

Article history: Received 16 May 2018; accepted 12 May 2019  
DOI: <https://doi.org/10.33182/rr.v4i1.556>

## Impact of International Remittances on Poverty in Bangladesh: Evidence from Household Data

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### Abstract

Although the impact of remittances on poverty is a widely examined topic, only a few studies shed light on this issue at the household level, especially in the case of Bangladesh. This study compares households with and without remittance receivers to estimate the poverty impact of remittances on a regional basis. The dataset used for this study is the Household Income Expenditure Survey (HIES) 2010, obtained from a representative sample of 12,239 households, and collected by the Bangladesh Bureau of Statistics (BBS). Determining propensity scores from the estimation of probit regression, the average treatment effect on the treatment group has been estimated by using nearest neighbour matching and Kernel estimator. Both of the techniques confirm that receiving remittances has an inverse impact on households' propensity of being poor. A regional comparison shows that this propensity is lower in urban areas (11.3 per cent) than the rural areas (16.3 per cent). In both urban and rural areas, per capita consumption expenditure and monthly consumption expenditure vary positively with remittance receipt of the households. Moreover, probit regression estimates that the probability of having migrant members in rural households is 2.8 per cent higher than that of urban households. On the basis of the major findings, the study reaches the conclusion that rural areas show more potential in terms of producing exportable manpower. Appropriate policy in terms of creating an enabling environment both in the destination and home countries should be arranged, especially to facilitate women migration.

**Keywords:** Consumption; International Remittance; Poverty; Propensity Score Matching.

JEL Classification: F14, F24

### Labor Migration and Development

Labour mobilisation from developing to developed world plays an important role in case of economic growth of developing countries in an ever more connected globalised world. Labour migration from developing to developed countries was once viewed as the outcome of development failure or the symptom of under-

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development. But now, there is a growing recognition of the positive impact of labour migration and is considered as the key driver to economic, social and political change (Natali, 2009). Manpower exporting developing nations accrue the benefits from manpower export through remittances. Remittances are the transfers made by the migrants from earnings or the accumulated stock of wealth originated in the host country but sending to the home country (Samuel, 2004). Wahba (1991) provided a useful taxonomy of remittances termed as potential remittances, fixed remittances, and discretionary remittances and saved remittances. Potential remittances are the highest amount that a migrant can transfer at any time to the home country, and it does not entail any further comment on it. Unlike potential remittances, fixed remittances are the minimum transfers that a migrant should send to cover expenses for family needs and other predetermined agreements, which embraces the neoclassical and NELM view of migration as a process of minimising risks and overcoming temporary financial constraints. Discretionary remittances are the amount at the hand of the migrant over fixed remittances. It provides a migrant with a sort of discretion over utilisation of the amount, which is determined by relative incentives and disincentives exists in both host and home countries. Saved remittances are the difference between potential remittances and the amount remitting during a specific period. This is the amount to be used for the economic development of the home country under the stable macroeconomic environment and the instituted incentives targeted to investment and other developmental use of remittances in the home country. Both discretionary and saved remittances have a developmental role to play as discussed in economics based theories of migration.

Although there exists plenty of literature focusing on migration and developmental impact of remittances, absence of any systematic theory of remittances keeps the empirical analysis of remittances in a black hole. Notwithstanding the fact, the contribution made by Lucas and Stark (1985) is widely accepted and considered as the foundation of the contemporary analytical framework of remittances related study. They divide the theories of remittances into three groups, pure altruism, pure self-interest and enlightened self-interest, which analyses remittances at the household level. Migrants may remit from the altruistic viewpoint, where he/she derives positive utility from consumption of the family in the home country. Here the motive is to minimise risk and vulnerability. Therefore, a positive relationship is found between migrant's income and altruism and a negative relationship with a recipient's income. Self-interest view documents that people remit with a view to inheritance aspiration, demonstration



effect in the home country and intention to return home. According to this view, although family at home has been utilising the remittances, migrants send it as a strategy of strengthening family ties and trustworthiness within the family and social acceptance within the community. It may be of use when he/she comes back home. Under the enlightened self-interest view, it is considered that there may be different types of contractual agreements between migrants and their families. People remit to realise those agreements, namely co-insurance, loan repayment and exchange for services (Lucas and Stark, 1995; Zankar and Seigel, 2007).

Direct routes whereby migration has an impact on economic and human development are channelled through social remittances. It incorporates the transfer of knowledge and experience that can be replicated and upgraded to fulfil the local needs and advance the economies of home countries. This impact of remittances, in most of the cases, can compensate the losses of brain drain on human capital development in the home country. Indirect routes through which migration have development role are observed through remittances sent back to the households in the home countries, which have both micro and macro level implications (Natali, 2009). Concerning defining channels to quicken the developmental role of migration, Martin (2006) identifies 3 Rs, which are Return, Recruitment and Remittances.

Remittances are the logical consequence of migration as in this case; there was a prior decision to migrate. Hence, the analysis of remittances cannot be isolated from the analysis of the theories of migration. A handful of theories and approaches make acquainted the phenomenon of international migration and development outcome in social, economic and political dimensions both at the micro and macro level. Until the 1980s, two main theoretic contentions were neoclassical and historic-structural approaches to migration. After the 1980s, New Economics of Labor Migration (NELM) theory appears itself as a theoretical midstream between the two approaches in the way of alleged reconciliation of agency and structure (Abreu, 2010).

Neoclassical theory of migration is the application of features and assumptions of traditional neoclassical economics in terms of methodology, rationality, hypothesis as well as optimisation principles to posit migration within the broader schema of development outcome. In conceiving human migration as a process, which intimately linked with development and growth, different scholars tried to make an inductive attempt to draw general inferences from a wide variety of behavioural pattern of agency as well as structural,

attractive and repulsive features of both areas of origin and destination (Abreu, 2010).

