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Impact of Remittances on Rural Poverty in Nepal: Evidence from Cross-Section Data

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ABSTRACT

This paper attempts to determine the impact of remittance on rural poverty in Nepal using the microdata set of household risk and vulnerability survey 2016 – 2018. The cross-sectional analysis has been carried out using a dataset of 2018 with 5,645 households across 50 districts of Nepal. The logit regression model has been used to determine the relationship between poverty and remittances. About 38 percent of rural households received remittances in 2018. About 65 percent of households headed by females received remittance compared to 30 percent of households headed by male counterparts. About 41 percent, 31 percent, and 32 percent of households living in the Hilly region, Terai, and Himalayan region respectively received remittance in 2018. About 1 in every 5 households in rural Nepal are poor. The probability of households falling into poverty reduces by 4.8 percent with a one percent rise in household assets. Remittance receiving households are 2.3 percent less likely to get caught in poverty as compared to remittance non-receiving households. The probability of households plunging into poverty decreases by about 1.1 percent with every 10 percent increase in remittance inflows to households.

Key Words: Remittance, poverty, logit regression

JEL Classification: C21, F24, I32

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I. INTRODUCTION

With the estimated international migrants of almost 272 million globally, with nearly two-thirds being labor migrants, the global remittance flows amounted to $654.33 billion in 2019 (World Bank 2020; United Nations 2020). In 2019, the top five remittance recipient countries were India ($83.1 billion), China ($68.4 billion), Mexico ($38.5 billion), the Philippines ($35.2 billion), and the Arab Republic of Egypt ($26.8 billion) (World Bank 2020).

As the tendency of emigration of Nepali workers have increased over a decade, remittance inflow has captured rapt attention in the Nepali macroeconomic environment. Nepal received remittance amounting to Rs. 875 billion in FY2019/20, which translates into a remittance to GDP ratio of 23.23 percent (NRB 2020). Consequently, Nepal is seemingly a remittance-based country with remittance inflow amounting to more than a quarter of the country's GDP. In a decade, remittances from abroad have increased by more than three-fold, from $2.54 billion to $8.75 billion. Labor migration is an integral part of the Nepalese economy. Department of Foreign Employment (DoFE) has issued over four million labor permits to Nepali workers from 2009 to 2019 (MOLESS 2020). Out of 110 destination countries for labor migration, Qatar, the UAE, Saudi Arabia, Kuwait, and Malaysia are the top five destination countries (MOLESS 2020).

According to the NLSS III (2010/11), 56 percent of Nepalese households receive remittance and one in every two rural households received remittance (CBS 2011). Poverty reduced from 25.2 percent in 2010 to 16.6 percent in 2019 (CBS 2011; MoF 2020). Remittance has been considered as a catalyst for reducing rural poverty. Likewise, overseas remittances are associated with increased investment in education which generates augmented human capital and has a future social return (Bui, Le, & Daly, 2015). Similarly, Raihan, Khondker, Sugiyarto, and Jha (2009) found positive and significant impacts of remittances on the household's food and housing-related expenditures; the probability of the household becoming poor decreases by 5.9 percent if it received remittances. However, Ang, Sugiyarto, and Jha (2009) concluded that remittances negatively influence the share of food consumption in the total expenditure; further, remittances to the Philippines do not have a significant influence on other key items of consumption or investment such as spending on education and health care. In the Nepalese context, Thapa and Acharya (2017) examined the impact of remittance on food consumption, health, and education using the dataset of NLSS-III, 2010-11. Remittance recipient households tend to spend more on consumptions, health, and education as compared to remittance non-receiving households (Thapa and Acharya 2017). Remittances have played a pivotal role in reducing poverty, however, the nexus between remittances and poverty have not been explored in recent times in the context of Nepal. This paper utilizes the microdata set of Household Risk and Vulnerability Survey 2016-18 to investigate the impact of remittance on rural poverty. The objective of this paper is to investigate the impact of remittances on the rural poverty of Nepal.

II. LITERATURE REVIEW

The literature review has been divided into two parts (i) theoretical review and (ii) empirical review. Under empirical review, we have reviewed Wagle and Devkota (2018), Thapa and Acharya (2017), Bui, Le, and Daly (2015), Ang, Sugiyarto, and Jha (2009) and Raihan et al. (2009).

2.1 Theoretical review

The theories of international remittances tend to identify why individuals migrate and go in for foreign employment reluctantly leaving off their family members. Some of the established theories that explain international remittance are (i) Neo-classical theory, (ii) New Economics of Labor Migration, (iii) Network theory, (iv) Human capital theory, and (v) Segmented labor market theory.

The neo-classical approach can be dated back to Smith (1776). Potential host countries select suitable migrants through immigration policies for human physical gains, hence an immigrant market exists between countries (Borjas 1987). Likewise, migrants with the motive of maximizing their utility will choose a country being bound by their budget constraints. The wage difference between the countries motivates labor to shift from low-wage countries to high-wage countries. The theory predicts the linear relationship between wage differentials and migration.

On the other hand, New Economics of Labor Migration (NELM) proposes that migration decisions are not taken by one individual only, but rather by families or households. The NELM emerged indicating that migrations stem from market failures outside the labor market (Kubursi 2006). Further, this theory posits that remittances lessen production and market constraints faced by households in poor developing countries (Taylor 1999).

From a different perspective, the network theory ties labor migration with Kinship ties, friendship, and community origins. The network theory of labor migration advocates that migration can be a self-perpetuating process because the cost and risk associated with migration are reduced by the existence of a diaspora or network. Kinship ties, friendship, and share community origins are hypothesized to increase migration flows because they reduce the psychic and risk cost of immigration (Kubursi 2006).

Interestingly, the human capital theory takes a novel perspective where migration is considered as an investment in the human agent which involves costs and returns (Kooiman, Latten, and Bontje 2018). According to this theory, human capital is the dominant personal driver of migration as migrated people can get access to opportunities beyond their current activity space. These opportunities may be jobs that directly render higher financial returns, but also

educational facilities or jobs through which people can augment their human capital which may render higher returns in the long run (Kooiman, Latten, and Bontje 2018).

In a nutshell, neoclassical migration theory and the NELM theory conceptualize migration decisions as the outcome of rational economic calculations by individuals or families. The network theory of migration attributes migration decision to personal relationships and human capital theory relates migration decision to long-run returns. Likewise, the segmented labor market theory of migration advocates that immigration responds to the demand-driven forces within structural imbalances of advanced economies (Kubursi 2006).

2.2 Empirical Review

Wagle and Devkota (2018) examine the dynamics of foreign remittances and their impact on poverty in Nepal using data from the longitudinal panel surveys of 1996, 2004, and 2011. They explored how foreign remittances have evolved and impacted poverty and the economic well-being of households. The effect of foreign remittances on poverty has been derived focusing on a consistent set of households across the three survey rounds in a balanced panel format with appropriate controls. Results from methodologically consistent, random-effects regressions that correct for potential attrition and heterogeneity bias support significant poverty-reducing and more accurately, economic well-being-enhancing effects of foreign remittances, especially when originating in countries other than India.

Thapa and Acharya (2017) examine the effect of remittances on household expenditure patterns applying propensity score matching methods that allow designing and analyzing observational data and enable reducing selection bias. The study uses data from the Nepal Living Standards Survey 2010/2011. In general, remittance recipient households tend to spend more on consumption, health, and education as compared to remittance non-receiving households. Although the findings do not provide evidence of either the productive or non-productive use of remittances, expenditures on non-food investment categories, such as durable goods, health, and education, are more apparent among remittance-receiving households compared to remittance non-receiving households, which signal the prospect of a sustainable long-term welfare gain among the former.

