The Impact of International Remittances on Poverty Alleviation in Bangladesh

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Abstract

This article mainly explores to what extent international remittances alleviate household poverty in Bangladesh. This study uses primary data collected from 216 households and employs multi-methods. Firstly, I measure the level of household poverty through Foster-Greer-Thorbecke index. The article secondly focuses on the impact of remittances on household poverty using a binary logistic regression model. I found that the level of poverty among remittance recipient households is notably lower than households that are not receiving remittances. Similarly, the probability of a household being poor is alleviated by 28.07 per cent if the household receives remittance. It can be suggested that nursing international remittances can be useful for poverty alleviation in Bangladesh.

Keywords: remittances; poverty; FGT index; logit model; Bangladesh.

JEL Classification: F14, F24

Introduction

International migration and remittances are an important and stable source of income in the developing world. Among the developing countries, Bangladesh is one of the major remittance recipients in the world where one in every three households is involved in migration and receives remittance, and most of the households are rural and poor (Bayes et al. 2015). In the rural areas of Bangladesh, the rate of poverty and unemployment is notably higher, which stress people to migrate. Currently, about more than eight million people of Bangladesh are now living and working abroad as migrant and transferring income to their families in the home country (Kundu, 2016). According to the Bureau of Manpower Employment and Training (2018), Bangladesh has received $13.53 billion remittances in 2017, which is 4.35 per cent of the country's GDP. This remittance is contributing to alleviate poverty and unemployment (Ghelli, 2018).

Since little attention, despite its economic importance, has been paid on this issue, migration and remittance literature is till now widely

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underrepresented in Bangladesh. Although a few studies have been conducted on remittances and poverty in Bangladesh, most of them rely on secondary data. Besides this, studies on other aspects of remittance have also been covered contextualising Bangladesh. Such as, Kumar et al. (2018) nicely summarise the significant factors and utilisation of international remittances in Bangladesh. On the other hand, Ahmed et al. (2018) provided the welfare impact of remittances while Hasan and Shakur (2017) provided the non-linear effects of remittances on the GDP growth of Bangladesh. This scenario reveals that remittances-poverty relationship is analysed either theoretically (Bayes et al., 2015) or drawing on secondary data such as Hatemi-J and Uddin (2014) and Raihan et al. (2009). In this article, I focused on the impact of remittances on household poverty in Bangladesh using primary data.

This study, unlike earlier studies in Bangladesh, which bases the analysis on the impact of international remittances on household poverty through a binary logistic regression model, mainly aims at measuring the level of household poverty in both remittance recipient and non-recipient households. In addition, it will examine the extent of the impact that international remittances have on household poverty. The paper is structured as follows: after presenting the relationship between remittances and poverty, a brief survey of the literature is reviewed in Section 2, while data and methodology are introduced in Section 3. Section 4 provides a descriptive comparison of remittance recipient and non-recipient households. The main analytical results are presented in Section 5. Section 6 concludes and recommends policies.

Relationship between remittances and poverty

Reviewing previous literature, both positive and negative relationships between remittance and poverty are found by the researchers. For example, Acosta et al. (2008) explored that remittances increase economic growth and reduce poverty in Latin American and Caribbean countries, and remittances have negative and poverty plummeting effects. On the other hand, Siddique et al. (2016) stated that remittances had reduced poverty in Pakistan significantly. Like other countries, remittances reduce poverty in Bangladesh as well (Bayes et al., 2015; Hatemi-J and Uddin, 2014 and Raihan et al., 2009).