Neoclassical theories or economics based approaches of migration consider both macro and micro perspectives in case of analysing the migration decision of an individual. According to this stream, geographical heterogeneity in terms of labour supply and labour demand and conjugated wage variability among labour abundant and capital abundant economy lead to migration decision, which was established by the seminal works of Hicks, Lewis, Harris and Todaro. When the economy is assumed to be in full employment, migration decision varies linearly with wage differentials remarkably (Kurekova, 2011). Anthropological and Sociological approaches have a better explanation of migration at the household level, which incorporates social factors that influence migration decision. In anthropological approaches to migration, it is recognised that migration decision cannot be taken in a super controlled environment; rather it is constrained by different social factors at both micro and macro level. Global migration is a long term process, which is subject to the change in both demand and supply side factors over the time period (Cohen and Sirkeci, 2016).

Theoretical connotation of historical-structural approaches focuses on different dimensions of the migration process, which documents migration as the way of fulfilling structural requirements of the developed industrialised countries. The inherent dualism, according to this approach, exists in advanced industrialised nations are characterised by primary labour market occupied with high skilled and well-paid native labours mostly, whereas secondary labour market preserves an established occupational hierarchy attracts unskilled workers for jobs at the bottom of job prestige hierarchy. Another connotation of this approach presents the migration process as a natural consequence of economic globalisation of the developed countries, which eventually attracts emigration from the poorer countries of the world. Apart from these two approaches, NELM lies in between the structural orientation of historical-structural perspective and agency emphasis of neoclassical theory. It considers migration as a family decision, aiming at minimising risks and overcoming temporary financial constraints (Abreu, 2010; Porumbescu, 2015).

World Bank's recent estimate of remittances inflow to developing nations is \$466 billion, which has increased by 8.5 per cent. In recent decades, the contribution of international remittances on the pathway of development of developing countries is immense as they constituted a significant portion of the GDP. Remittances at the time of economic downturns influence both remittance inflow and its



utilisation. When major migrant destination countries faced an economic downturn, they failed to absorb workers from developing nations. Thus, in 2009, remittances inflow to that of developing nations fell by around six percentage point, though it had an upward sloping trend until 2008 (Ratha and Sirkeci, 2011).

International migration is the source of significant economic and noneconomic benefits for the families of the migrants and their receiving countries. Again it is a source of funds for rural development, for safety nets during shock and emergency and for productive and social purposes. Fiji experienced mentionable (60 per cent) outflow of skilled professional to foreign countries, which has particularly been useful for rural households' crop production and crop diversification. This use of remittances endorses the opposite of the general belief and earlier findings that remittances are mostly used for food consumption. Rather it has more productive uses in terms of education expenses, and housing and agricultural diversification (Xing, 2018).

Sing (2018) analysed the impact of remittances from the sociological viewpoint unlike many other studies in remittances literature. That study documents remittances as the outcome of male outmigration in two randomly selected villages of Uttar Pradesh of India. Households find remittances as a powerful tool to fight against poverty and population pressure. But this economic gain of the female-headed households is offset by the increased workload of them within the family and in the agriculture-based activities. This situation, along with with other disadvantages, for example, the inability to take a decision and lack of financial autonomy impede women empowerment to a greater extent, although remittances exert a significant positive influence on economic ground. Likewise, Ali et al. (2017) explored another sociological impact of remittances on 328 rural emigrant households in eight villages of Kushinagar district in Eastern Uttar Pradesh in India. The study concludes that other than larger economic gain, labour migration and remittances reshape the intra-household family structure and emigrant households' individual and community behaviour as well as redesign the caste systems, especially in case of performing assigned set of activities.

So far we have evidence of positive impacts of remittances on economic development of a country. If we flip the coin, a study conducted by Lipton (1999) has introduced three distinct damaging impacts of remittance that worth considering in analysing the impacts of migration and remittances. First, this is hard to manage household agricultural activities by other family members in the absence of young male members. That shrinks agricultural yields. Then comes

unproductive utilisation of remitted money, for example, the use of remittances for consumption rather than productive investments. And lastly, with an increment of remitted amount, recipients achieve a better living standard without hard work and thus dependency increases due to leisure-labour substitution.

However, the utilisation of remittances to economic growth is dependent on financial sector development, which makes a bridge between households' savings out of remittances and domestic investment. In this case, the analysis made by Jayaraman et al. (2018) suggests greater financial inclusion for Asia Pacific Countries (PICs) through the spread of branchless banking and the advancement of information and communication technology.

### **Remittances and Development: Bangladesh Case**

Remittance earning has a positive association with macroeconomic indicators in Bangladesh, for example, the balance of payment, money velocity, savings and investment along with foreign exchange reserve (Ali, 2014). Available evidence shows that the size of the households, the status of human capital, work experience abroad and other earnings significantly affect remittances earning in Bangladesh. Households use almost half of the earned remittances for only consumption of food items, and the rest amount is spent on other purposes. Realising the current situation in utilising remittances, the reviewed study emphasises on enhancing training and skill of the manpower in order to broaden the scope from earning abroad and also for the creation of investment spheres (Kumar et al., 2018).

In other cases, remittances inflow may not be directly channelled to the development process through investment and efficiency. That is why Wadood and Hossain (2015) have paid heed to the overall economic growth rather than concentrating around a sole indicator. By using World Development Indicator data, covering over 40 years of the time period of 1972-2013, they have got the positive and one-way causal relationship between remittances and economic growth in Bangladesh.

Based on the analysis above, it can be said that the positive impact of international remittances on economic growth and households' living standard is evident in Bangladesh. But it is important to mention that households living in urban and rural areas differ in their socio-economic, demographic and institutional structure, which might have an impact on exploiting the benefits derived from international remittances. In this backdrop, making a regional comparison concerning poverty impact of international remittances within Bangladesh is a crying need because rural-urban differences in



education rate, skill development, access to training, employment opportunity and demographic composition are evident by the recent literature.

