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DETERMINANTS AND INVESTMENT BEHAVIOR OF FOREIGN REMITTANCES IN RURAL BANGLADESH

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ABSTRACT

Flow of investments' remittances in Bangladesh exhibited a continuously increasing trend over the last 30 years in both absolute and relative terms. It is now well-documented that foreign remittances have an utmost importance in the socioeconomic development of Bangladesh economy, especially in the rural areas. This paper has explored the determinants and investment behavior of foreign remittances in rural Bangladesh. The study has used the data and information on 502 rural international remittance receiving households from 30 clusters over six former divisions of Bangladesh. The present study have been identified the predictors of household investments from remittances by using multiple binary logistic regression analysis along with typical descriptive statistical tools and techniques. The distribution of investment at household level along with the necessary elements are drawing Lorenz curve. The *Gini* concentration ratios are also estimated at 0.497 for the overall households, which indicate a higher inequality of investment among the survey households. The results suggest that about 50% of the investment of the community is concentrated in the hands of few peoples and the rest of the investment is all distributed among the major portion of the households of the study area.

Keywords: foreign remittances, investment, lorenz curve, *gini* co-efficient, BLRM

INTRODUCTION

Flow of investments' remittances in Bangladesh exhibited a continuously increasing trend over the last 30 years in both absolute and relative terms. Key to the flow of remittances is the destination of the money and its effects on the household and domestic economies. Remittance receiving households not only save a portion of their money, but also remittances play an investment and insurance function (Mahmud, 1998). In the case of investment, immigrants send money back home with the specific purpose of acquiring some investment opportunity at household level such as education, medical, household tools, land, housing, agriculture and non-agriculture equipments, business investment, plants, liquid assets, re-migration, repayment of loan for investment, stock, bonds, insurance premium, mutual funds, savings schemes cash on hand, philanthropy, social infrastructure, gifts, transfers and social security contributions.

The remittances have been used to estimate the cost and benefits of investment at both the micro and macro levels. Most observers acknowledge that benefits do accrue to individual migrants and their families. The benefits to the economy and the society are viewed as being more questionable, given the effects of remittances in increasing consumer demand, increasing imports and fuelling inflation (Chandavarkar, 1980 and Russell, 1986). Finally, one of the central issues in the report is whether or not migrants and their families, who are generally able to micro investment during the period of migration because of inflow of remittances income, are able to maintain these investments after migrants returned home. If migrants and their families were successful in directing substantial proportions of resources obtained from overseas work to investment, it is likely that they could enhance their productive capacity and thereby their ability to sustain the higher living standards. The specific objectives are to investigate and analyze the household allocation pattern of international remittances in different investments, determine the predictors of the investment of foreign remittances, provide some suggestions regarding how foreign remittances' performance on investment could be improved.

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MATERIALS AND METHODS

The study collected the information from 502 rural international remittances-receiving households from 30 clusters over six divisions (Sylhet, Chittagong, Dhaka, Barisal, Khulna and Rajshahi) of Bangladesh. The data were collected during February to July, 2010.

To identify the inequality of investment distribution in the surveyed population we use Lorenz Curve. A formulation as a solution to the problem of performing the 'Distribution of investment' can be made even if the functional form of the distribution f(x) is not known. This can be achieved through ' the curve of concentration'defined as follows:

N= Total frequency of population
I= Total household investment
N(x) = Number of households with investment x or more
I(x) = Total amount of investment possessed by N(x)
P(x) = {N-N(x)}/N= Proportion of households with investment less than or equal to x
q(x) = {I-I(x)}/I= Proportion of investment of the households with investment less than or equal to x

The straight line q(x)=p(x) is known as 'Line of equal distribution'. The graphical form of this function is known as Lorenz Curve (Figures 1). The design of concentration of investment is compared with the line of equal distribution. As a mesure of the difference between distributions, Gini proposed a concentration ratio difined as follows:

Let p(x) is plotted on x-axis and q(x) on y-axis. Put BC=1 on the x-axis and BA=1 on the y-axis. BD is the q(x) =p(x) line and the point O is on the curve, q=f (p).
Therefore concentration ratio, g= (area BOD) / (area BCD).
An alternative computation of the Gini coefficient was suggested by Barrow (1998) using the equation:

$$G = \frac{\text{Area(BOD)}}{\text{Area(BCD)}} = \frac{\text{Area(BOD)}}{\text{Area(BOD)} + \text{Area(BODC)}}$$

Where, $\text{Area(BODC)} = \frac{1}{2}\{(x_1 - x_0)(y_1 + y_0) + (x_2 - x_1)(y_2 + y_1) + \ldots + (x_k - x_{k-1})(y_k + y_{k-1})\}$

Area (BOD) = (½ x 1 x1) – Area (BODC)

The predictors of household investments from remittances have been identified by using binary logistic regression analysis. When the dependent variable is dichotomous, logistic regression model is widely used not only to identify risk factors but also to predict the probability of success. The simple linear logistic regression model can be expressed as $\log_e[\frac{\pi(X_i)}{1 - \pi(X_i)}] = \beta_0 + \beta_1 X_i$

Where, the quantity $\pi(X_i) = E(y_i = 1 \mid X_i)$ represent the conditional probability that Y=1 given X and expressed as $\pi(X_i) = \frac{e^{\beta_0 + \beta_1 X_i}}{1 + e^{\beta_0 + \beta_1 X_i}}$.

If one consider a collection of p independent variables denoted by the vector $X'=(X_1, X_2, \ldots, X_p)$ then the multiple logistic regression model is given by the equation as

$$\log_e[\frac{\pi(X_i)}{1 - \pi(X_i)}] = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \text{- - - -} + \beta_p X_{pi}$$

RESULTS AND DISCUSSION

Profile of foreign remittances at household level

Remittances are an alternative source of funding for household survival and for financial activities among small businesses and enterprisers. As a form of foreign savings, remittances are influencing not only consumption behavior but also investment behavior. In Bangladesh substantial amount of foreign remittances go to the international migrants' households in rural areas countrywide. In some cases these private transfers provide the life support to the receiving households whose only source of income is remittances. In general, the percentage of such kind of households is estimated at about 20 by this study indicating the utmost importance of foreign remittances for these households and the rural economy of Bangladesh. In this study an attempt was made to collect and document the data and information on foreign remittances in rural areas. These data and information are inflows of remittances over the year 2009, motives behind remittances during this year, status of remittances in terms of frequency and major channels of remitting in 2009. Then the allocation and utilization pattern for investment behavior of these remittances was investigated into and its details are given in the following subsections.

Remittance inflows over the year from 2009

502 sampled international-migrant households reported to get foreign remittances in 2009. The mean/average remittances were estimated at TK.180597.61. The remittance receiving sample households on an average allocated and utilized 64.75% of their foreign remittances for investment at household (micro) level (Table 1).

Major channels of remitting in 2009

Five kinds of major channel have been considered in this study. These are: 1) banking channel when the receiver has account, 2) through other persons living in other country, 3) from migrants' account to other persons' account, 4) cash from the migrant to the receiver (Through Western Union, CMT, Money gram, Self declaration at ports) and 5) cash from the migrant to the receiver (Through other persons living in the native country). The highest 67.3% of the households reported to receive remittances through the channel numbered 1. The next highest 22.5% of the households reported to get these transfers through the channel numbered 4. The following channels reported by 4%, 3.6% and 2.6% households are numbered 3, numbered 5 and numbered 2 respectively. It is happily notable that only 6.2% of the households have been found out to receive foreign remittances through informal channel (channels numbered 2 and 5). The rest 93.8% of the households received remittances through formal channel (Table 1). This might happen because of the cost-effective and time-saving technology in remitting as well as the effective execution of anti-money laundering and financing of terrorism rules and regulations in recent times in Bangladesh.