Bui, Le, and Daly (2015) examine the micro-level impacts of domestic and overseas remittances on household behavior such as consumption-investment expenditure patterns and the propensity of households being engaged in business activities in the case of Vietnam employing the Ordinary Least Square (OLS) regression and logistic regression models. The study finds that households in receipt of remittances spend less at the margin on the key consumption normal goods. Likewise, overseas remittances are associated with increased investment in education. The findings strengthen the optimistic perspective of the significant positive effects of remittances on household expenditure patterns in developing economies.

Ang, Sugiyarto, and Jha (2009) examine the role of remittances in increasing household consumption and investment and thereby their potential for rebalancing economic growth and creating long-term human and capital investment. The study applies an instrument variable estimation technique and a reduced form equation to estimate the effects of remittances on household expenditure. The results indicate that remittances negatively influence the share of food consumption in the total expenditure. However, unlike previous studies, the estimations show that remittances to the Philippines do not have a significant influence on other key items of consumption or investment such as spending on education and health care. A further analysis using logistical regression shows that remittances help to lift households out of poverty. Remittances thus may help in fighting poverty in the Philippines but not in rebalancing growth, especially in the long run.

Raihan et.al (2009) examine the impacts of international remittances on household consumption expenditure and poverty in Bangladesh using computable general equilibrium modeling of the Bangladesh economy and micro-econometric analysis at the household level. The paper estimates that 1.7 out of the 9-percentage point reduction in the headcount ratio during 2000–2005 is due to the growth in remittances. A closer look at the household level further reveals the positive and significant impacts of remittances on the household's food and housing-related expenditures. The impacts on education and health expenditures are also positive but insignificant. This implies a limited role of remittances in creating domestic demand for rebalancing growth and in developing the human capital necessary to achieve the MDGs. However, results based on logit regression suggest that the probability of the household becoming poor decreases by 5.9% if it receives remittances, which further confirms the positive impact of remittances.

Myriad of international literature attempt to disclose the relationship between remittances and poverty. Thapa and Acharya (2017) have examined the effect of remittances on household expenditure patterns using a dataset of Nepal Living Standard Survey III (2010-11), which is nearly a decade-old dataset. Also, Thapa and Acharya (2017) have not explored the impact of remittance on poverty. Wagle and Devkota (2018) have explored the relationship between remittance and poverty using a balanced panel of three rounds of NLSS from 1996 to 2010. Exploring the relationship between remittances and poverty using the new dataset unveils a novel phenomenon between them. Thus, this paper attempts to dig out the relationship between remittance and poverty using the new dataset of Nepal Household Risk and Vulnerability Survey (2016-18) by the World Bank Group.

III. DATA AND METHODOLOGY

The study uses panel microdata of household risk and vulnerability survey conducted from 2016 to 2018 by the World Bank. The survey sampled 6000 households and a total of 400 PSUs from rural and urbanizing VDCs, excluding the municipal areas within the 50 districts of Nepal. The

majority of households in 2016 and 2017 were exposed to shocks (Walker, Kawasoe, and Shrestha 2019), so the study is confined to cross-sectional data of 2018 for descriptive and econometric analysis.

The study follows the methodology applied by Raihan et al. (2009). Two models have been derived to assess the impact of remittances on the rural poverty of Nepal. Equation (i) estimates the impact of remittances on poverty where remittance is a binary variable and Equation (ii) uses remittance in log form.

The functional form is written as follows:

$$P_i = \beta_0 + \sum_{l=1}^{n} \beta_l S_l + \sum_{j=1}^{n} \beta_j H_j + \sum_{k=1}^{n} \beta_k Z_k + \phi \text{Remit}_i + \varepsilon_i \quad \ldots\ldots\ldots (1)$$

$$P_i = \beta_0 + \sum_{l=1}^{n} \beta_l S_l + \sum_{j=1}^{n} \beta_j H_j + \sum_{k=1}^{n} \beta_k Z_k + \phi \text{Lnremit}_i + \varepsilon_i \quad \ldots\ldots\ldots (2)$$

Where Pi denotes poverty, Sl is the vector of individual characteristics, Hj is the vector of household characteristics, Zk is the vector of community characteristics. β_l, β_j and β_k are the coefficient associated with individual characteristics, household characteristics, and community characteristics respectively. Remit in equation (i) identifies if a household is a remittance recipient. Lnremit in equation (ii) is the amount of remittance received by the household.

The econometric form is:

$$\begin{aligned} \text{Poverty} = {} & \beta_0 + \beta_1 \text{Gender} + \beta_2 \text{Age} + \beta_3 \text{Age}^2 + \sum_{i=1}^{5} \beta_{ei} \text{Education}_i + \beta_6 \text{Assets} + \\ & \beta_7 \text{Income} + \beta_8 \text{HH size} + \beta_{81} \text{HH size sq} + \beta_9 \text{Fallow land} + \beta_{10} \text{Upland} + \\ & \beta_{11} \text{Distance} + \beta_{12} \text{Remit} + \sum_{j=1}^{2} \beta_{edj} \text{Ecobelt}_j + \sum_{k=2}^{10} \beta_{etk} \text{Ethnic}_k + \\ & \sum_{l=1}^{49} \beta_{dl} \text{District}_l + \varepsilon \end{aligned} \quad \ldots\ldots\ldots (3)$$

$$\begin{aligned} \text{Poverty} = {} & \beta_0 + \beta_1 \text{Gender} + \beta_2 \text{Age} + \beta_3 \text{Age}^2 + \sum_{i=1}^{5} \beta_{ei} \text{Education}_i + \beta_6 \text{Assets} + \\ & \beta_7 \text{Income} + \beta_8 \text{HHsize} + \beta_{81} \text{HH size sq} + \beta_9 \text{Fallow land} + \beta_{10} \text{Upland} + \\ & \beta_{11} \text{Distance} + \beta_{12} \text{LnRemit} + \sum_{j=1}^{2} \beta_{edj} \text{Ecobelt}_j + \sum_{k=2}^{10} \beta_{etk} \text{Ethnic}_k + \\ & \sum_{l=1}^{49} \beta_{dl} \text{District}_l + \varepsilon \end{aligned} \quad \ldots\ldots\ldots (4)$$

Following Raihan et al. (2009), equation (iii) and equation (iv) utilize the logit model. We have calculated the odds ratio and marginal effect. The odds ratio has no direct economic interpretation, so we have estimated marginal effects. A specification test has been carried out to confirm whether the model is correctly specified nor not. The goodness of fit statistics has been calculated to check if the model fits the data.

The study uses household-level poverty. The reason for using household-level poverty are (i) this paper seeks to determine the impact of household remittance on poverty, (ii) the simultaneous causality bias between headcount poverty and household size is evident, and (iii)

using survey weights is more appropriate while using household poverty as other variables are at the household level.

Table 1

Description of variables

S.N.	Variable	Description
1	Poverty	It is a binary variable where '1' represents poor and '0' represents non-poor.
2	Gender	It is a binary variable where '1' represents female and '0' represents male. Male is a reference category.
3	Age	It is a continuous variable in log form.
4	Age squared (Age^2)	It is a continuous variable in log form.
5	Education	It is an ordinal variable. Bachelor's and above has been used as the benchmark category.
6	Assets	It is the total assets owned by the household. It is a continuous variable in log form.
7	Income	It is the total income earned by the household excluding remittance income. It is a continuous variable in log form.
8	HH size	HH size is household size. It is a continuous variable.
9	HH size sq	HH size sq is square of HH size.
9	Fallow	Fallow denotes fallow land and measured in square meters. It is a continuous variable in log form.
10	Upland	Upland denotes a form of land and is measured in square meters. It is a continuous variable in log form.
11	Distance	Distance of household measured as the average distance of household from the market, bank, motorable road, and black-topped road. Log transformation is performed.
12	Remit	It is a binary variable where '1' represents a household that received remittance and '0' represents a household without remittance.
13	RemitRs	'RemitRs' denotes the total amount of remittance received by a household in 2018. It is a continuous variable.
14	EcoBelt	It is a categorical variable, where '1' denotes Himalayan, '2' denotes Hilly, and '3' denotes Terai. Terai district has been taken as a reference category.
15	Ethnicity	It is a categorical variable with 10 ethnic groups. Brahmin Hill has been taken as a reference category.
16	Districts	Fifty districts are used to control for area-level effect. Jhapa district has been taken as a reference category.