The determinants of international migration and scope to utilise remittances and poverty impact of it are not equal in urban and rural areas separately. Considering this research gap in the background, this study is an attempt to estimate the impact of international remittances in rural-urban context. Findings of this study would be an important guideline to the policy makers in the way of devising policies toward international migration. Especially, it is needed to focus on rural region to facilitate and encourage migration. Regarding this, the female participation rate in international migration should be patronised as female constitutes almost half of the total population. A paper conducted by Iqbal (2013) on poverty and international migration has suggested somewhat different policy. That is the issuance of remittance bond for the remitters for encouraging them to send remittance in the home country. It will both work as a multiplier effect and as a source of reserve growth of the central bank.

Moreover, according to the findings of that study, it has been observed that remittance promotes higher marginal propensity to consume for rural people than that of urban people. Though the average deviation is quite low, yet higher marginal propensity to consume denotes lower marginal propensity to save, thus creating a saving gap at the micro level and hampers productive investments. Therefore, the study of this kind is of immense importance in a way to introduce policy towards the productive investment of remittances that will sustain the level of solvency of rural people.

### **Role of International Remittances: Findings from Available Literature**

International remittance is considered as one of the most effective tools in case of attaining financial solvency of the lower income households. In a macroeconomic sense, remittances substitute for financial development in poverty alleviating process (Inoue, 2017). Imai et al. (2014) shed light on the effect of remittances on GDP per capita by using annual panel data for 24 Asia and Pacific countries.

They find remittance inflows are beneficial, but the volatility of it along with FDI inflows is bad for economic growth. But the study concludes that remittances contribute to poverty reduction through its direct effect. By using generalised methods of moments to panel data, Inoue et al. (2017) analyse the interaction effect of remittances and financial development on poverty conditions of 120 developing countries from the period of 1980-2013. The authors find that financial development and remittances inflow jointly improve poverty level

and remittances substitute for financial development in poverty alleviating process. Akobeng (2015) evaluates the effectiveness of remittances inflow from a macro perspective. By controlling for time-invariant country-specific effects and endogeneity, he finds that remittances reduce poverty, but the effectiveness of it depends on how well the financial sector performs in Sub-Saharan Africa. Acosta et al. (2008) find that remittances in Latin America and Caribbean (LAC) countries have increased growth and reduced poverty and inequality.

At the household level, remittances have an impact on higher investment in physical assets and education and health. It also enhances access to a larger pool of knowledge base and hence, has a role to play in human capital formation. In the national economy, remittances promote financial development in the long run and foster growth and reduce poverty (Fromentin, 2017). It is found by Brown and Jimenez-Soto (2015) that remittances have a direct relationship with income and village inequality indicators. Similar findings were derived from the study based on Morocco's living standard measurement survey data, which shows that international remittances have a statistically significant positive association with the expenditure pattern of the recipient households. Apart from this finding, Bouoiyour and Miftah (2014) have concluded that besides improving the living standard of Moroccan families, it also lessens a household's tendency to be poor. This is because private, and public transfers often constitute a significant component of total household income and hence contribute to the reduction of income poverty and the increase of the investment in human capital in certain developing countries. Analysis done by Semyonov and Gorodzeisky (2008) compares households with and without remittance receivers of Philippines households. The authors measure the impact of remittances on households' contribution to income and standard of living and find that most of the remittances are used for consumption purposes, which in turn is the basis of the difference in wellbeing between remittance receivers and non-receivers.

Moreover, the same study finds that households with overseas migrants have different social and demographic composition. For example, remittance receivers have higher education status and younger age structure than the non-receiver group. Adams and Cuecuechae (2013) analyse the impact of both internal and international remittances on investment and poverty in Ghana. They find that households receiving remittances spend more at the margin on three investment goods- education, housing and health. Considering Ghana as a case study, they conclude that remittances





have a great likelihood of reducing household poverty in developing countries. While investigating the causal effect of international migration and remittances on poverty, Adams and Page (2005) have found a significant negative impact of an increasing share of migrant people within a total population on the number of people living below the poverty line. They have used an instrumental variable regression analysis to control for the endogeneity of the international remittance and other factors. The study findings suggest that a 10 per cent increase in the number of international migrants within the economy will lead to a 2.1 per cent decline in the number of people below the defined poverty threshold on an average (\$1.00 per person). Similarly from the perspective of remittance earning, a 10 per cent increase in earning of per capita official international remittances results in a 3.5 per cent decline in the share of people living below the poverty line.

Applying computational general equilibrium modelling in Bangladesh, Raihan et al. (2009) suggest that 1.7 out of the 9 percentage point reduction in the headcount ratio during 2000–2005 was due to the growth in remittances. But Nepal simulation study done by Acharya & Leon-Gonzalez (2012) provides evidence of increasing poverty incidence, poverty gap and poverty severity in short-term. More poor households send their household members to abroad in Nepal whereas, from other countries the comparatively well-off households send their members to abroad. This fact might lead to a different experience for Nepal. Based on a longitudinal panel dataset, the descriptive statistics suggest that the share of extreme poor declined in foreign migrant villages in Bangladesh from 9 per cent in 1988 to 1 per cent in 2000, but the proportion of moderate poor increased over time in the same villages (Hossain & Bayes, 2009).

The impact of inequality on migration is also mixed. McKenzie (2006) in Mexico, Nguyen et al. (2011) in Vietnam and Acharya & Leon-Gonzalez (2012) in Nepal suggest a reduction in expenditure inequality due to migration and remittances. Majeed (2015) also suggests that a country enjoys a positive effect of remittances on inequality if it has a higher level of financial development. Using Heckman specification technique based on household survey data collected in 1991, Barham & Boucher (1998) show that potential home earnings of Migrants have a more equalizing effect that do remittances on income distribution in Nicaragua. However, International migrant remittances receiving households in Ghana experience an increase in inequality, measured by Gini coefficient, by 17.4 per cent (Adams et al., 2008). This study applies the Lee

method, a multinomial logit model and generalisation of Heckman two-stage, to analyse the impact of international migrant remittances on the inequality of households. Hossain & Bayes (2009) find similar results which suggest that migration increases Gini concentration ratio from 0.39 to 0.53 in Bangladesh.