Furthermore, a negative relationship is also found between international remittances and poverty in Bangladesh from the analysis of data. Figure 1 shows that both the inflows of remittances and the rate of poverty have declined over time. This does not provide a clear direction about the relationship between remittances and poverty in Bangladesh.
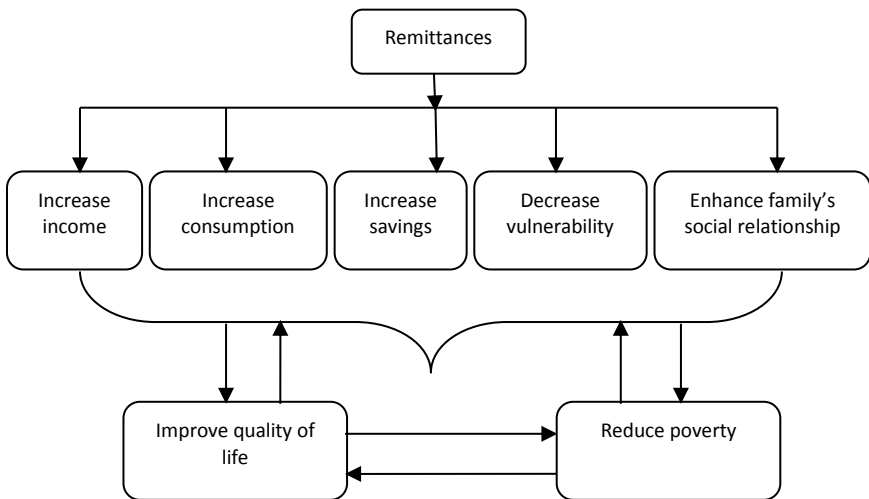
Figure 1: Remittance and Poverty Scenario of Bangladesh
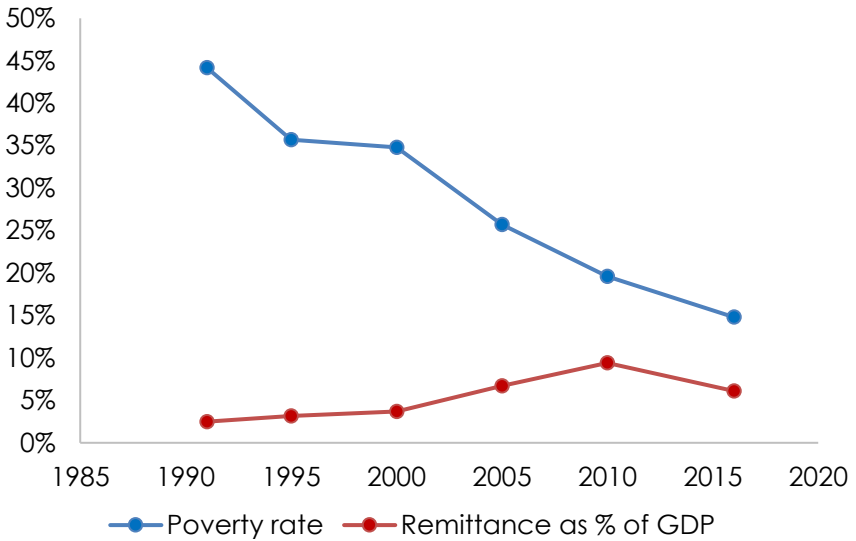
For clarification of this critical situation, it is mandatory to describe the mechanism of how remittances alleviate poverty. Figure 2 illustrates how, possibly, remittances may have such an effect on poverty.

Figure 2: Framework of remittance and poverty alleviation

Like Acosta et al. (2008), Guinigundo (2007) also reveals a two-way relationship between remittances and poverty, which has been stated in Figure 2. The figure implies that remittances cause poverty reduction and poverty reduction also causes remittances receipt. The figure 2 shows that remittances directly increase the level of income of the remittance recipient households, increase consumption and savings, decrease vulnerability, and enhance family's social relationship which consequently improves the quality of life and alleviates poverty. On the contrary, reduction of poverty improves the quality of life, which increases income, consumption, savings and decreases vulnerability and enhances the family's social relations.

Review of Literature

This section introduces the remittances and poverty-related facts of many other countries besides Bangladesh, which, like the other developing countries, has also been facing some socio-economic challenges over a long time. The country was historically one of the poorest countries in the world, and it is still struggling with a higher level of poverty, unemployment and low per capita income although a little progress is noticed recently. Several important factors, of which the contribution of international remittance is notable, have contributed to this little improvement of recent time. It is observed that one in every three households receives international remittance in the country (Bayes et al. 2015). Indeed, the potential of remittances to reduce poverty significantly is widely discussed in the earlier literature.

A good number of researchers studied remittances in Bangladesh (Kumar et al., 2018; Ahmed et al., 2018; Hasan and Shakur, 2017; Wadood and Hossain, 2016; Regmi and Paudel, 2016; Haider et al., 2016; Bayes et al., 2015; Hatemi-J and Uddin, 2014; Chowdhury, 2014; Masuduzzaman, 2014; Al-Mukit et al., 2013; Khan and Islam, 2013; Raihan et al., 2009). However, most of these studies are either descriptive or not focusing on the link between remittances and poverty. Although Bayes et al. (2015), Hatemi-J and Uddin (2014) and Raihan et al. (2009) have studied recently on the relationship between remittances and poverty, to the best of knowledge, these studies are not based on primary data. This study is, therefore, a pioneering effort to shed light on remittances' possible role in poverty alleviation in Bangladesh.