The study adopted the methodology of NLSS-III for determining the items to be included in the consumption aggregates. The accounting for the use of durable goods is adopted from Deaton and Zaidi (2002).

Following Deaton and Zaidi (2002), the use of durable goods is calculated as:

$$\text{Services from durable goods} = C_i \times \left((i_i - \pi) + \delta_i\right)$$

Where, C_i = Current value of durable goods; i = nominal interest rate; π = inflation rate; δ = rate of depreciation

The weighted average lending rate of 12.3 percent (NRB 2019a) and the inflation rate of 4.6 percent (NRB 2019b) are used. The depreciation rate of durable goods is extracted from NLSS-III. The purchased price and the date of purchase of durable goods are not disclosed in the dataset, so it is assumed that the durable goods have been used for two years on average. Moreover, to avoid simultaneous casuality bias, the value of durable goods net depreciation has been used while calculating the value of total assets of a household..

IV. RESULT AND DISCUSSION

4.1 Descriptive Statistics

Under descriptive statistics, we have calculated the mean, standard deviation, minimum, and maximum of all the variables under study. A total of 5,645 households were sampled. Table 2 depicts the descriptive statistics of the variables. Survey weights have been used to deduce the descriptive statistics.

Table 2
Descriptive statistics of variables under study

Variables	Obs	Mean	SD	Min	Max
Gender (1 = Female)	5645	0.23	0.42	0.00	1.00
Age	5645	50.45	13.64	15.00	95.00
Education status$	5645	-	1.26	1.00	6.00
Assets ('000' Rs.)	5645	2304.59	12707.46	2.00	809500.00
Income ('000' Rs.)	5645	133.61	247.77	0.00	6500.00
HH size	5645	4.91	2.04	1.00	17.00
Fallow	5645	929.39	3052.38	0.00	67726.31
Upland	5645	2664.01	4937.96	0.00	115134.74
Distance of Household	5645	7.41	10.04	0.00	87.68
Remit (1= received)	5645	0.38	0.49	0.00	1.00
Remit ('000' Rs.)	5645	73.67	178.52	0.00	5000.00
Poverty$$	5645	0.197	0.39	0.00	1.00

Note: $ Median value is 2; $$ Household-level poverty; Nominal scale variables such as Ecological belt, Ethnicity, and Districts have been excluded while calculating descriptive statistics

Source: Author's calculation

The descriptive analysis in Table 2 reveals that 23 percent of households are headed by females. The average age of the household is 50 years and the average household size is about 5. About 38 percent of the household received remittances in 2018. The poverty rate stands at 21 percent at the individual level and 19 percent at the household level. Individual weights and household weights have been used to derive these poverty figures.

Table 3 depicts the correlation matrix. Age, education, assets, income, household size, and remittance are negatively correlated with individual as well as household-level poverty. Household income is positively correlated to household size. Distance is positively correlated to poverty. The details of correlation coefficients are presented in Table 3.

Table 3
Correlation matrix

Variables	Poverty$$	Poverty$	Gender	Age	Age2	Education	Assets
Poverty$$	1						
Poverty$	0.458*	1					
Gender	-0.090*	0.026	1				
Age	-0.028*	-0.043*	0.231*	1			
Age squared	-0.012	-0.043*	0.208*	0.988*	1		
Education	-0.184*	-0.180*	0.211*	-0.306*	-0.301*	1	
Assets	-0.054*	-0.054*	0.021	0.037*	0.037*	0.089*	1
Income	-0.039*	0.034*	0.109*	-0.009	-0.017	0.034*	0.023
HH size	-0.234*	0.271*	0.193*	0.068*	0.051*	-0.057*	0.025
Fallow	-0.060*	-0.061*	0.035*	0.057*	0.056*	0.048*	0.030*
Upland	-0.131*	-0.105*	0.106*	0.112*	0.105*	0.158*	0.203*
Distance	0.017	0.055*	0.012	-0.001	0.002	-0.058*	-0.046*
Remit	-0.034*	-0.019	-0.299*	0.045*	0.042*	-0.138*	-0.024
Remit (Rs.)	-0.081*	-0.082*	-0.159*	0.042*	0.037*	-0.027*	0.015

Variables	Income	HH size	Fallow	Upland	Distance	Remit	Remit (Rs.)
Income	1						
HH size	0.163*	1					
Fallow	-0.004	-0.004	1				
Upland	0	0.094*	0.146*	1			
Distance	-0.064*	0.053*	0.109*	-0.075*	1		
Remit	-0.143*	-0.038*	-0.002	-0.015	-0.006	1	
Remit (Rs.)	-0.093*	-0.024	0.059*	0.016	-0.027*	0.516*	1

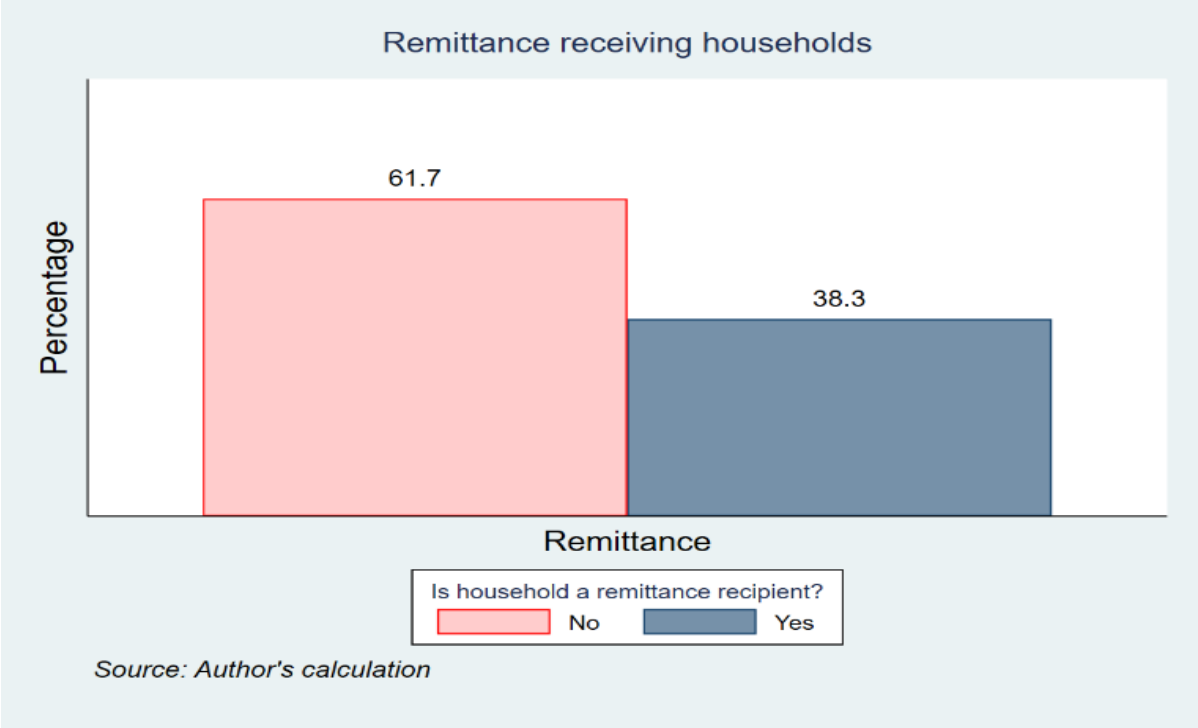
Note: *p<0.05

Source: Author's calculation

4.2 Descriptive Analysis of Remittance and Poverty

Remittance is the primary source of livelihood for rural households. Figure 1 depicts the households by remittance. The result represents entire rural households as survey weights have been applied to derive the result. About 38.3 percent of total rural households received remittance in 20181.