Empirical findings reviewed above suggest the fact that there is an explicit linkage between the number of international migrants and households' propensity to be poor in developing countries. But the research vacuum in this regard is that most of the study is based on regional aggregated data and least of them focus on country-specific impact of remittances on poverty status of households living in the urban and rural areas separately. By considering household level data of Bangladesh as a case, the present study is an attempt to address this limitation. The justification behind considering Bangladesh as the study field is that Bangladesh is considered as one of the leading manpower exporting nations, where a big portion of the total labour force is migrants. International remittances have been recognized as an effective tool for eradication of extreme poverty, better living standard and human capital formation. Against this backdrop, the study attempts to estimate and compare the poverty impact of international remittances in case of remittance earning households in both urban and rural areas of Bangladesh.

### **Trends of Regional Remittance inflow**

The table below depicts the amount of yearly remittance earning trends by regions. Here, the statistics of developing, low and middle income countries have been demonstrated in Table 1.3.

From the estimated and projected result starting from 2010 in table 1, the remittance inflow of developing nation shows an increasing trend till 2014. From 2015, it has shown a drastic fall and corresponding fall in the overall economic growth rate of the countries. The estimated result is based on low and middle-income countries in Asia, Europe, and Latin America and so on.

World Bank (2017) indicates that in terms of remittance earning, India seems to be the highest remittance earner country among all other countries and Indonesia is the lowest remittance earner country.

According to World Bank ranking in 2015, Bangladesh occupies the eighth largest remittance earning country among all developing countries. From the perspective of remittance earning, Bangladesh joined in the 10 billion USD club of remittances inflow in the fiscal year 2010. Remittances inflow to Bangladesh experienced 552.3 per cent growth in the fiscal year 2013 over the fiscal year 2003 and the size of



yearly remittances inflow in the fiscal year 2013 is more than twenty-three times over the inflow of the fiscal year 1995.

**Table 1:** Estimated and projected remittance flow in developing nations

Region	2010	2013	2014	2015	2016e <sup>1</sup>	2017f <sup>2</sup>	2018f
	(\$ billions)						
Developing countries	340.3	426.4	444.3	439.8	429.3	443.6	459.1
East Asia and Pacific	94.9	114.3	122.7	127.3	125.8	129.0	132.7
Europe and central Asia	37.8	54.6	51.7	40.3	38.4	41	43.6
Latin American and Caribbean	56.5	61.5	64.5	68.3	73.1	75.5	78.2
Middle-East and North Africa	39	50.5	54.4	51.1	48.8	51.8	53.5
South Asia	82	110.8	115.8	117.6	110.1	112.3	115.3
Sub-Saharan Africa	30.1	34.7	35.3	35.1	33	34.1	35.7
<b>World</b>	<b>466.7</b>	<b>574.8</b>	<b>598.3</b>	<b>582.4</b>	<b>575.2</b>	<b>593.8</b>	<b>615.9</b>
Low and middle income countries	334.2	419	435.9	432.5	422.5	436.3	451.1
	<b>Growth Rate in Percentage</b>						
Developing countries	11.2	5.2	4.2	-1	-2.4	3.3	3.5
East Asia and Pacific	19.5	6.7	7.4	3.8	-1.2	2.5	2.9
Europe and central Asia	4.8	17.1	-5.3	-22.1	-4.6	6.6	6.4
Latin American and Caribbean	2.6	2.1	4.8	6	6.9	3.3	3.6
Middle-East and North Africa	18.2	3.4	7.8	-6.1	-4.4	6.1	3.3
South Asia	9.4	2.6	4.5	1.6	-6.4	2	2.7
Sub-Saharan Africa	9.6	1	1.7	-4	-6.1	3.3	4.9
<b>World</b>	<b>8.3</b>	<b>5.3</b>	<b>4.1</b>	<b>-2.7</b>	<b>-1.2</b>	<b>3.2</b>	<b>3.7</b>

Source: World Bank (2017)

Contribution of remittances inflow to GDP is also rising in Bangladesh. The share of remittance inflow in GDP for Bangladesh was 7.5 per cent in the fiscal year 2007 which has reached 9.6 per cent in the fiscal year 2013. It stood at 5.17 per cent in the fiscal year 2017. Gross remittance earnings decreased by 14.5 per cent to USD 12769.5 million in the fiscal year 2017 compared to USD 14931.16 million of the fiscal year 2016. It is 5.17 per cent of the country's GDP, 49.2 per cent of total export earnings and 29.4 per cent of import payments in the fiscal year 2017. Amount of remittances earned during the beginning of the fiscal year 2018 stood 3391.02 million. This amount is around 5.14 per cent lower than the preceding quarter (April-June) and 4.48 per cent higher than the corresponding quarter (July-September, 2016) of the preceding year (Bangladesh Bank, 2017).

<sup>1</sup> 'e' means estimated

<sup>2</sup> 'f' means forecasted

## Method

### Data Source

The database for the study is cross-sectional data of Household Income and Expenditure Survey (HIES), 2010. It covers 12,239 households drawn from 64 districts of Bangladesh. Primary sampling units were 612 unions, where 16 strata were formed to choose samples. Those 16 strata cover six rural, six urban and four statistical metropolitan areas. Among 12,239 households, 1206 receives migrant remittances and rests do not receive that. The database contains different variables of respondents' social, economic and demographic characteristics.