Motives behind remittances

Most of the cases of international migration in Bangladesh are temporary, economic and remittances-motivated in nature. So it can easily be inferred that the act of international migration is adopted in this country as an ex-ante strategy for risk-diversifying and household economic condition-developing by the concerned households. Hence remittances are motive binding here. In this study six motives behind remittances have been considered. These are: 1) maintaining household consumption expenditure, 2) purchase of durables, 3) investment for human resources development, 4) direct investment, 5) indirect financial portfolio investment, 6) social investment. In the year 2009, 87.6 percentages of the households reported to get remittances with the motive of investment for human resources development and followed by (54.8%, 56.6%, 38.0% and 43.4% households the motive of purchase of durables, direct investment, indirect financial portfolio investment and social investment respectfully (Table 1).

Overall status of remittances

This study finds that 69.52% of the households receive foreign remittances on regular basis while the remaining 30.48% households receive these transfers on irregular basis indicating remittances as a source of permanent income for a substantial portion of the receiving households in rural Bangladesh (Table 1). The finding of the motives behind remittances proves that these transfers are the life-support for most of the receiving households since the motive of maintaining household investment very significantly dominates over other motives. Finally it is found out that as a channel of remitting in aggregate sense formal one extremely predominates over the informal one in recent times in Bangladesh, especially in rural areas. It is undoubtedly a happy message for all.

Table 1. Remittance inflows over the year from 2009

Remittance 2009	**Amount**	
Mean	180597.61 TK	
Sum	90660000 TK	
Investment		
Mean	116938.94 TK	
Sum	58703350 TK	
% of investment	64.75	
Channel of remitting in 2009		
	No of Household	**% of Household**
Through banking channel when the receiver has account	338	67.3
Through other persons living in other country	13	2.6
From migrants account to other persons' account (Through banking channel)	20	4.0
Cash from the migrant to the receiver (Through Western Union, CMT, Money gram, Self declaration at ports)	113	22.5
Cash from the Migrant to the receiver (Through other persons living in the native country)	18	3.6
Frequency of remittances		
Regular	349	69.52
Irregular	153	30.48
Total	**502**	**100.0**
Utilization of foreign remittance		**% of Household**
Household consumption expenditure		92.2
Purchase of durables		54.8
Investment for human resources development		87.6
Direct investment		56.6
Indirect financial portfolio investment		38.0
Social investment		43.4

Inequality of investment distribution in the surveyed population: Lorenz Curve

The distribution of investment at household level along with the necessary elements for drawing Lorenz curve is given in Tables 2 and Figures 1 shows the corresponding Lorenz curves at household level of the study population.

The *Gini* concentration ratios are estimated at 0.497 for the overall households, which indicate a higher inequality of investment among the survey households. The results suggest that about 50% of the investment of the community is concentrated in the hands of few peoples and the rest of the investment is all distributed among the major portion of the households of the study area.

Table 2. Calculation of *Gini*-coefficient for overall household investment

Upper Limit of Investment (X)	No. of households (N)	N-Nx	Total Investment (I)	I-Ix	p(x)=X	q(x)=y	$(x_k - x_{k-1})$	$(y_k + y_{k-1})$	$(x_k - x_{k-1}) * (y_k + y_{k-1})$
≤5000	13	13	22200	22200.00	0.026	0.000	0.088	0.011	0.00096
20000	44	57	598500	620700.00	0.114	0.011	0.080	0.039	0.00309
30000	40	97	1035200	1655900.00	0.193	0.028	0.064	0.076	0.00484
40000	32	129	1143900	2799800.00	0.257	0.048	0.116	0.145	0.01677
60000	58	187	2920750	5720550.00	0.373	0.097	0.133	0.276	0.03683
80000	67	254	4755900	10476450.00	0.506	0.178	0.120	0.453	0.05412
100000	60	314	5629300	16105750.00	0.625	0.274	0.056	0.602	0.03358
120000	28	342	3131500	19237250.00	0.681	0.328	0.096	0.767	0.07331
150000	48	390	6533200	25770450.00	0.777	0.439	0.070	0.974	0.06791
170000	35	425	5638300	31408750.00	0.847	0.535	0.034	1.121	0.03797
190000	17	442	2995100	34403850.00	0.880	0.586	0.036	1.237	0.04437
240000	18	460	3830000	38233850.00	0.916	0.651	0.024	1.354	0.03237
270000	12	472	3033000	41266850.00	0.940	0.703	0.020	1.458	0.02905
350000	10	482	3065000	44331850.00	0.960	0.755	0.024	1.602	0.03829
550000	12	494	5356400	49688250.00	0.984	0.846	0.016	1.846	0.02943
2781000	8	502	9015100	58703350.00	1.000	1.000	-	-	-
Total	502		58703350.00						0.50289