Figure 1: Remittance receiving households

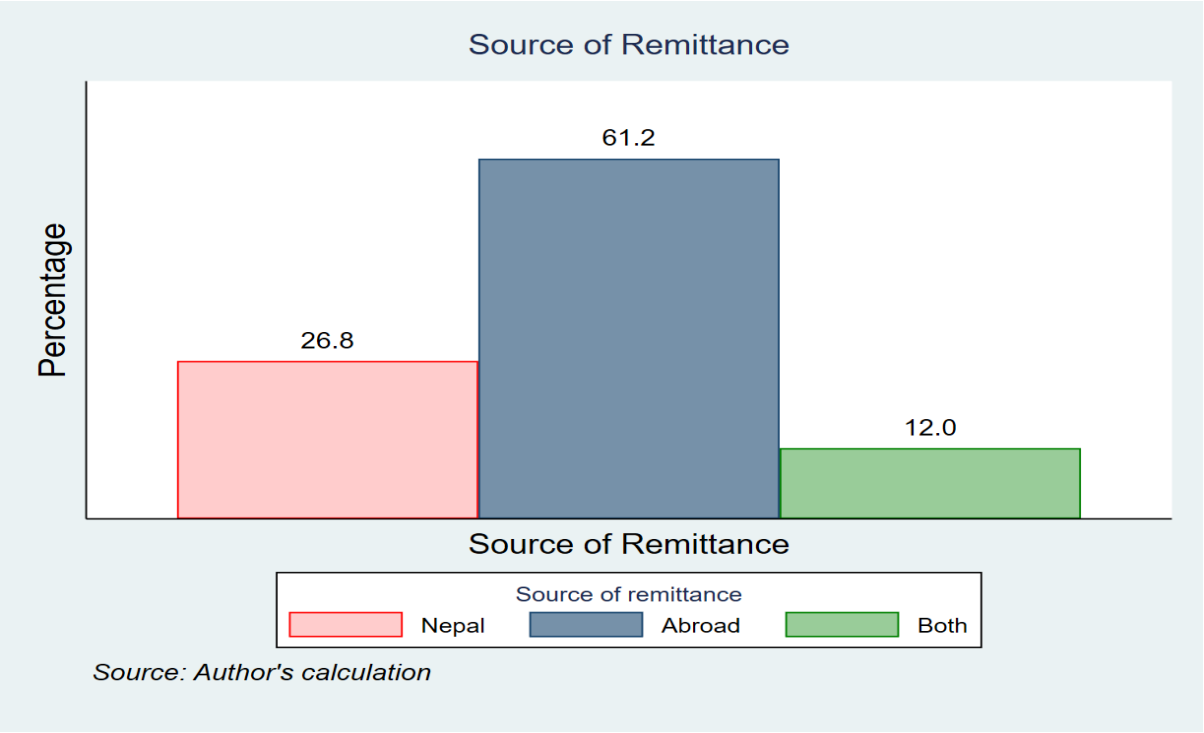


Labor migration from Nepal is a predominantly male phenomenon with the share of female migrant workers accounting for a little about 5 percent (MOLESS 2020). Consequently, 65.4 percent of households headed by females received remittance, but only 30.1 percent of households headed by males received remittance in 2018 (Annex 4). This represents that foreign employment is dominant in female-headed households. Likewise, About one-fourth of those households with migrant workers did not receive remittance in 2018. (Annex 4).

Sixty-one percent of households were sent remittance by migrant workers abroad, 26.8 percent of households received remittance from within Nepal, and 12.0 percent of households received remittance from migrants in both Nepal and Abroad (Figure 2). Remittance inflow of whooping Rs. 879 billion in 2018 also supports the fact that the majority of Nepalese receive remittance from aborad (NRB 2019b).

[1] The same result has been reported by Walker, Kawasoe, and Shrestha (2019).

Figure 2: Source of remittance

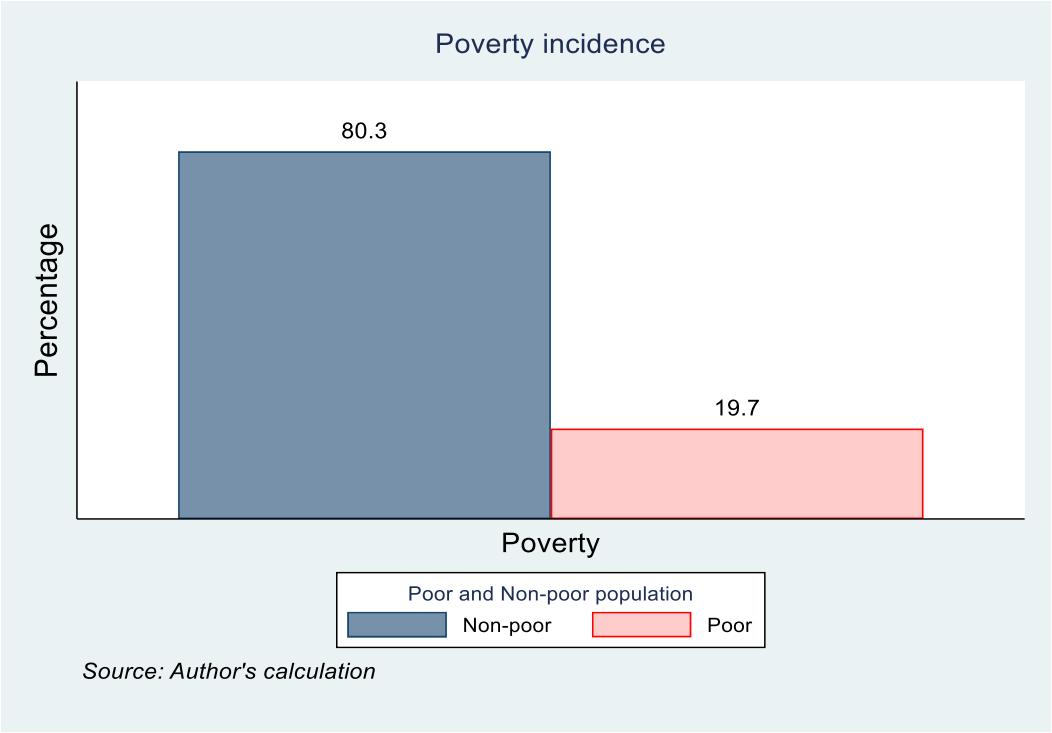


Source: Author's calculation

Likewise, Magar ethnic group has the highest remittance recipients. 44.2 percent of households with uneducated heads received remittances, and 39.1 percent of households in rural municipalities received remittances. The detailed figure is presented in Annex 3.

About 41 percent of households living in the Hilly region received remittances in 2018. Likewise, 37.2 percent and 32.0 percent of households in the Terai and Himalayan region received remittances (Annex 4). NLSS III concluded that two in three households in the Terai region and every one in two households in the Hilly and Himalayan region receive remittances (CBS 2011).

Figure 3: Household poverty incidence



About 1 in every 5 households in rural Nepal are poor (Figure 3). Remittance has played a catalyst role in reducing poverty. 20.2 percent of households not receiving remittances are poor, which is greater than those of remittance-receiving households with 19.0 percent (Annex 4).