To examine the impact of international remittances on household poverty, different methods have been used and hence, results varied. I have reviewed and classified some of the empirical studies by variables and methods used, as summarised in Table 1.

Table 1: Empirical effects of variables on poverty

Authors	Method	Age	Sex	Edu	HS	Ocu	IL	TL	PCE	Rem
Cuecuecha and Adams (2016)	Probit model	+	+							
Wurku and Marangu (2015)	Logit model	-	+	-	+					-
Abbas *et al.* (2014)	Logit model	+	-	-	+	+	-			-
Raihan *et al.* (2009)	Logit model	+	+	-	+	-		-	-	-

Note: Edu = education, HS = household size, Ocu = occupation, IL = income from livestock, PCE = per capita expenditure and Rem = remittance

Source: Author's classification based on existing literature

Sometimes scholars have found both the unidirectional and bi-directional relationship between remittances and poverty. For example, Hatemi-J and Uddin (2014) have found a bi-directional impact that remittances cause poverty reduction is greater than poverty causes remittances receipt. Contrarily, Gaaliche and Zayati (2014) found the reverse direction. In addition, some studies have argued that international remittances significantly reduce poverty in Bangladesh (Bayes et al., 2015 and Raihan et al., 2009). Rural poverty of the country has declined at an accelerated pace over the decade of the 2000s, which is consistent with the observed rapid growth of the economy as a whole combined with a stable distribution of consumption expenditure (Osmani and Latif, 2013). Remittances have not only statistically significant impacts on poverty but also on financial development (Masuduzzaman, 2014) and attributing food and aggregate consumption expenditure in addition to savings (Haider et al., 2016). Khan and Islam (2013) showed that a one per cent increase in remittance inflows increases inflation rate by 2.48 per cent in the long run but no effects in the short run. Besides these impacts, remittances have significant impacts on household welfare in Bangladesh as well (Ahmed et al., 2018) and Wadood and Hossain, 2016).

Several previous studies focused on poverty and remittances relationship in country contexts other than Bangladesh. Pekovic (2017a) showed that remittances have a larger impact on poverty reduction of rural households in East Serbia while in another study (Pekovic, 2017b), it was argued that a 10 per cent increase in remittances per capita would lead to a decline, on average a 4.7 per cent in poverty headcount, and also 5.2 per cent in poverty depth

and 5.8 per cent in poverty severity. By analysing 25 developing countries for three years, Pradhan and Mahesh (2016) found that remittances reduce poverty significantly in the developing countries while Islam and Rayhan (2016) found the same findings by analysing 15 developing countries. Masron and Wari (2018) interpreted that remittances reduce poverty by increasing household income of the poor and utilising remittances in more productive activities. Similar findings have been found by Bam et al. (2016) that there is an inverse relationship between remittance and poverty headcount ratio and poverty gap. Remittances from abroad are found to have a statistically significant and positive impact on poverty alleviation only for upper middle-income countries (Azam et al. (2016) while Simiyu et al. (2018) found that there were significant welfare and poverty level differences between remittance recipient and non-recipient households. Besides, Huary and Bani (2017) found that a 1 per cent increase in remittances decreases the poverty headcount by 0.41 per cent. Waheed et al (2013) found that a 10 per cent increase in domestic remittances decreased poverty incidence, poverty gap and squared poverty gap by 1.80 per cent, 1.60 per cent and 1.60 per cent while 10 per cent rise in foreign remittances reduced poverty incidence, poverty gap and squared poverty gap by 0.86 per cent, 0.62 per cent and 0.62 per cent respectively in rural Nigeria. Naghar and Arshad (2017) found that an increase in remittances led to a reduction in poverty by 2.56 per cent. Cuecuecha and Adams (2016) found that remittance recipient households are less likely to be poor compared to remittances non-recipient households.