### Variable Description

**Table 2:** Description of the variables

	<b>Variables</b>	<b>Measurement Unit</b>
<b>Outcome Variables</b>	Poverty	Cost of Basic Need
	Monthly per capita consumption expenditure	BDT
	Monthly household consumption expenditure	BDT
<b>Explanatory Variables</b>	Household size	Numbers
	Age of household head	Year
	Sex of household head	Dummy (0=female, 1=male)
	Education of household head	
	Primary education	
	Secondary education	Ratio
	Higher secondary education	
	Higher education	
	Education of household members	
	Primary education	
	Secondary education	Ratio
	Higher secondary education	
	Higher education	
Regional Dummy	Dummy (0=Urban, 1=Rural)	
Land ownership	Decimal	
Monthly household income	BDT	

Source: Authors' compilation from the household survey data, 2010 1 Descriptive Analysis

Descriptive statistics have been used for the analysis of the socio-economic and demographic profile of the households. The poverty line defined for identifying poor and non-poor category of households in the study is done according to the cost of a basic need method by the Bangladesh Bureau of Statistics (BBS). In this case, a threshold of per capita expenditure is defined. The household which has per capita food and non-food consumption expenditure below that threshold is said to be poor. For HIES, 2010 data the threshold level of



food consumption is defined as 2122 kilo calorie and the monetary value of it denotes the national poverty line. HIES has set up this level by adjusting inflated price level.

### **Empirical Strategy**

In this section, the impact of international remittance on poverty is estimated using Propensity Score Matching (PSM) technique. PSM offers a unique way to construct a statistical comparison group based on a model of estimating the probability of having migrant member by a household conditional on its' own observed characteristics  $X$  (Rosenbaum and Rubin, 1983). That estimated probability is termed as 'propensity score'. This score enables us to identify those households having similar characteristics of the remittance recipient households but do not receive transfers. The value of the score ranges from 0 to 1. According to this approach, there are two distinct stages:

- Developing a logit or probit model
- Estimation of the Average Treatment effect on the treated groups (ATT)

### **Probit Regression Model**

In the PSM technique, the propensity score is determined using a probit regression model. The justification behind using a probit regression model is to analyse the variables, which explain the likelihood of receiving remittances or not. That is for the dichotomous outcome variable 'migration status', we use other socio-economic variables as explanatory to predict the propensity score. Here, 'X' represents that set of covariates or unobservable characteristics of the households.  $T$  is a dummy that takes value 0 or 1. When  $T=1$ , it indicates the treatment group that is the households which receive remittances. When  $T=0$ , it represents the control group or the households that do not receive remittances. The goal is to determine the impact of  $T$  on the outcome variable. Through using PSM technique, our motive is to compare the control group with the treatment group based on the pre-treatment unobservable characteristics (Borici and Gavoci, 2015).

To estimate the propensity score or predicted probability, following probit regression is used. Here the dependent variable is  $T_i$  that equals to 1 when household  $i$  has migrant member(s); otherwise,  $T_i$  equals to 0.

$$P_i = P(T_i = 1 | X) = \beta_0 + \beta_1 X_i$$

From the estimated result of the probit model, the propensity score is predicted by the following model

$$P(X) = \Pr(T_i = 1 | X)$$

Here,  $X_i$  is the set of covariates presenting pre-migration individual, household and community level characteristics of household  $i$ .  $T_i$  denotes households receiving remittance and  $1-T_i$  are the comparison group. After estimating the migration equation, the predicted values of  $T$  from the above equation can be derived. The predicted value represents the estimated probability or propensity score of migration. Every sampled migrant and non-migrant will have an estimated propensity score

$$\hat{P}(X|T = 1) = \hat{P}(X).$$

There is an assumption of conditional independence. The term conditional independence means that conditioning upon the unobservable household characteristics ( $X$ ), the outcomes are independent of treatment. Thus, the outcomes of the control group can be used to approximate the counterfactual outcome of treatment group in the absence of treatment (Bouoiyour and Miftah, 2014). Mathematically it can be shown as

$$(Y_i^T, Y_i^C) \perp T_i | X_i$$

Here,

$Y_i^T$  = The outcome of the treatment group

$Y_i^C$  = The outcome of the control group

$T_i$  = treatment (remittance receipt)

$X_i$  = unobservable characteristics of the households.

### **Common Support or Overlap Condition**

In the case of a propensity score matching approach, the common support or overlap condition is used. The overlap condition refers to the situation where an adequate number of migrant and non-migrant members fall under a common region of propensity score distribution plot. Unmatched households are dropped from the analysis to improve precision by reducing biases (Bouoiyour and Miftah, 2014). The mean propensity score and the mean of covariates  $X$  are the same. Mathematically, the balancing property is:

$$\hat{P}(X|T = 1) = \hat{P}(X|T = 0)$$

### **Estimation of Average Treatment Effect (ATT)**

The final estimator for the average treatment effect is obtained as the average of the differences between the situation of households treated and their counterfactual:

$$\Delta \hat{ATT} = \frac{1}{N} \sum_{i=1}^N (y_{i1} - y_{i0})$$



Here, the right-hand side denotes the estimated average treatment effect of migration.  $I$  is the sub sample of households treated and  $N$  is the number of households treated,  $y_{i1}$  denotes the outcome for treated households and  $y_{i0}$  is that of non-treated households.

In an explained form the average treatment effect denotes

$$\Delta \hat{ATT} = E(y_{i1}|T_i = 1) - E(y_{i0}|T_i = 1)$$

That is, expected value of the outcome of control group conditioning upon the treatment effect subtracted from the expected value of control group conditioning upon the treatment effect results in the average treatment effect.

Average treatment effect can be estimated using different techniques. Approaches used in this study are Kernel matching and nearest neighbour matching. In the case of empirical models, the nearest neighbour method considers those reference households for each of the experimental households depending on the value of predicted propensity score. Regarding this, only households which are close enough in terms of the score are incorporated. On the other hand, kernel estimation is about the matching of treatment households with a weighted average of the controls. And it is done using weights which are inversely proportional to the difference between propensity scores of treatment and control groups (Esquivel and Huerta-Pineda, 2006).