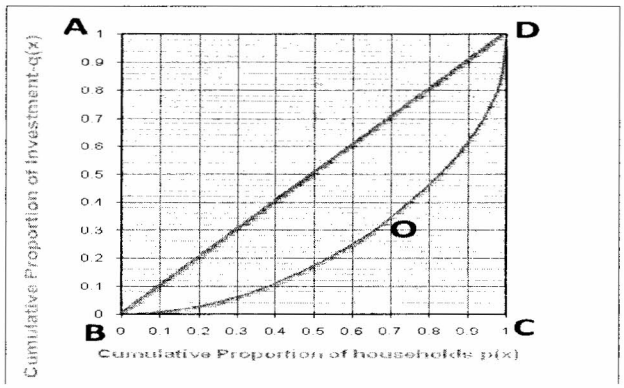

Fig. 1: Lorenz Curve of overall household investment

Predictors of substantial amount of household investment from remittances

To apply binary logistic regression model, the dependent variable, amount of total annual investment from remittances, is converted into a dichotomous variable. The dependent variable is made dichotomous by using the median value of the amount of total investment from remittances. The median value of this statistic is obtained as Tk.80000, which is not a sufficient amount for annual investment in Bangladesh (Baten 2009). So, the dependent variable is made dichotomous accordingly and each dichotomous part has been coded as '0'and '1'. Code-0 is used for the value less than the median and code-1 is used for the value greater than or equal to the median. Very rationally the value greater than or equal to the median is defined here as substantial. Genuinely, the Hosmer & Lemeshow test statistics bears the evidence of better fit of the model to the data set under consideration. The detailed results of the analysis of BLRM are illustrated in Table 3. The covariates that are included in the model for investment in the study are; maximum education of the household, employment status of the household head, region of the household, destination of the migrant, motive behind remittances, relationship of the household head with migrant, optimistic perception about profitability of investment, perceptive status of investment climate, inter-household relative socio-economic position,

intra-household relative economic position, adult male member of the household, sex of the household head and dependency ratio. Among these, the statistically significant predictors as identified by the study are: maximum education of the household, region of the household, current destination of the migrant, motive behind remittances, relationship of the household head with migrant, inter-household relative socio-economic position, sex of the household head and dependency ratio.

Table 3. Estimated regression coefficients and associated statistics from multiple binary logistic regression model for identifying the predictors of high investment factor, Dependent variable: Amount of investment (0=less than median, 1=greater or equal median)

Covariates	B	S.E.	Wald	p-value	Exp(B)
Maximum education of the household			**2.954**	**0.228**	
Primary					1.000
Secondary	0.402	0.358	1.266	0.261	1.495
Higher secondary	0.418	0.245	2.910	0.088	1.519
Employment status					
Unemployed					1.000
Employed	0.034	0.272	0.016	0.900	1.035
Region of the household					
West					1.000
East	0.498	0.227	4.790	0.029	1.645
Destination			**14.824**	**0.001**	
Malaysia					1.000
Middle East	0.481	0.286	2.822	0.093	1.617
UK,USA, EC	1.641	0.431	14.518	0.000	5.161
Motive behind of remittances					
Family maintenance					1.000
Otherwise	0.707	0.252	7.865	0.005	2.028
Relationship of the household head with migrant			**7.869**	**0.049**	
Brother					1.000
Husband	-0.223	0.499	0.199	0.656	0.800
Household head	0.073	0.439	0.028	0.867	1.076
Son	0.608	0.329	3.421	0.064	1.838
Optimistic perception about profitability of investment					
Less					1.000
More	0.113	0.241	0.221	0.638	1.120
Perceptive status of investment climate					
Unfavorable					1.000
Favorable	0.219	0.255	0.743	0.389	1.245
Inter-household relative socio-economic position					
Poor					1.000
Other than Poor	0.707	0.268	6.955	0.008	2.027
Intra-household relative economic position					
Poor					1.000
Other than Poor	0.215	0.320	0.450	0.502	1.239
Adult male member of the household					
No					1.000
Yes	0.412	0.311	1.755	0.185	1.510
Sex of the household head					
Female					1.000
Male	0.334	0.376	0.791	0.037	1.397
Dependency ratio	-0.498	0.271	3.383	0.066	0.608
Constant	0.233	0.247	0.892	0.345	1.263