Although the role of remittances in poverty alleviation is widely discussed, there are also other effects and variations. For instance, the South Asian region draws nearly one-fourth of global remittance volume that contributes on average to over 10 per cent of GDP of South Asian countries (Rahman et al., 2014a). Although male migrants earn and keep their earnings, in most cases, female migrants' earnings go to their male counterparts (Ullah, 2014). In this regard, Ullah (2013) argued that females remit a higher proportion of their income than men, but they enjoy less 'exposure to remittance' than men. Remittance also reduces infant mortality rate and increases children school attendance rate of remittance recipient households (Cordova, 2004). Rahman et al. (2014b) thoroughly investigate the diverse mechanisms through which migrant communities remit, investigating how recipients engage in the development process in South Asia. South Asian countries did not fully benefit from migrant remittances, although there is huge potential to contribute to the development (Ullah, 2017). The number of family members working abroad declined by about 7 per cent, and a corresponding 6.4 per

cent drop was seen in the number of households receiving remittances and a 19 per cent decline in remittance income (Sirkeci et al. 2012, p 178-179). Besides it was also suggested that remittances were related to better economic conditions for Bangladeshi and Pakistani migrants in the United States during the crisis period (Sirkeci et al. 2012, p 168). Adhikari (2016) found that the remittance has contributed 35.6 per cent in total expenses of remittance receiving household, whereas there was only 2.3 per cent contribution made by non-remittance. By analysing household survey data of Fiji and Tonga, Brown and Jimenez (2007) found that the positive effects of migration and remittances on poverty alleviation and income distribution are found to be stronger when the more rigorous, counterfactual income estimates are used.

Earlier literature showed that international remittances not only reduce poverty but also lessen inequality, unemployment, inflation and enhance welfare, economic growth, the balance of payments, and so on. It is also found that besides the positive impacts, international remittances have negative impacts on the economy as well. For example, remittances increase the dependency behaviour among the members of remittance recipient households and make them idle (Abbas et al., 2014). Also, migration creates moral and social problems such as parentless children, broken family incidents and failure of women in taking a strong decision in the absence of family's male member (Chami et al., 2003). In addition, remittance also causes brain drain, which has strong negative effects on a country's long-run economic growth (Faini, 2007). The literature show both positive and negative impacts of international remittances at household, community, and national levels, as presented in Table 2.

Besides the studies in Table 2, Ewubare and Okpoi (2018) found an interesting result for Nigeria. They found that in the long run, while domestic remittances intensified poverty, foreign remittances reduced poverty incidence. On the contrary, in the short run, domestic remittance has diverse effects on poverty reduction while foreign remittances have no effects. Tsaurai (2018) has used two different approaches and found contradictory results. Such as the fixed effects approach results that remittances led poverty reduction hypothesis, whereas the pooled ordinary least squares framework reveals that remittances inflow into the selected emerging markets led to an increase in poverty levels.

On the other hand, Mollers and Meyer (2014) found that remittances have no impact on the extremely poor, but lift around 40 per cent of migrant households above the vulnerability threshold. International remittances have positively and significantly contributed to absolute

poverty reduction, while negatively and insignificantly contributed to relative poverty augmentation in Sri Lanka (Karunaratne and Dassanayake, 2018). Majeed (2015) showed that remittances have no direct effect on poverty; rather, the effect of remittances on poverty depends on the level of financial development of a remittance receiving economy. Migration and remittance may not be able to eradicate all types of poverty, and may even exacerbate some, but the alternative of attempting to limit or restrict migration is likely to be much less productive (Skeldon, 2006).

Table 2: Summary of literature about the impacts of international remittances

Recipient	Positive impacts	Negative impacts
Household	• Increase household income and savings • Smooth consumption • Improve education and health condition • Reduce child labour • Enhance access to information	• Remittances are used mostly on consumption instead of productive purposes • Create recipient family idol and dependent • Increase inequality by age and sex within the family
Community	• Create local employment opportunities • Expand local capital markets • Improve local physical infrastructure • Enhance the community's welfare	• Increase inequality between the recipient and non-recipient families • Hinder simultaneous development of community • Degrade social and cultural customs and practices
National	• Improve the balance of payments and foreign exchange reserve • Boost economic growth • Decrease unemployment, inequality and poverty • Improve human capital	• Deteriorate exchange rate • Increase inflation • Cause brain drain and Dutch disease • Distort property markets

Source: Author's classification from the literature

In summary, the literature does not provide clear directions for the impacts of international remittances on household poverty. Therefore, the study bases analysis of Bangladesh on the widely accepted hypothesis that remittances have negative impacts on poverty.