4.3 Econometric Analysis

For econometric analysis, the logit model has been applied. Odds ratio and marginal effects have been calculated to interpret the impact of individual characteristics, household characteristics, and remittance on poverty. Table 4 presents the odds ratio and marginal effects only. The detailed result is presented in Annex 1 and Annex 2.

Table 4

Impact of remittances on rural poverty[2]

	Logged Remittance (Rs.)		Remittance received or not	
Poverty	Odds ratio	Marginal effects	Odds ratio	Marginal effects
Gender ('Male' omitted)				
Female	0.825	-0.0160	0.814	-0.0170
Age	0.922***	-0.00703***	0.922***	-0.00706***
Age squared	1.001***	6.13e-05***	1.001***	6.16e-05***
Assets	0.576***	-0.0477***	0.575***	-0.0478***
Income	0.977***	-0.00200***	0.977***	-0.00199***
HH size	0.381***	-0.0834***	0.381***	-0.0834***
HH size squared	1.037***	0.00317***	1.037***	0.00317***
Fallow	1.016**	0.00141**	1.016**	0.00141**
Upland	1.021***	0.00179***	1.021***	0.00179***
Distance	1.176***	0.0140***	1.176***	0.0140***
Remit (Rs.)	0.987***	-0.00112***	-	-
Remittance ('Not received' omitted)				
Remittance Received		-	0.764**	-0.0228**
Education status ('Bachelors and above' omitted)				
No schooling	10.46***	0.248***	10.42***	0.248***
Primary	6.465***	0.243***	6.431***	0.242***
Secondary	3.630**	0.152**	3.616**	0.151**
SLC	2.197	0.0899	2.192	0.0896
2	2.542*	0.113*	2.540*	0.113*
Ecological belt ('Terai' omitted)				
Himalayan	69.12***	0.768***	69.19***	0.768***
Hilly	11.47**	0.266**	11.48**	0.266**
Constant	920.9***	-	1,090***	-
Observations	5,645	5,645	5,645	5,645

Note: *** p<0.01, ** p<0.05, * p<0.1

Source: Author's Calculation

The goodness of fit is not significant at 5 percent reveals that the model fits the data well and the measure of fit reports the count R2 of 0.85 represents that 85 percent of the data fit the regression model (Annex 5). The model is free from specification test as 'hat' is significant and 'hat squared' is insignificant at 5 percent (Annex 5). The model suffers from heteroskedasticity but is free from multicollinearity (Annex 5). Survey weights have been applied in carrying out

[2] The complete regression result is presented in Annex 1 and Annex 2.

logit regression to correct for heteroskedasticity error terms (Solon, Haider, and Wooldridge 2013).

The coefficients of the two models are almost identical. Age and Household size have a 'U' shaped relationship with poverty. An odds ratio of 0.57 for assets means that the households with higher assets have about half or 50 percent, of odds of plunging into poverty as the households with lower assets. The marginal effect reveals that the probability of households falling into poverty reduces by 4.8 percent with a one percent rise in household assets. Likewise, Fallow land and upland also tend to increase poverty but have a very small impact. With the increase in distance of the average household from the market, banks, and roads by 1 percent, the log odds of the household being poor increases by 0.18. Marginal effects suggest that a 1 percent increase in the average distance of households from the market, banks, and roads is likely to increase poverty by 1.4 percent. Hence, remote households are exposed to poverty.

Education is a significant factor in reducing poverty. Households with educated household heads are less likely to fall into poverty. Households in the Himalayan and Hilly region are highly vulnerable to poverty as compared to that of the Terai region. Remittance lessens poverty. The remittance recipient households are less exposed to poverty as compared to remittance non-recipient households. Remittance receiving households are 2.3 percent less likely to get caught in poverty as compared to remittance non-receiving households. Moreover, the probability of households plunging into poverty decreases by about 1.1 percent with every 10 percent increase in remittance inflow to households. The findings of this study confirm with Raihan et al. (2009) and Ang, Sugiyarto, and Jha (2009).

V. CONCLUSION

With foreign employment being an increasingly popular trend in Nepalese households, remittances have turned into one of the major sources of livelihood for Nepalese households. About 38 percent of rural households received remittances in 2018. About 65 percent of households headed by females received remittances compared to 30 percent of households headed by head counterparts. About 41 percent, 31 percent, and 32 percent of households living in the Hilly region, Terai, and Himalayan region received remittances respectively in 2018.

About 1 in every 5 households in rural Nepal are poor. the probability of households falling into poverty reduces by 4.8 percent with a one percent rise in household assets. Fallow land and upland also tend to increase poverty but have a very small impact. 1 percent increase in the average distance of households from market, banks, and roads is likely to increase poverty by 1.4 percent. Households with educated household heads are less likely to fall into poverty. Remittance receiving households are 2.3 percent less likely to get caught in poverty as compared to remittance non-receiving households. the probability of households plunging into poverty decreases by about 1.1 percent with every 10 percent increase in remittance inflow.

Nepalese households use remittance primarily for consumption purposes. Remittance receiving households are twice less likely to fall into poverty in Bangladesh as compared to Nepal. About 2 percent of total remittance inflows in Nepal contribute to capital formation. The utilization of remittance inflows in the productive sector enhances the output and consequently aids in further poverty reduction.

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ANNEXES

Annex 1

Impact of remittance (in rupees) on household poverty

Poverty	(1) Logit Coeff	(2) Odds ratio	(3) Marginal effects
Gender ('Male' omitted)			
Female	-0.193	0.825	-0.0160
Age	-0.0812***	0.922***	-0.00703***
Age squared	0.000708***	1.001***	6.13e-05***
Assets	-0.551***	0.576***	-0.0477***
Income	-0.0231***	0.977***	-0.00200***
HH size	-0.965***	0.381***	-0.0834***
HH size squared	0.0367***	1.037***	0.00317***
Fallow	0.0163**	1.016**	0.00141**
Upland	0.0207***	1.021***	0.00179***
Distance	0.162***	1.176***	0.0140***
Remit (Rs.)	-0.0130***	0.987***	-0.00112***
Education status ('Bachelors and above' omitted)			
No schooling	2.348***	10.46***	0.248***
Primary	1.866***	6.465***	0.243***
Secondary	1.289**	3.630**	0.152**
SLC	0.787	2.197	0.0899
+2	0.933*	2.542*	0.113*
Ecological belt ('Terai' omitted)			
Himalayan	4.236***	69.12***	0.768***
Hilly	2.440**	11.47**	0.266**
Ethnicity ('Brahmin Hill' omitted)			
Chhetri	-0.300	0.741	-0.0240
Magar	-0.135	0.874	-0.0112
Tharu	0.221	1.247	0.0206
Tamang	0.0710	1.074	0.00630
Kami	0.580***	1.786***	0.0622***
Rai	0.224	1.251	0.0211
Thakuri	-0.0243	0.976	-0.00208
Newar	-0.0173	0.983	-0.00149
Others	0.479***	1.615***	0.0434***
District ('Jhapa' omitted)			
Taplejung	-2.255***	0.105***	-0.0858***
Ilam	-2.287***	0.102***	-0.0883***
Morang	2.927***	18.68***	0.547***
Sunsari	0.971	2.642	0.12
Dhankuta	2.379**	10.80**	0.433**
Bhojpur	0.0384	1.039	0.00337
Solukhumbu	-3.517***	0.0297***	-0.0949***
Okhaldhunga	-1.743**	0.175**	-0.0785***
Khotang	-1.438*	0.237*	-0.0724***

