure (formerly general government consumption) includes all government current expenditures for purchases of goods and services (including compensation of employees). It also includes most expenditures on national defence and security, but excludes government military expenditures that are part of government capital formation. Data are in

current U.S. dollars. The data was collected from World Bank national accounts data, and OECD National Accounts data files

4. **Foreign direct investment, net inflows** (BoP, current US\$). Foreign direct investment are the net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. This series shows net inflows (new investment inflows less disinvestment) in the reporting economy from foreign investors. Data are in current U.S. dollars. The data is available from International Monetary Fund, Balance of Payments database, supplemented by data from the United Nations Conference on Trade and Development and official national sources.
5. **Labor Force**: Total labor force comprises people ages 15 and older who meet the International Labour Organization definition of the economically active population: all people who supply labor for the production of goods and services during a specified period. It includes both the employed and the unemployed. While national practices vary in the treatment of such groups as the armed forces and seasonal or part-time workers, in general the labor force includes the armed forces, the unemployed and first-time job-seekers, but excludes homemakers and other unpaid caregivers and workers in the informal sector. The labour force data is assembled from International Labour Organization, using World Bank population estimates.
6. **Exports of goods and services** (BoP, current US\$): Exports of goods and services comprise all transactions between residents of a country and the rest of the world involving a change of ownership from residents to non-residents of general merchandise, net exports of goods under merchant, nonmonetary gold, and services. Data are in current U.S. dollars. From International Monetary Fund, Balance of Payments Statistics Yearbook and data files.
7. **Imports of goods and services** (BoP, current US\$): Imports of goods and services comprise all transactions between residents of a country and the rest of the world involving a change of ownership from non-residents to residents of general merchandise, nonmonetary gold, and services. Data are in current U.S. dollars. . From International Monetary Fund, Balance of Payments Statistics Yearbook and data files.
8. **Consumer price index** (2010 = 100): Consumer price index reflects changes in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. The Laspeyres formula is generally used. Data are period averages. International Monetary Fund, International Financial Statistics and data files.
9. **Exchange rate**: The exchange rate is presented as the amount of Bangladeshi Taka traded for each country's foreign currency at the end of the year. Economic Data, Bangladesh Bank.

4.3. Estimation Strategies:

This paper applies widely used panel estimation techniques like Pooled Ordinary Least Squares (POLS), Panel model with Fixed Effects and Random Effects. We estimate and analyse these models and determine the best model through Hausman test and LM test.

We aim to establish the determinants of remittance by using panel data estimation method for our model with following specification:

$$\text{remittance}_{it} = \alpha_i + \beta_1 \ln_FDI_{it} + \beta_2 \ln_LF_{it} + \beta_3 \ln_Export_{it} + \beta_4 \ln_Import_{it} + \beta_5 \ln_CPI_{it} + \beta_6 \ln_GE_{it} + \beta_7 \ln_GB_{it} + \beta_8 \ln_EXR_{it} + u_{it} \dots (3)$$

Pooled OLS:

The Pooled OLS estimator pools or combines the cross section and time series aspects of the data. If the model is

$$y_{it} = x_{it}'\beta + u_{it}, t=1, \dots, T \text{ and } i= 1, \dots, N \dots \dots \dots (4)$$

with t as time data and i as individual cross sectional data, then through simple OLS estimation, one can obtain Pool OLS estimator. The assumption here is $E[x_{it}u_{it}] = 0$, with additional assumption that error u_{it} is uncorrelated with regressors in periods other than the current period, i.e. $E[x_{it}u_{it}] = 0, s \neq t$. However, if u_{it} are correlated over t given i , then this estimator is invalid and produce downward bias. The pooled model is inconsistent if the true model is fixed effect model.

Fixed Effect and Random Effect Model:

If we allow for individual specific effects which means each cross sectional units has a different intercept term then the model becomes:

$$y_{it} = \alpha_i + x_{it}'\beta + u_{it}, t=1, \dots, T \text{ and } i= 1, \dots, N \dots \dots \dots (5)$$

where α_i is the individual specific effect.

Fixed effect model treats α_i as unobserved random variable that is potentially correlated with the observed regressors x_{it} . On the other hand, the Random effect model treats the unobservable individual effects α_i as random variables that are distributed independently of the regressor. With additional assumptions $\alpha_i \sim [0, \sigma_\alpha^2]$ and $u_{it} \sim [0, \sigma_u^2]$.

5. Empirical Results

Here we present the Pooled OLS results in table 1. In the pooled model we see that FDI is significant at 5% level and import, price level, consumption expenditure, government expenditure and exchange rate are significant at 1 % level. Labor force and export is not significant in this model. The adjusted r-square is about 35% meaning the model is explaining 35% of the variations.

Table 1: Dependent Variable: Log of Remittance		
	Pooled OLS Model	
Variables	Coefficients	t statistics
Log of FDI	-.2091923**	-2.34
Log of Labor Force	.3774455	1.21
Log of Export	.1680946	0.75
Log of Import	.8397577***	3.28
Log of CPI	5.671842***	5.18
Log of Consumption Expenditure	-4.512341***	-7.47
Log of Government Expenditure	3.865048***	7.99
Log of Exchange rate	0.3853012***	2.95
Constant	-13.93391***	-2.87
R^2	0.3831	
Adj R^2	0.3564	
***, **, * denotes significant at 1%, 5%, and 10% levels, respectively		

In table 2 we observe both the results of Random Effects and Fixed Effects models.