Data and Methods

This paper focuses on primary data collected from both rural remittance recipient and non-recipient households. For this study, *Noakhali* district of Bangladesh is selected as the study area because

this is one of the districts from which most of the households have migrated abroad and sends remittances to their families. Also, almost two decades ago, most of the people of the district lived in a rural area and was dependent on agriculture. Also, there was scant non-farm employment opportunities and low standard of living in the district. Thus, most people migrated abroad to improve their socio-economic conditions.

In selecting the sample, the study employed a multi-stage random sampling technique. From *Noakhali* district *Begumganj Upazila* from nine *Upazilas* was selected randomly. Then, three unions from the *Upazila* were selected randomly, such as *Gopalpur, Chaoyang* and *Rajgnuj.* In the next step, three villages were selected randomly from each union. In this stage, the total number of remittance recipient and non-recipient households of the selected villages were collected from each union council office. Finally, fifteen per cent from both types of household heads from each village were selected randomly for an interview following Abbas et al. (2014) and Wurku and Marangu (2015). By this way, a total of 216 household heads were face to face interviewed from March to June 2018 with a well-structured questionnaire. The sample distribution is presented in Table 3.

Table 3: The distribution of sample by village

Union	Village	Remittance recipient households		Remittance non-recipient households	
		Total	Sample	Total	Sample
Gopalpur	Modhupur	80	12	100	15
	Kalikapur	107	16	73	11
	Basantabag	53	8	67	10
Choyani	Ramswarpur	93	14	107	16
	Vabani Jibonpur	87	13	87	13
	Gangabar	60	9	47	7
Rajgunj	Aladinagar	113	17	93	14
	Dililpur	73	11	60	9
	Alampur	53	8	87	13
Total number of sample			**108**		**108**

Empirical methods

Foster-Greer-Thorbecke index

James Foster, Joel Greer and Erik Thorbecke first stated the Foster-Greer-Thorbecke (FGT) index in 1984, which measures incidence, depth and severity of poverty. The index is calculated with the following formula:

$$FGT_\alpha = \frac{1}{N} \sum_{i=1}^{H} (\frac{z - y_i}{z})^\alpha \qquad (1)$$

where, H is the total number of poor households whose income lie below the poverty line, y_i is the income of ith individual household, N is the total number of households and z is the poverty line. In this study, US$1.25 as daily per capita income (monthly Tk.2925) is used as poverty line in measuring household poverty following the World Bank's declaration in 2008 for developing countries. a is a parameter. With the variation in the value of the parameter, the index gives different measures of poverty. When a equals 0, the formula gives headcount index and the formula also gives poverty gap and poverty severity with a equals to 1 and 2, respectively.

The index is used in this study to measure the level of household poverty of remittance recipient and non-recipient households following Foster et al. (1984), Wurku and Marangu (2014) and Pekovic (2017a).

The logistic regression model
Being informed of the level of household poverty, the study examines the extent of the impact of remittances on household poverty. In this study, household poverty is considered as a dichotomous variable having two categories such as poor and non-poor. That is why, the study applies a binary logistic regression model to find out a cause and effect relationship between household poverty and a set of explanatory variables following Raihan et al. (2009), Wurku and Marangu (2015) and Abbas et al. (2014). Equation (2) states the relationship as follows:

$$P_i = f(X_i) \qquad (2)$$

where P_i is household poverty and X_i is the set of explanatory variables that affect household poverty. Household poverty is measured through the poverty line i.e. Tk.2925 per month. A household with income below the poverty line is assigned as poor, otherwise non-poor.

Let us suppose that the probability of a household being poor is:

$$P_i = E(Y = 1/X_i) = \beta_1 + \beta_2 X_i \qquad (3)$$

where P_i is the probability of being poor, X_i is a set of explanatory variables, and Y = 1 means that the household is poor. Equation (3) can also be written as:

$$P_i = E(Y_i = 1/X_i)$$
$$= \frac{1}{1 + e^{-(\beta_1 + \beta_2 X_i)}} = \frac{1}{1 + e^{-(Z_i)}}$$
$$\qquad (4)$$

Where $Z_i = \beta_1 + \beta_2 X_i$ is known as (cumulative) logistic distribution function. In this case, Z_i ranges from $-\infty$ to $+\infty$ and P_i ranges between 0 and 1 and it is non-linearly related to Z_i (i.e. X_i). This satisfies the conditions of the probability model but violates one of the assumptions of the classical linear regression model as P_i is not only non-linearly related to X_i but also to β_i. In this circumstance, the OLS method is not applicable. However, $1\text{-}P_i$, the probability of a household not being poor, is:

$$1 - P_i = \frac{1}{1 + e^{(Z_i)}} \qquad (5)$$

Thus, the ratio of a household being poor to a household not being poor is:

$$\frac{P_i}{1 - P_i} = \frac{\dfrac{1}{1 + e^{(-Z_i)}}}{\dfrac{1}{1 + e^{(Z_i)}}} = e^{z_i} \qquad (6)$$

where, $\dfrac{P_i}{1 - P_i}$ is the odds ratio in favour of a household being poor.