**Results: Socio-Demographic and Economic Profile of the Households**

In this part, we analyse the socio-demographic and the economic profile of the households. To compare two groups, the selected variables have been presented in table 3.

**Table 3:** Remittance receipt percentage by region

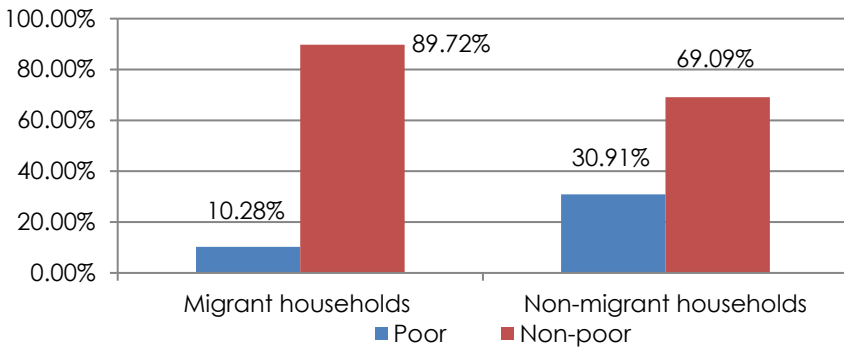
	All Households	Urban	Rural
Non-recipient (%)	90.85	91.84	89.20
Recipient (%)	9.15	8.16	10.80

Source: Authors' computation based on HIES, 2010 survey data

According to the analysis of cross-section data of HIES, 9.15 per cent households have migrant members, that is, they receive international remittance. The percentage of remittance receiver in rural areas is 10.8, which is quite higher than that of urban areas. Apart from this, for migrant members there is an important issue regarding the sex of migrants or remittance earners. Data shows that female members' participation as the remittance earner is very insignificant, which is only 2.19 per cent of the total remittance earners. From the context of Bangladesh, where most of the social institutions are male-biased, female workers' involvement in international remittances earning is a

sign of progress. This situation implies that there is an opportunity to explore the potentialities of Bangladeshi female migrants in the foreign labour market as nearly all of the migrant population in Bangladesh are male. The average age of the migrant members is around 32 years. On average, each migrant member sent more than one million Bangladeshi take (BDT) to their family per year (HIES, 2010). Most of them used to send remittance with a regular time interval in the concerned year.

**Figure 1:** Comparison of the poverty status of migrant and non-migrant households



Source: Authors' computation based on HIES, 2010 survey data

International remittances have a significant impact on the standard of living of people in Bangladesh. The utilisation of remittances sent from abroad is used for different productive purposes, and that have impacts on the socio-economic condition of the recipient households. For the assessment of poverty rates in two categories, the standard poverty line is set according to the cost of basic need (CBN) method which varies from region to region and assumes distinct values for each region. Hence, consumption expenditure is a crucial variable in this case. After identifying the poor and non-poor categories according to the cost of basic need approach, we have again differentiated these two categories within the remittance receiver and the non-receiver groups. The results have shown that, among remittance recipient households, 10.28 per cent people live below poverty line represented in figure 1. This amount is much lower than the percentage of poor people in the non-receiver group, which stands for about 31 per cent. This is somewhat a flat conclusion about the poverty assessment because the study is composed of more sophisticated estimation method for the assessment of poverty in a relevant context. Descriptive statistics of selected socio-economic variables are shown in table 4.





**Table 4:** Descriptive statistics of selected variables

	All households (N=12239)		Remittances recipient (N=1206)		Remittances non- recipient (N=11033)	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Monthly household consumption expenditure (BDT)	11058	9125	15304	11906	10594	8643
Monthly per capita consumption expenditure (BDT)	2565	2110	3510	2759	2462	2000
Household size (Number)	4	1.89	5	2.25	5	1.84
Age of household head (years)	46	14	48	16	46	14
Sex of household head (percentage)	85.7	35	51.3	50	89.5	30.7
Education of household members...						
Primary education	0.389	0.316	0.446	0.283	0.382	0.319
Secondary education	0.120	0.222	0.122	0.202	0.120	0.224
Higher secondary education	0.062	0.160	0.048	0.128	0.064	0.164
Higher education	0.011	0.066	0.005	0.041	0.012	0.068
Regional dummy (Percentage)	0.641	0.48	0.70	0.457	0.634	0.482
Land ownership (Decimal)	95.63	249.76	134.63	234.14	91.37	251.06
Monthly household income (BDT)	11514	16368	19433	23623	10649	15121

Source: Authors' compilation based on HIES, 2010 survey data

Table 4 depicts the descriptive statistics of socio-economic indicators of two types of households. In the case of poverty measurement, both food and non-food consumption expenditure have considered. However, by comparing between two categories, it is seen that monthly households' per capita consumption expenditure of remittance recipient households is slightly higher than that of non-recipient households. The remittance recipient households spend on an average BDT 15,304 as monthly consumption expenditure while this figure is BDT 10,594 for households on the contrary.

In the case of average household size and the average age of the household head, there is no large deviation between the two groups. The average age of the household head in remittance earning group is higher than that of non-recipient households. An important observation is that for remittance recipient households, the percentage of female-headed households appeared to be higher than that of non-recipient households. The probable reason behind this may be the absence of working aged male member due to migration.

The proportion of household members with a considered level of education is also poor. The mean proportion of household members with primary education in the remittance earner group is 44 per cent,

which is higher than the non-recipient group. The average proportion of family members with secondary education is almost the same for the two categories of households. Similarly, percentages of respondents belong to higher secondary and higher education level is somewhat low for all categories.

### Monthly per capita consumption expenditure (BDT)

Among all the households, 64 per cent of people lives in a rural area. For remittance recipient households, this figure is 70 per cent, which is higher than non-recipient households. There is a large deviation between the two groups in case of land ownership. Remittance receivers' land ownership is higher than that of non-receivers'. While the former group on an average owns about 135 decimal land, the latter one owns only 91 decimal. Likewise, monthly household income of the remittance-recipient household is higher than that of the non-recipient group. Table 5 shows monthly income quintile in case of both remittance receiver and non-receiver groups.