Table 2: Dependent Variable: Log of Remittance				
	Random Effect Model		Fixed Effect Model	
Variables	Coefficients	Z statistics	Coefficients	t statistics
Log of FDI	-.072909	-1.51	-.0568766	-1.15
Log of Labor Force	-1.153237***	-3.51	-.9353638***	-2.66
Log of Export	.545532***	2.40	.3850752	1.52
Log of Import	.3339318***	2.54	.3192022**	2.42
Log of CPI	2.959712***	3.68	1.274483	1.28
Log of Consumption Expenditure	-3.660876***	-7.28	-3.454301***	-6.65

Log of Government Expenditure	4.726798***	9.96	5.149673***	10.18
Log of Exchange rate	-0.1566954**	-2.11	-.2351165***	-3.01
Constant	-18.85116***	-5.55	-25.93811***	-5.94
R^2 Within	0.7398		0.7468	
R^2 Between	0.0697		0.0054	
R^2 Overall	0.1810		0.0516	
***, **, * denotes significant at 1%, 5%, and 10% levels, respectively				

In the random effect model FDI is not significant but all other variables are significant at 1 % level and exchange rate at 5 % level. In the fixed effect model the FDI is also not significant. In addition export and price level is also not significant in the FE model. All other variables are significant at 1 % level except import which is significant at 5 % level in the FE model. The sign of all the variables are same for both Random Effects and Fixed Effects model. The values of the coefficients are also not that far off from either model. This raises the question which model is better? To answer this question we first conducted Hausman test between Random Effect and Fixed Effect model. The result is given in table 3 in the following:

Ho : Difference in coefficients not symmetric	
Chi squared (8)=	10.35
Probability > Chi-squared=	0.2415

Here, the null hypothesis is that the random effect is the preferred model. The hypothesis is basically test whether α_i is correlated with the regressors and the null hypothesis says they are not. From table 3 we see the probability value is 0.2415 and thus cannot reject the null hypothesis implying that random effect model is the preferred model. We also checked Breusch-Pagan Lagrange Multiplier test for Random Effects. This test indicates whether Random Effect or Pooled OLS is the preferred model. The null hypothesis is that the variances across entities are zero meaning there is no panel effect. The result of the LM test is given in table 4 below:

	Variance	Standard deviation
Log of Remittance	4.286495	2.070385
Residual e	.3511739	.5925992
Residual u	4.491233	2.119253
Test: Var(u) = 0		
	Chi bar-squared (01)	715.15
	Probability> Chi bar-squared	0.0000

Here from table 4 we can see that we can reject the null meaning there exist random effect and random effect model is preferred.

Analysing all these tables clarifies that Random Effect model produces better conceivable results. Such as, 1 % of host countries increased export and imports leads to about .55 % and .34 % increase in Bangladesh's inward remittance respectively. Similarly, 1 % of host countries increased consumption and government expenditure raises the inward remittance of Bangladesh by 2.96 % and 4.73 % respectively. Both exchange rate and labor force shows negative relationship with inward remittance income of Bangladesh. According to the results as the currency of Bangladesh appreciates against the host countries currency the remittance income falls. This is plausible because, as the home countries currency appreciates there is less incentives for the Bangladeshi workers to remit. Again any changes in the labor force of the host countries have a significant impact on the inward remittance income. The results show a 1 % increase in host countries total labor force reduces the remittance income of Bangladesh by 1.15 %. This result suggests that host countries increased labor force substitutes the Bangladeshi workers in the job or makes the job market more competitive. This reduces the capability of the Bangladeshi workers to send money back to Bangladesh.

6. Conclusion

The importance of inward remittance income for the economic growth of Bangladesh is a proven fact. Like any other developing nation inward remittance facilitates in, boosting up private consumption, domestic investment and overall income of the population. Thus, researchers have been keen on finding the determinants of inward remittance income. The issue has a special significance for a heavily populated and under developed country like Bangladesh. However, most of the researchers have focused on the internal factors or issues that Bangladesh can change like, human capital, cost of migration, and exchange rate of BD Taka as determinants of inward remittance. Yet, no attempts have been taken to understand some of the external

factor which also can heavily influence the inward remittance of a country. The aim of this study was to establish the external determinants that which have considerable effect on the remittance income of Bangladesh. According to the panel study any changes in the number of labor force, consumer price index, export, import, government expenditure and devaluation or appreciation of host countries (origin of the remittance income) currency can significantly influence the inward remittance income of Bangladesh. Policy makers of Bangladesh are trying to improve the remittance income of by developing all the internal factors. Even so we believe that Bangladesh will not be able to reach its full potential of earning remittance income if it only focuses on the reforming the internal factors. To achieve long run growth in inward remittance Bangladesh needs to find new labor markets where they can send its workers both skilled and unskilled. While trying to uncover new markets for the workers of Bangladesh, the policy makers should also look at the external factors like the expenditure pattern, labor force conditions, foreign trade and consumption pattern of the host country. This, along with managing other internal factors Bangladesh will be able to achieve sustainable growth in remittance income for long term.

7. References

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