Taking natural log in both sides of equation (6), an appropriate function is found as:

$$L_i = \ln\left[P_i / 1 - P_i\right] = \beta_1 + \beta_2 X_i \qquad (7)$$

Here, L_i is the log odds ratio or logit which is not only linearly related to X_i but also to β_i. Therefore, the specified model is:

$$L_i = \ln\left[P_i / 1 - P_i\right]$$
$$= \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 +$$
$$\beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + u_i \qquad (8)$$

where, L_i represents the log odds ratio in favour of a household being poor; β_0.......β_9 are parameters to be estimated; X_1, X_2.......X_9 are the explanatory variables and u_i is the stochastic disturbance term. The explanatory variables of the model are described in Table 4.

These below variables have been considered in the regression model and their expected sign has been assumed following earlier literature. The list and relationship of these variables with the dependent variable have been presented in Table 2.

Table 4: Description of explanatory variables used in the logistic regression model

Variables	Type	Measurement	Expected sign
Age (X_1)	Continuous	Age of household head (Years)	-
Sex (X_2)	Dummy	Household head's sex (1 for male, otherwise 0)	-
Education (X_3)	Continuous	Household head's education (years of schooling)	-
Household size (X_4)	Continuous	Total number of family members	+
Occupation (X_5)	Dummy	Household head's occupation (1 for non-agriculture, otherwise 0)	-
Income from livestock (X_6)	Continuous	Household's total income from livestock (Tk./year)	-
Land (X_7)	Continuous	Household's total amount of land (*Bigha*)	-
Per capita expenditure (X_8)	Continuous	Household's per capita expenditure (Tk./year)	-
Remittance (X_9)	Dummy	Remittance (1 for recipient household, otherwise 0)	-

Socio-economic and demographic features of households

This section presents the socio-economic and demographic features including age, sex, education, household size, occupation, income from livestock, total land, per capita expenditure and poverty of remittance recipient and non-recipient households. These features are analysed with a one way ANOVA test, which implies the statistically significant variation in different features by different categories of households. This analysis is measured through SPSS 23.00 and presented in Table 5.

Table 5: Features of remittance recipient and non-recipient households

Variables (Mean Value)	Remittance recipient households	Remittance non-recipient households	F	Sig.
Age	45.74	43.74	1.24	0.266
Sex (male)*	0.68	0.81	5.58	0.019
Education**	5.72	4.41	4.43	0.036
Household size**	4.95	4.50	3.89	0.050
Occupation (non-agriculture)	0.31	0.32	0.09	0.771
Income from livestock*	2320.96	4473.98	14.51	0.000
Total land**	4.54	3.24	5.15	0.024
Per capita expenditure*	14431.13	1972.77	45.62	0.000
Poverty (poor)*	0.13	0.58	61.89	0.000

Note: * and ** means 1 and 5 per cent level of significance
Source: Field survey, 2018

Table 5 shows that the mean age of remittance recipient households' head is 45.74 years while it is 43.74 years for non-recipient households, and the variation is statistically insignificant. On the other hand, it is found that household head is male is higher for remittance recipient households than compared to non-recipient households, and the

variation is significant at 1 per cent level of significance. This interprets that male member of remittance recipient households have migrated abroad and the female member is maintaining the family. Like sex, education, household size, income from livestock, total land, per capita expenditure and poverty are statistically significant, and occupation is statistically insignificant. The table also shows that the number of poor households is higher for remittance non-recipient households than recipient households and the variation is significant at 1 per cent level of significance. This variation explains that remittances have a significant influence on poverty reduction.

Results of FGT index

The result of the Foster-Greer-Thorbecke index is calculated through MS-Excel (2010) and presented in graphical form. Figure 3 presents the level of household poverty, including remittance recipient, non-recipient households and total households.