**Table 5:** Regional income quintile

Quintile	Remittances receipt						Total
	Yes			No			
	Rural	Urban	All	Rural	Urban	All	
1	3.15	0.61	3.76	73.57	22.67	96.24	100
2	4.45	0.57	5.02	67.28	27.70	94.98	100
3	7.27	1.67	8.95	61.11	29.94	91.05	100
4	8.82	4.00	12.83	51.55	35.62	87.17	100
5	10.91	7.80	18.71	32.15	49.10	81.25	100
Total	6.9205	2.933246	9.85	57.13702	33.00923	90.15	100

Source: Authors' computation based on HIES, 2010 survey data

In case of remittance recipient households, in rural area, 3.15 per cent comes from the lowest income quintile, while 10.91 per cent belongs to the highest income quintile. For the same group in the urban region, a small percentage of people belong to the lower income quintiles. In the case of non-recipient households, almost 74 per cent belongs to the lowest income quintile, and 32 per cent comes from the highest income quintile in the rural area. For the same group, almost 23 per cent come from the lowest income quintile and 49 per cent from the highest income quintile in the urban area.

## Empirical Results

### Probit Regression

The authors follow an empirical analysis to assess the causal relationship between poverty and international remittance earnings. For this, the propensity score matching approach has been applied to determine the intervention impact on the propensity of households being poor. Household migration decision or propensity of earning



remittances is determined by the socio-economic and demographic characteristics of individual households. To compare and assess the impact, a comparison group has been selected based on those characteristics. To predict the propensity score, a probit regression has been estimated with respect to those selected variables at the first stage. For the assessment of the average treatment effect, a counterfactual group has been detected from the estimated propensity score to compare. In the second stage, the average treatment effect is estimated using two types of matching method.

Before going for the main econometric method, we have applied different diagnostic tests of the selected variables like multicollinearity tests and Heteroscedasticity tests. From the IM test of the selected variables, we have found heteroscedasticity problem in the main model. The null hypothesis that the error term has constant variance is rejected here and the chi-square value found is 2716.79. To deal with the problem, we have taken robust standard error of the probit regression model instead of normal standard error. It minimizes the problem to a reasonable extent.

Table 6 represents the result of the probit regression. Here the outcome variable is dichotomous, that is migration condition of households (1 = migrant, 0 = otherwise). From the estimation of migration status of households with respect to the selected socio-demographic and economic variables, we have found that an increase in the number of male-headed households by one unit decreases the probability that the household has a migrant member by 17 per cent. In the case of age, we have also found a negative association that is one year increase in the age of household head decreases the likelihood of the household to have a migrant member. While an increase in the primary and secondary year of schooling of the household head has a direct association with migration and remittance earning, it has demonstrated a quite the opposite situation in case of higher education. However, the increase in household income increases the probability that the household receives remittance. An increase in household living in a rural area increases the probability of having a migrant member by 2.8 per cent than that of the urban area. Here the pseudo R square value is 0.1863.

**Table 6:** Probit regression result

Variables	dy/dx	Coefficient	Robust Std. Err.	z-value	P> z
Sex of household head (Percentage)	-.17404	-1.2350	0.0383	-31.79	0.000
Age of household head (years)	-.00350	-0.0248	0.0066	-3.73	0.000
Age of household head squared (years)	.00005	0.0003	0.0001	5.24	0.000
Education of Household head					
Primary education	.01578	0.1120	0.0534	2.12	0.034
Secondary education	.00093	0.0066	0.0855	0.08	0.938
Higher secondary education	-.03104	-0.2202	0.1243	-1.9	0.057
Higher education	-.00396	-0.0281	0.2426	-0.12	0.904
Monthly household income (BDT)	1.81e-06	0.0000129	2.40e-06	16.06	0.000
Land ownership (decimal)	.00002	0.0001	0.0001	2.17	0.030
Education of household members					
Primary education	.07049	0.5002	0.0849	5.76	0.000
Secondary education	-.01129	-0.0801	0.1788	-0.47	0.641
Higher secondary education	-.08580	-0.6089	0.2563	-2.55	0.011
Higher education	-.10154	-0.7206	0.7032	-1.24	0.216
Regional dummy	.02844	0.2018	0.0408	5.13	0.000
Constant		-0.5079	0.1679	-3.03	0.002
<b>Heteroscedasticity (<math>H_0: \sigma_u^2 = \text{constant}</math>)</b>			$\chi^2 = 2716.79; P = 0.00$		
<b>Mean VIF</b>					8.96
<b>Pseudo R<sup>2</sup></b>					0.1863

Source: Authors' computation based on HIES, 2010 data

### Average Treatment Effect on the Treated Group

After determination of propensity scores from the estimation of probit regression, the average treatment effect on the treated group has been estimated by using two distinct types of estimators namely kernel estimators, which uses weighted average and the nearest neighbour matching. The results are shown in Table 7.

**Table 7:** Estimated result of Average Treatment Effect on the treated group

Variables	Sample	Treated	Controls	Difference	S.E.	T-stat
<b>Nearest neighbour</b>						
Poverty	Unmatched	0.1028	0.3091	-0.2063	0.0136	-15.1500
	ATT	0.1028	0.2604	-0.1575	0.0179	-8.7900
Monthly per capita consumption (BDT)	Unmatched	3510	2462	1047	63	16.54
	ATT	3510	2724	785	107	7.35
Monthly household consumption (BDT)	Unmatched	15304	10594	4710	273	17.22
	ATT	15304	11582	3722	528	7.05
<b>Kernel estimator</b>						
Poverty	Unmatched	0.1028	0.3091	-0.2063	0.0136	-15.15
	ATT	0.1028	0.2466	-0.1438	0.0119	-12.13
Monthly per capita consumption (BDT)	Unmatched	3510	2462	1047	63	16.54
	ATT	3510	2747	763	87	8.80
Monthly household consumption (BDT)	Unmatched	15304	10594	4710	273	17.22
	ATT	15304	11025	4279	374	11.40

Source: Authors' computation based on HIES, 2010 survey data

Interestingly, in case of both kinds of estimations, we have found identical figures in the result. This estimation has been done in two phases. In the first phase, we estimate the average treatment effect on the treated group based on all households' information. The



second phase has been conducted by using the regional difference in a separate manner to estimate the effect.