Poverty	(1) Logit Coeff	(2) Odds ratio	(3) Marginal effects
Udayapur	0.725	2.065	0.083
Saptari	0.081	1.084	0.00722
Dhanusha	1.823*	6.191*	0.289*
Mahottari	2.886***	17.92***	0.545***
Sarlahi	2.729***	15.32***	0.504**
Sindhuli	-0.562	0.57	-0.039
Dolakha	-2.273***	0.103***	-0.0868***
Sindhupalchok	-1.452***	0.234***	-0.0734***
Kabhrepalanchok	-0.212	0.809	-0.0169
Nuwakot	-0.573	0.564	-0.0396
Dhading	-1.055**	0.348**	-0.0613***
Makwanpur	0.689	1.992	0.0777
Bara	2.779***	16.10***	0.521***
Parsa	3.062***	21.36***	0.587***
Gorkha	-0.215	0.806	-0.0171
Lamjung	-1.515**	0.220**	-0.0743***
Tanahun	-0.115	0.891	-0.00954
Syangja	-1.148**	0.317**	-0.0642***
Myagdi	0.276	1.318	0.0266
Baglung	0.371	1.45	0.0371
Gulmi	0.431	1.539	0.044
Palpa	-0.059	0.943	-0.00499
Nawalparasi	1.118	3.06	0.145
Rupandehi	1.395	4.033	0.196
Rolpa	0.117	1.124	0.0106
Rukum	-0.407	0.666	-0.03
Dang	3.114***	22.52***	0.597***
Banke	4.031***	56.30***	0.755***
Surkhet	0.37	1.448	0.0369
Dailekh	0.631	1.88	0.0697
Jajarkot	0.628	1.875	0.0694
Jumla	-0.336	0.714	-0.0254
Kalikot	-0.118	0.889	-0.00974
Bajura	-0.636**	0.530**	-0.0427***
Bajhang	0.327	1.386	0.0321
Achham	0.224	1.251	0.0212
Doti	0.0959	1.101	0.00862
Kailali	3.598***	36.52***	0.685***
Constant	6.825***	920.9***	
Observations	5,645	5,645	5,645

Note: *** p<0.01, ** p<0.05, * p<0.1

Source: Author's Calculation

Annex 2

Impact of remittance on household poverty

Poverty	(1) Logit Coef	(2) Odds ratio	(3) Marginal effects
Gender ('Male' omitted)			
Female	-0.205	0.814	-0.0170
Age	-0.0816***	0.922***	-0.00706***
Age squared	0.000711***	1.001***	6.16e-05***
Assets	-0.553***	0.575***	-0.0478***
Income	-0.0230***	0.977***	-0.00199***
HH size	-0.964***	0.381***	-0.0834***
HH size squared	0.0366***	1.037***	0.00317***
Fallow	0.0162**	1.016**	0.00141**
Upland	0.0207***	1.021***	0.00179***
Distance	0.162***	1.176***	0.0140***
Remittance ('Not received' omitted)			
Remittance Received	-0.269**	0.764**	-0.0228**
Education status ('Bachelors and above' omitted)			
No schooling	2.344***	10.42***	0.248***
Primary	1.861***	6.431***	0.242***
Secondary	1.285**	3.616**	0.151*
SLC	0.785	2.192	0.0896
+2	0.932*	2.540*	0.113*
Ecological belt ('Terai' omitted)			
Ecological belt = 1, Himalayan	4.237***	69.19***	0.768***
Ecological belt = 2, Hilly	2.440**	11.48**	0.266**
Ethnicity ('Brahmin Hill' omitted)			
Chhetri	-0.302	0.739	-0.0242
Magar	-0.138	0.871	-0.0114
Tharu	0.222	1.248	0.0207
Tamang	0.0688	1.071	0.00610
Kami	0.577***	1.782***	0.0618***
Rai	0.223	1.250	0.0210
Thakuri	-0.0278	0.973	-0.00238
Newar	-0.0197	0.981	-0.00169
Others	0.477***	1.612***	0.0432***
District ('Jhapa' omitted)			
Taplejung	-2.246***	0.106***	-0.0857***
Ilam	-2.283***	0.102***	-0.0883***
Morang	2.928***	18.69***	0.547***
Sunsari	0.97	2.637	0.12
Dhankuta	2.382**	10.82**	0.434**
Bhojpur	0.037	1.038	0.00325
Solukhumbu	-3.509***	0.0299***	-0.0949***
Okhaldhunga	-1.740**	0.176**	-0.0785***
Khotang	-1.437*	0.238*	-0.0725***

Poverty	(1) Logit Coef	(2) Odds ratio	(3) Marginal effects
Udayapur	0.727	2.069	0.0833
Saptari	0.0813	1.085	0.00726
Dhanusha	1.817*	6.151*	0.287*
Mahottari	2.879***	17.80***	0.544**
Sarlahi	2.728***	15.31***	0.504**
Sindhuli	-0.557	0.573	-0.0388
Dolakha	-2.271***	0.103***	-0.0868***
Sindhupalchok	-1.447***	0.235***	-0.0733***
Kabhrepalanchok	-0.209	0.812	-0.0166
Nuwakot	-0.569	0.566	-0.0395
Dhading	-1.052**	0.349**	-0.0612***
Makwanpur	0.695	2.004	0.0786
Bara	2.782***	16.15***	0.521**
Parsa	3.064***	21.42***	0.587***
Gorkha	-0.212	0.809	-0.0169
Lamjung	-1.520**	0.219**	-0.0744***
Tanahun	-0.114	0.893	-0.00942
Syangja	-1.146**	0.318**	-0.0642**
Myagdi	0.278	1.32	0.0268
Baglung	0.367	1.444	0.0367
Gulmi	0.426	1.531	0.0434
Palpa	-0.0639	0.938	-0.0054
Nawalparasi	1.118	3.058	0.145
Rupandehi	1.396	4.04	0.197
Rolpa	0.121	1.128	0.011
Rukum	-0.402	0.669	-0.0297
Dang	3.115***	22.53***	0.597***
Banke	4.030***	56.25***	0.755***
Surkhet	0.375	1.455	0.0375
Dailekh	0.639	1.894	0.0707
Jajarkot	0.64	1.896	0.071
Jumla	-0.328	0.72	-0.0249
Kalikot	-0.112	0.894	-0.00926
Bajura	-0.634**	0.530**	-0.0427***
Bajhang	0.329	1.39	0.0324
Achham	0.226	1.254	0.0214
Doti	0.0913	1.096	0.0082
Kailali	3.599***	36.57***	0.686***
Constant	6.994***	1,090***	
Observations	5,645	5,645	5,645

Note: *** p<0.01, ** p<0.05, * p<0.1

Source: Author's Calculation

Annex 3

Annex 3.1: Remittance recipient households by ethnicity

Ethnicity	Remittance received or not (in percent)	
	No	Yes
Chhetri	56.50	43.50
Brahman (Hill)	64.57	35.43
Magar	56.06	43.94
Tharu	71.29	28.71
Tamang	60.26	39.74
Kami	58.33	41.67
Rai	64.67	35.33
Thakuri	65.36	34.64
Newar	65.23	34.77
Others	62.42	37.58
Total	**61.69**	**38.31**

Source: Author's calculation

Annex 3.2: Remittance recipient households by local body

Local body	Remittance received or not (in percent)	
	No	Yes
Rural Municipality	60.91	39.09
Municipality	61.74	38.26
Sub-Metropolitan	68.96	31.04
Metropolitan	76.75	23.25
Total	**61.69**	**38.31**