Figure 3: Level of household poverty (%)
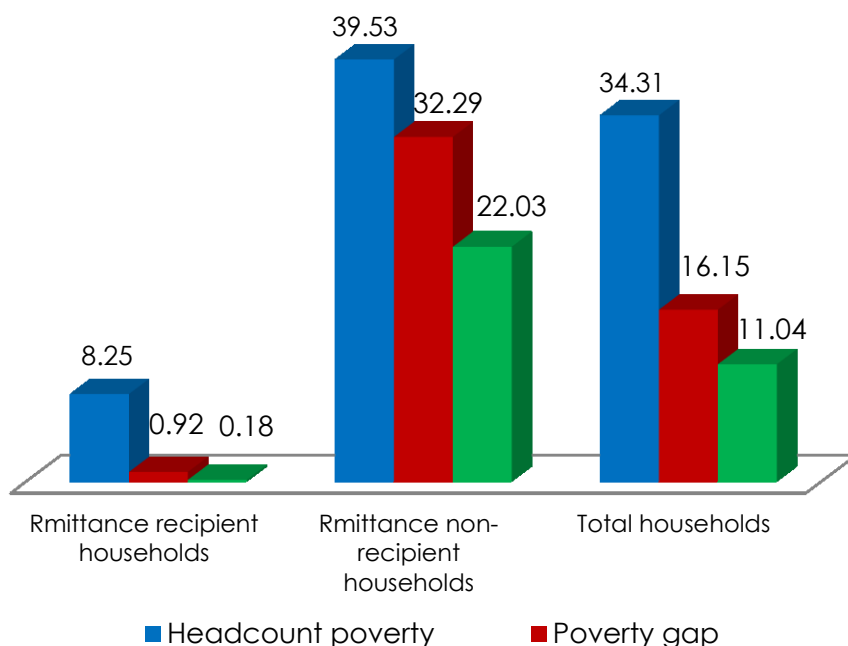
Source: Field survey, 2018

From Figure 3, it is found that the headcount index for all households is 34.31%. This means that 34.31% of the households live below the poverty line out of the total households. The poverty gap index is found to be 16.15%. This reveals that on average, the income needed

to eliminate poverty in the country should be increased by 16.15%. The poverty severity of the households is 11.04%.

The breakdown of the poverty indices with the response to remittance illustrates that remittance non-recipient households have the highest percentage of poor people compared to remittance recipient households. The FGT analysis shows that 8.25% of remittance-receiving households is under the poverty line, while 39.53% of remittance non-recipient households live below the poverty line. Similarly, the poverty gap is higher among the remittance non-recipient households compared to remittance recipient households. For remittance recipient households, the cost of eliminating poverty is 0.92% of the poverty line while it is 32.29% for non-recipient households. The poverty severity index is widely used to compare poverty rankings between two groups. The higher the value of severity index, the greater the inequality of the distribution among the poor and the severity of poverty. Figure 3 shows that the amount of poverty severity for remittance recipient households is 0.18% while it is 22.03% for non-recipient households.

From the FGT analysis, it is found that the rate of poverty in all forms of remittance recipient households is lower than that of remittance non-recipient households. It can be interpreted by the fact that remittance recipient households are being able to meet up the regular demand by the remittance, but non-recipient households are not being able there is few scopes of other non-farm employment opportunities in the rural areas of Bangladesh. Therefore, it can be concluded that international remittance plays a significant influence on household poverty reduction.

Results of the logistic regression model
The binary logistic regression model for measuring the extent of the impact of international remittances on household poverty is analysed with STATA-13, and the result is presented in Table 6.

From the above table, it is found that the log likelihood statistic (Log likelihood = - 79.03) indicated by Chi^2 statistic is highly significant (Prob.>chi^2=0.00000) suggests that the model has strong explanatory power. The Pseudo R^2 = 0.4383 indicates that variables included in the model maximised the likelihood of data in poverty reduction by 44 per cent. The study finds that household size, income from livestock, total land and remittance have a significant influence on the alleviation of household poverty. On the other hand, age, sex, education, per capita expenditure and occupation have no significant influence on the alleviation of household poverty, although all variables exhibited expected signs.