Here, the average treatment effect on the treated group is significant for all outcome variables at 1 per cent level. The estimated result shows that the remittance earning has an inverse impact on the households' propensity of being poor. The negative association is visible in the result with the expected significance level in case of both estimators.

In the case of monthly per capita consumption expenditure and monthly household consumption expenditure, remittance receiving has a positive association (significant at 1 per cent level). According to the concept of cost of basic need method, consumption expenditure of the households gets priority to any other indicator. Positive causal effect indicates a better living standard of the households. According to some studies conducted in the same field, households' poverty status is also determined by the households' previous financial condition before migration decision. This factor determines whether remitted money is utilized in productive or unproductive purposes.

We can also assess the difference in the average treatment effect on the treated group on a regional basis. Table 8 represents the region-wise ATT difference for three outcomes separately.

**Table 8:** Estimated ATT difference by region

	ATT difference	S.E.	T-stat
Poverty			
Rural	-0.1629	0.0223	-7.32
Urban	-0.1142	0.0271	-4.21
Monthly per capita consumption(BDT)			
Rural	650	112	5.79
Urban	675	273	2.47
Monthly household consumption (BDT)			
Rural	3938	537	7.33
Urban	2638	1209	2.18

Data Source: Authors' computation based on HIES Data, 2010.

We have found that in both rural and urban areas, receiving international remittances has a negative association with the likelihood of people being poor. Here, remittance receipts decrease the propensity of people to stay below the poverty line by 16.3 per cent in rural area and 11.4 per cent in an urban area.

In the case of monthly per capita consumption, the average per capita consumption expenditure has been improved by an amount of 650 BDT in rural area due to remittance receiving. That is remittance receivers consume on an average 650 BDT more than that of the non-

receiver group. For urban areas, the treatment group has high per capita consumption expenditure by an amount of 675 BDT than that of the non-receiver group. That is both per capita, and monthly consumption expenditure of the two groups have positive ATT difference, which represents the direct relation with remittance earning.

### **Conclusion and Policy Recommendations**

In Bangladesh, the highest 28.57 per cent of remittances come from BDT 100-149 thousand category; the second highest 25.57 per cent of remittances comes from BDT 50-99 thousand categories per year. These two groups constituted more than 50 per cent of the remittances in all six divisions of Bangladesh (HIES, 2010). Although per month remittances share is not immense per household, poverty reduction impact of remittances on Bangladesh economy as evidenced by the present study is worth to analyse. We can assess the impact of remittance on the basis of the theoretical framework outlined by Lucas and Stark (1985). Remittances reduce poverty via consumption effect at the household level according to the pure altruistic viewpoint. Then, utilisation of remittances for the investment made for housing and living condition, education for children, health care, social security for elderly and more investment for income generating activities can be analysed under pure self-interest view. Migrants tend to remit a major share of their earning because they are employed on a contractual basis and for short term, and are bound to come back home country after expiry the short spell of migration. Evidence shows that temporary unskilled migrants remit more money and their propensity to save is also higher than their skilled counterparts (Liton et al., 2016), which have a poverty reduction impact on the regional economy. Most of the migrants in Bangladesh have to take a loan or sell their properties to afford the expenditure for education, training and skill development or to incur the cost of migration, which bonds them under any sort of contractual agreement with the family. They tend to realise those agreements or repay the prior loans, which falls under the viewpoint of enlightened self-interest. This behaviour increases the amount of remittances from the assumption and expectation of the family that the amount of remittances should be higher for educated workers and the children of the head of the households rather than the children of in-laws and even spouses.

Analysis of the current study confirms that in the case of both rural and urban households, remittance has influenced the consumption expenditure positively. The propensity score matching approach has demonstrated an inverse relationship between international



remittances and households' propensity to stay below the poverty line. This finding is verified by the negative value of the differences between average treatment effects on the treated group and the non-receiver group. Regardless of identifying the non-receiver group, on an average poverty rate in the migrant group is comparatively lower than that of the non-migrant group. Extending this finding through a regional lens, the authors conclude that remittance helps in reducing poverty by 16.3 per cent in rural areas and 11.3 per cent in an urban area. A regional comparison of households' consumption expenditure also shows the same pattern. That is the monthly consumption expenditure of recipient households in rural areas is greater than that of urban areas. Moreover, probit regression estimates that the probability of having migrant members in case of rural households is 2.8 per cent higher than that of urban households. Hence, it can be concluded that rural areas in Bangladesh explore more benefits from international migration and thus have more potentialities to produce exportable manpower targeted to the international labour market. Concerning this point, proper training facilities for skill development and needed education, which can serve the destined labour market should be provided, especially in the rural area.

Female labours' participation in remittance earning is very poor, which necessitates special intervention by the government. Because women constitute almost half of the total population in Bangladesh and a lot of them are still outside of the labour market. In this case, appropriate policy in terms of creating an enabling environment both in the destination and home countries should be arranged.

The estimated result in this study has shown that the monthly per capita income of the remittance earners is quite higher than that of non-recipient households. Earning remittance helps increasing the income level of the households. There are some exceptions where people used to utilise the money in some unproductive activities rather than productive ones. In that case, earning remittances cannot ensure increased income for the households. To alter the scenario, both government and non-government sector may introduce an incentive package for the remitters, which will promote investment in the productive/ income generating sector, in both rural and urban areas of Bangladesh.

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