Source: Author's calculation

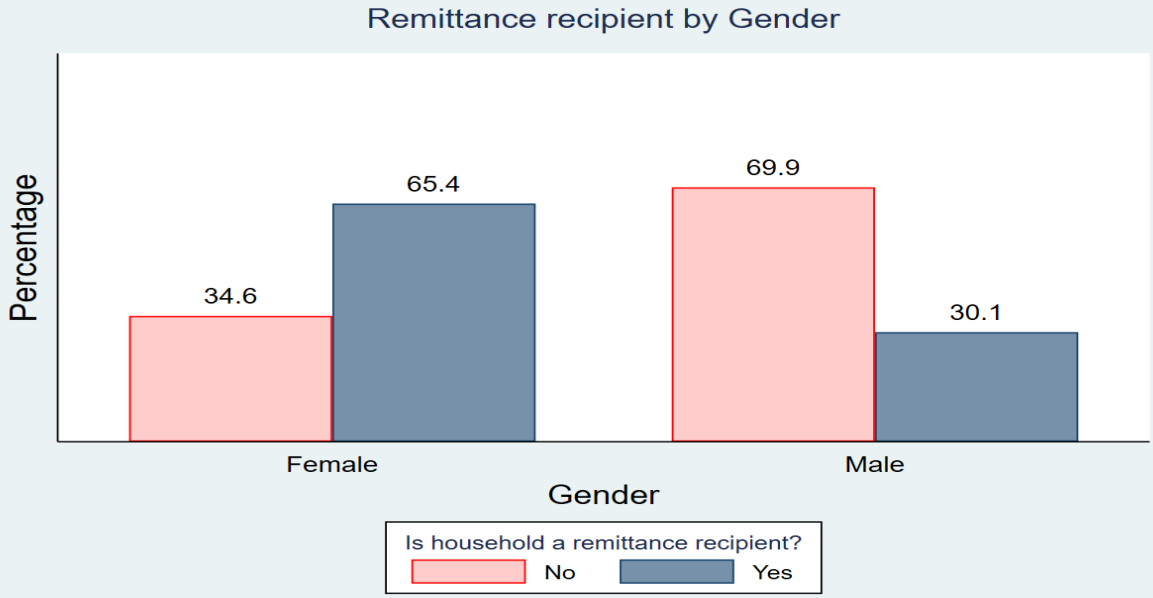
Annex 3.3: Remittance recipient households by education

Education status of household head	Remittance received or not (in percent)	
	No	Yes
No schooling	55.85	44.15
Primary	60.43	39.57
Secondary	67.23	32.77
SLC	70.61	29.39
+2	76.72	23.28
Bachelors above	86.16	13.84
Total	**61.69**	**38.31**