Model Summary			Hosmer and Lemeshow Test		
-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square	Chi-square	d.f	Sig.
609.710a	0.158	0.210	12.839	8	0.118

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Discussion of the empirical findings from the multiple binary logistic regression models is as follows

The findings are discussed separately for each of the covariates for a better and clear realizing. Here it is crucially mentioning that the impacts of the covariates on considerable amount of foreign remittances spent on investment are explained in terms of the odds ratio which is a measure of association that has found wide use, especially in epidemiology, as it approximates how much more likely (or unlikely) it is for the outcome to be present among those with x=1 than among those with x=0 (Hosmer and Lemeshow, 2000). The odds ratios are presented in the rightmost column of Table 3 in terms of exp (B).

Maximum education of the household member

The maximum educated member of the household plays an essential role in determining what magnitude ratio of remittances should go for investment. If the person is higher educated, it naturally extends the utilization of remittance in profitable sectors that is the foreign remittances regarding spending on investment and vice versa in case of the illiterate person. Thus it can be taken for granted that the educated person of the household contribute to the progress or growth of the utilization of a substantial amount of remittances for investment. This presumption is strongly supported by the estimate of odds ratio here as it shows that the households having higher educated are 1.519 times more likely to spend a substantial amount of their remittances on investment than the primary educated member of the household. Similarly the households having secondary educated member are 1.495 times more likely to spend a substantial amount of their remittances on investment than the primary educated member of the household.

Region of the household

The east region formerly consists by three divisions such as Sylhet, Chittagong and Dhaka. The west as low migration area consists by Barisal, Khulna and Rajshahi. The study was accomplished in rural areas of the above six former divisions of whole Bangladesh. This divide can have impact on the substantial amount of remittances to be spent for investment due to the region-specific features such as distance and connectivity to the capital city, Dhaka. The empirical finding in this study discover the estimate of odds ratio indicates that the remittances-receiving households of the east, the high migration area, are 1.645 times more likely to spend a substantial amount of their remittances on investment than their western, the low migration area, counterparts.

Current destination of migrant

Destination of the migrant is the source of remittances. So, consideration of the source of remittances broadly reflects the overall outcome of international migration along with financial remittances on the investment behavior of the concerned receiving household. To have an idea about this reflection on investment, this study has included the destination variable in the model. The finding on the odds ratio estimate exhibits that the households receiving remittances from developed (USA, UK, EC) countries are 5.161 times more likely to spend a substantial amount of their remittances on investment than the households receiving remittances from Malaysia. Similarly, the households having remittances from Middle East countries are 1.617 times more likely to spend a substantial amount of their remittances on investment than the reference households.

Motive behind remittances

The utilization of foreign remittances is substantially influenced by the motive behind these transfers since the motive is determined by the joint decision of the remitter(s) and the left behind household members based on their needs. It can logically be hypothesized that the utilization of a substantial amount of remittances for investment is more likely to occur for other motives than family maintenance. The estimate of odds ratio reveals that the utilization of a substantial amount of remittances for investment is 2.028 times more likely to take place on the ground of other motives than the altruistic (family maintenance) motive of remittances.