Table 6: Results of the binary logistic regression

Variable	Coefficient	Odds ratio	Std. Err.	Z	dy/dx	Sig.
Age	-0.02279	0.978	0.0193	-1.18	-0.0027	0.24
Sex	-0.00389	0.996	0.3890	0.01	0.0005	0.99
Education	-0.04163	0.959	0.0587	-0.71	-0.0051	0.48
Household size*	0.24742	1.28	0.1237	2.00	0.0294	0.05
Occupation	-0.39945	0.671	0.4812	-0.83	-0.0475	0.41
Income from livestock*	-0.000167	0.999	0.00008	-2.03	-0.00002	0.04
Total land**	-0.333492	0.716	0.1344	-2.48	-0.0397	0.01
Per capita expenditure	-0.000153	0.999	0.0002	-0.74	-0.000018	0.46
Remittance**	-2.3603	0.094	0.549	-4.30	-0.2807	0.00

Log likelihood = -79.03; LR chi^2 (9) = 47.35; Prob.> chi^2 =0.000; Pseudo R^2 = 0.4383; Total number of observations = 216.Note: ** and * equals 1 percent and 5 percent level of significance.

Source: Field survey, 2018

Table 6 also shows that the odds ratio of household size reveals that an increase in household size by one unit reduces the log odds of households being poor by 1.28 and it is negatively significant at 5 per cent level of significance. The result is interpreted by the fact that if the household size is large, more members can engage them in income earning activities which ultimately reduces poverty. The similar view is also reported by Raihan et al. (2009).

The odds ratio of the income from livestock reveals that for one unit increase in household's income from livestock, the log odds of household poverty decreases by 0.999 which is negatively significant at 5 per cent level of significance. The result is interpreted by the fact that the paper is studied in rural areas where livestock is an important source of household income. This reveals that households with higher income from livestock have a higher probability of being non-poor. Abbas et al. (2014) have also found a similar result.

Similarly, the log odds of household poverty are decreased by 0.716 with one unit increase in the total land which is negatively significant at 1 per cent level of significance. The rational explanation is that total land generates household income directly which ultimately reduces household poverty. The result is in line with Raihan et al. (2009).

The study finds that if a household receives international remittances, the log odds of a household being poor reduce by 0.094 which is negatively significant at 1 per cent level of significance. A logical interpretation is that international remittances directly reduce budget constraint of the recipient households by increasing the level of income which conspicuously reduces the hardship of poverty (Abbas et al., 2014; Raihan et al., 2009 and Wurku and Marangu, 2015).

As the estimated coefficient of the logistic model has no direct economic interpretation, the most preferred way in this regard is to find out the marginal effects (Gujarati and Poter, 2009). The marginal effect of a particular variable expresses the probability estimation of household poverty that means the probability of a household being poor keeping other variables constant. Table 6 also presents the marginal effects of the logit model.

The result of the marginal effect indicates that the probability of a household being poor may be reduced by 2.94 per cent if the household size is increased by one unit. On the other hand, if a household's income from livestock is increased by one unit, the probability of a household being poor may be reduced by 0.002 per cent. The marginal effect of total land shows that an increase in one unit of total land reduces the probability of the household being poor by 3.97 per cent. The marginal effect result also reports that the probability of a household being poor may be reduced by 28.07 per cent if the household receives international remittances.

Conclusion

This article addresses two separate questions. First, what is the level of poverty among not only remittance recipient households but also remittance non-recipient households? Second, how does international remittances impact on household poverty in Bangladesh? I use household-level survey data from both remittance recipient households but also remittance non-recipient households to estimate a remittance non-recipient counterfactual household poverty scenario, against which to compare actual, with remittance recipient household.

My results are interesting in a number of respects. Firstly, this study, in line with the findings of the literature and similar to various cases around the world, provided evidence for the argument that the propensity of people in poverty among remittance recipient households is lower than households that are not receiving remittances in Bangladesh. I find that the impact of remittance on poverty alleviation is stronger in remittance recipient households, enjoys a considerably lower incidence and depth of poverty than the counterfactual remittance non-recipient households. Based on the empirical findings, secondly, it is shown that if a household receives international remittances, the probability of that household being poor is decreased by 28.07 per cent.

On the basis of these findings, the study recommends nursing international remittances as an important poverty reduction tool in Bangladesh. In order to get optimal benefit from remittances, the

country should pay attention to two things. First, proper technical and vocational education, training, loan facilities, easing visa processing and other migration-related facilities should be provided to the migrants prior to their migration to entice their interest to send more remittance to home country. Second, migrant families should be made aware of opportunities and offered advice in utilising remittances in productive purposes like setting up business, investing in education and improving commercialised farming. As this article is carried out taking very small sampling, short time and limited self-funding, the core representative findings has not been brought to light by this study. Therefore, I like to suggest researchers to carry out further research on this issue.

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