Source: Author's calculation

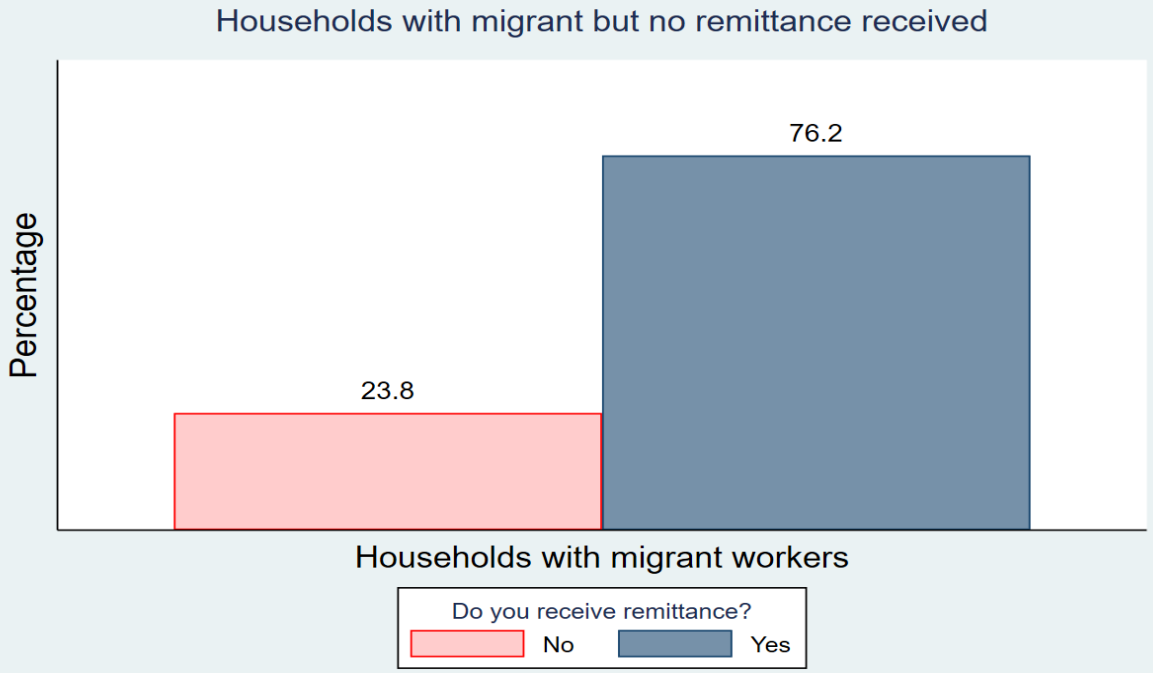
Annex 4

Annex 4.1: Remittance recipient by gender



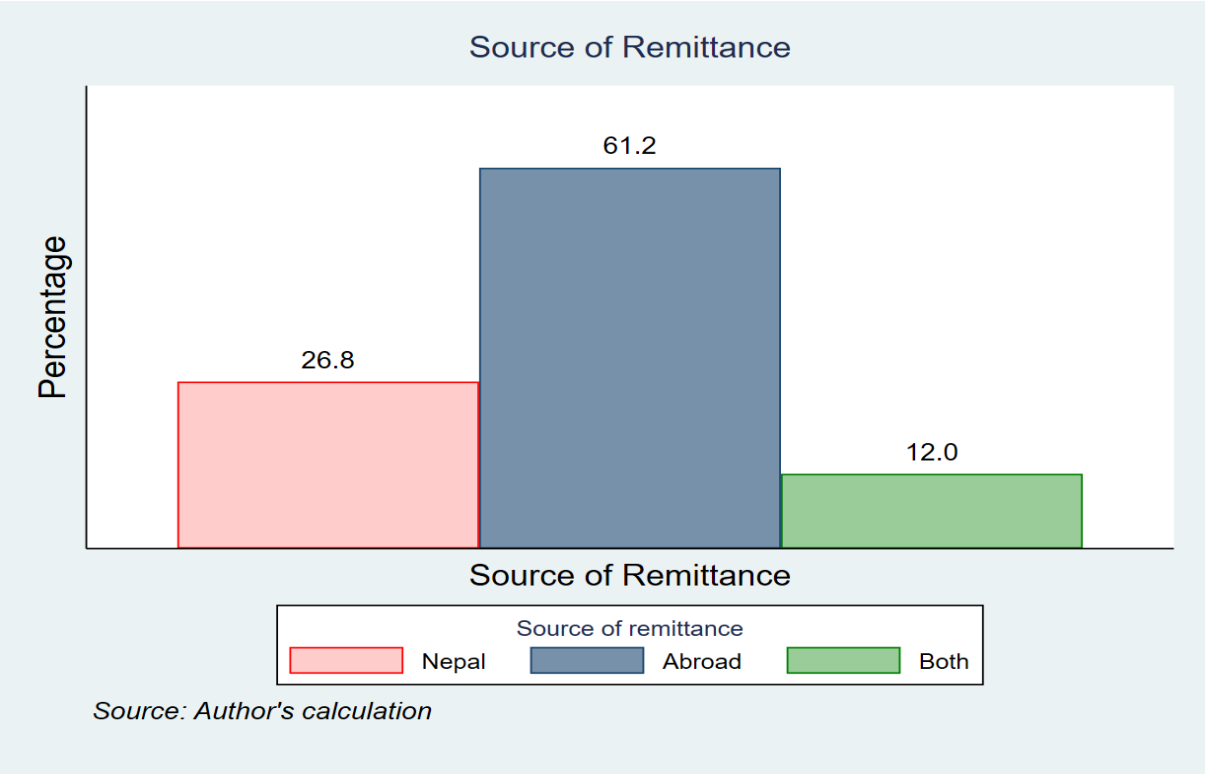
Source: Author's calculation

Annex 4.2: Households with migrants but no remittance received



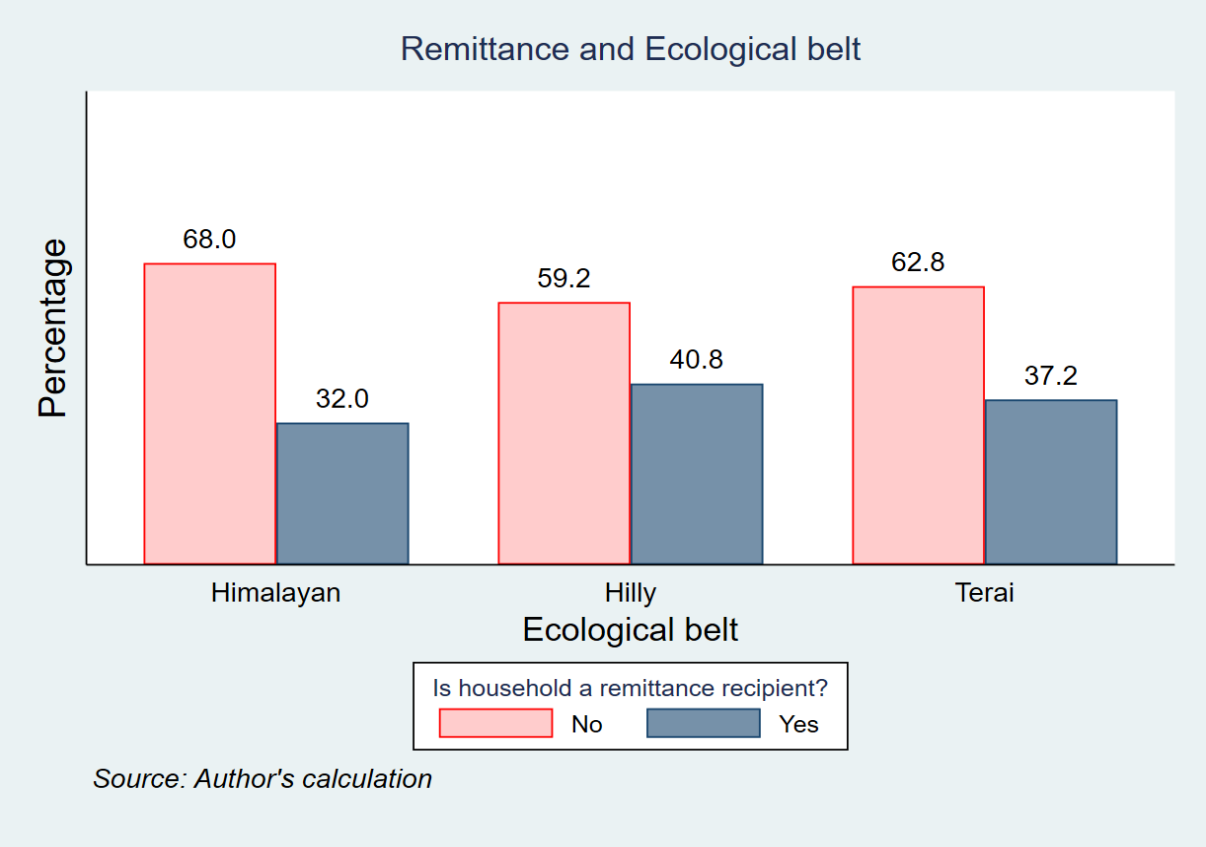
Source: Author's calculation

Annex 4.3: Source of remittance



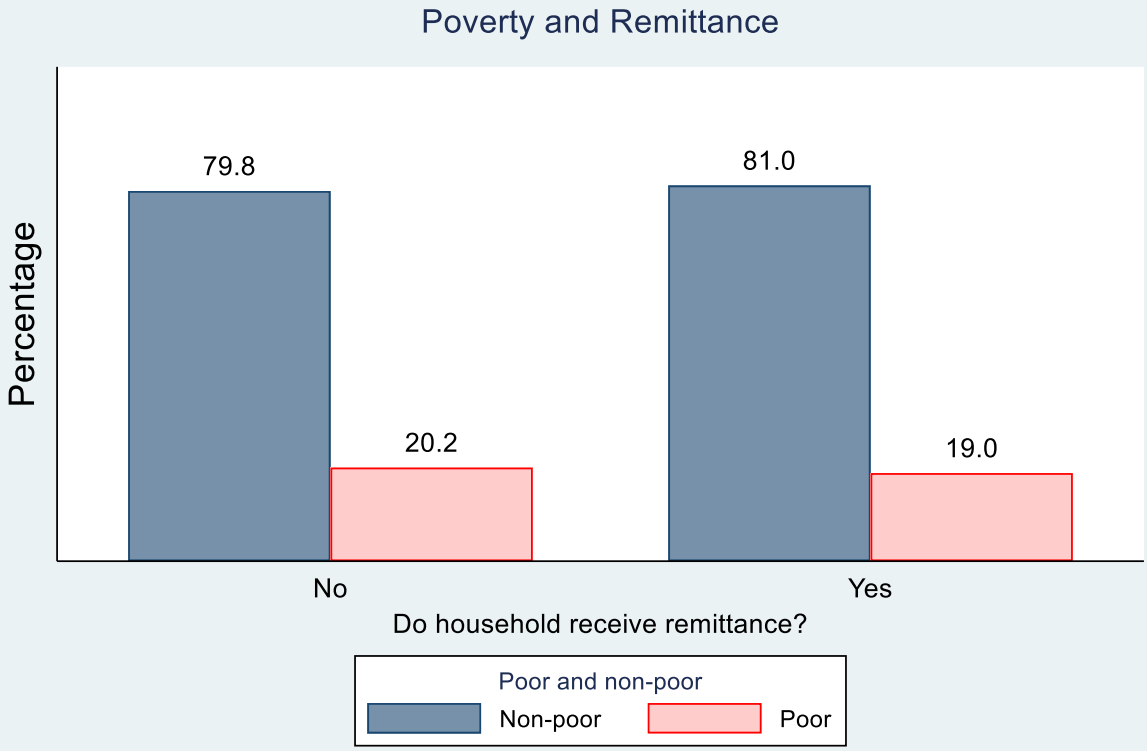
Source: Author's calculation

Annex 4.4: Remittace receiving households by ecological belt



Source: Author's calculation

Annex 4.5: Poverty incidence among remittance-receiving and not receiving households



Source: Author's calculation

Annex 5

Annex 5.1: Goodness of fit test and measure of fit

Goodness of fit test	
Pearson chi2(5582)	4895.61^{NS}
Measure of fit	
LR (62):	1759.34***
Count R2:	0.85

Source: Author's estimation

Annex 5.2: Specification test of logit model

Povert	Coef.	Std.Err.	z	P>z	[95%Conf.	Interval]
hat	0.955	0.047	20.520	0.000	0.863	1.046
hatsq	-0.022	0.017	-1.290	0.197	-0.055	0.011
cons	0.012	0.051	0.240	0.810	-0.088	0.113

Source: Author's estimation

'

Annex 5.3: Heteroskedasticity and multicollinearity test

Heteroskedasticity test
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
chi2(1) = 997.23***
Multicollinearity test
VIF = 4.30

Source: Author's estimation

*Note: *** p<0.05; NS p>0.1*

The tests in Table A6, Table A7, and Table A8 are identical for both models and yield the same values.