Relationship of the household head with migrant

The relationship of the household head plays an important role in determining what amount of remittances should go for investment. If the migrant person is husband of the household head which

extends negative impact of the utilization of remittance on investment sectors that is the foreign remittance less considering spending on investment than the migrant person is brother of the household head and so on. Thus it can be taken for granted if the migrant person is husband of the household head contribute to the less progress or growth of the utilization of a substantial amount of remittances for investment. This presumption is strongly supported by the estimate of odds ratio here as it shows that the migrant person is husband of the household head is 0.800 times more likely to spend a substantial amount of their remittances on investment than the migrant person is brother of the household head. Unlikely the migrant person is household head and son of the household head are 1.076 and 1.838 times respectively more likely to spend a substantial amount of their remittances on investment than the brother of the household head.

Inter-household relative socio-economic position

According to the hypothesis of investment household relative income impacts a lot on the household investment. In this respect, if the concerned household considers itself relatively poor in compare with the neighboring households despite its high absolute income, it is likely that it tends to spend less on investment due to demonstration effect and vice versa. This hypothesis has been proved true here since the estimate of odds ratio demonstrates that the households thinking them relatively poor compared with their neighboring households. Then these household who are not poor than other are 2.027 times more likely to spend a substantial amount of their remittances on investment than their counterparts thinking them otherwise.

Sex of the household head

It is true that the sex of household plays a vital role in determining what amount of remittances should go for investment. If the migrant person is male who extends positive impact of the utilization of remittance on investment sectors vice versa of female. Thus it can be taken for granted if household head is male who contributes to the progress or growth of the utilization of a substantial amount of remittances for investment. This presumption is strongly supported by the estimate of odds ratio here as it shows that the male person is 1.397 times more likely to spend a substantial amount of their remittances on investment than the female household head.

Dependency ratio

In addition to the above mentioned categorical covariates, this BLRM has considered a continuous covariate named dependency ratio. The odds ratios estimate that with one unit increase in these covariates it becomes 0.608 times more likely for the households to spend a substantial amount of their remittances on investment. The predictor dependency ratio is found out to put negative impact on the utilization of a substantial amount of their remittances for investment for every unit increase in their value.

The study found that a considerable amount of remittances has been utilized into investment. In overall sense, about 65% of the remittances were allocated and utilized for investment at micro-household level. It is found that migrant households which had access to some assets and resources before migration were more successful in directing remittances into investment than households with poorer economic backgrounds, suggesting that these resources form a base for further improvements and for investment of overseas earnings.

Access to employment of household head is another important factor affecting decision-making to directing remittances into investment. This becomes clear when one contrasts the situation of those migrant households which had supplementary sources of income with that of those which depended solely on remittances. If the primary income earner remains at home and continues to maintain the household, earnings from migration are more easily diverted to investment. The *Gini* concentration ratios also indicates that about 50% of the investment of the community is concentrated in the hands of few peoples and the rest of the investment is all distributed among the major portion of the households of the study area.

The present study have also been identified the predictors of household investments from remittances by using multiple binary logistic regression analysis. Maximum education of the household, region of

the household, destination of the migrant, motive behind remittances, relationship of the household head with migrant, inter-household relative socio-economic position, sex of the household head and dependency ratio have had significant impact on overall investment at micro level in rural areas of Bangladesh.

This study has shown that migrant households were able to direct a considerable proportion of remittances into investment. This ability was heavily influenced by the process of recruitment, pre-migration household economic position and the human capital of workers. These factors should be taken into account when formulating policies and programs to encourage workers to use remittances productively. Overall investment climate in rural economy in all of its dimensions should be improved and ensured to give the households payments for spending more of their remittances on different kinds of investment, especially directly productive investment for sustainable socioeconomic development.

REFERENCES

Baten, M.W. 2009. Vision of Micro Financing in Bangladesh Successes and Challenges, Copenhagen Business School (CBS).79(2): 54

Chandavarkar, A.G. 1980. Use of Migrants Remittances in Labor-Exporting Countries, Finance and Development. 17 June, p: 36–39.

Hosmer D.W. and Lemeshow, S. 2000. Applied Logistic Regression, John Wiley & Sons, Inc.

Mahmud, R.A. 1998. Globalization, International Migration and Human Development: Linkage and Implications, Prepared for the UNDP (Mimeo).

Russell, S.S. 1986. Remittances from International Migration: A Review in Perspective, A research report prepared by the authors, Dhaka (Mimeo).