

Role 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 is 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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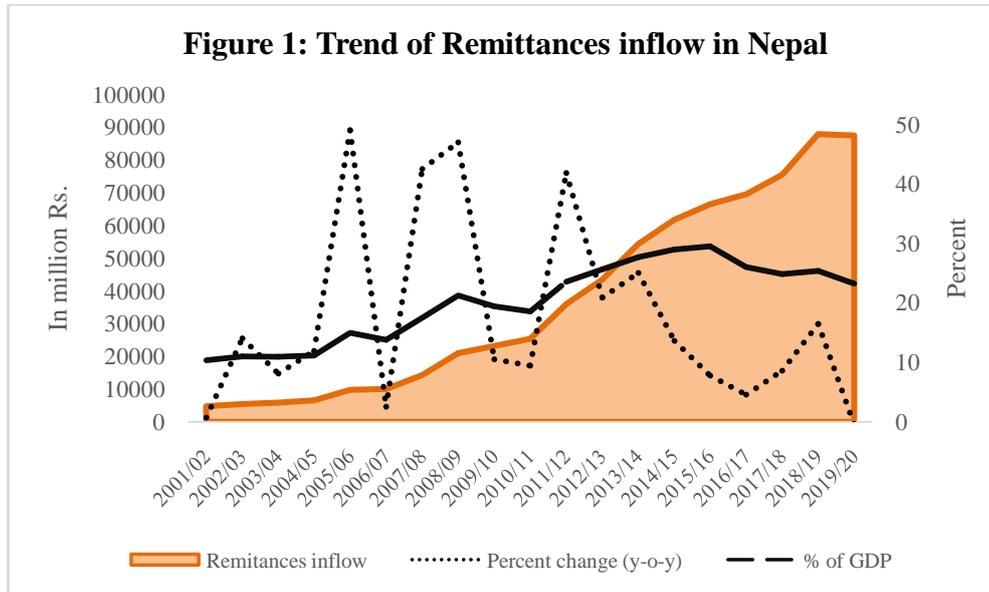
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I. INTRODUCTION

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 (United Nations, 2020; World Bank, 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 has increased over a decade, remittance inflow has captured rapt attention in the Nepali macroeconomic environment. Nepal received remittance amounting to Rs. 875 billion in FY 2019/20, 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).

Raihan, et. al.(2009)find positive and significant impacts of remittances on the household's food and housing-related expenditures in Bangladesh; the probability of the household becoming poor decreases by 5.9 percent if it received remittances. Thapa and Acharya (2017) have attempted to explore the relationship between remittance and expenditures on consumption, health, and education using a decade old dataset of NLSS-III. Similar to Thapa and Acharya (2017), Wagle and Devkota (2018) have deployed old datasets, but uses pseudo-panel of three rounds of NLSS.



Source: NRB (2021)

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). Remittances have persistently increased during the 2010s. Similarly, poverty reduced from 25.2 percent in 2010 to 16.6 percent in 2019 (CBS, 2011; MoF, 2020). But the trend observed between remittances and poverty does not provide enough evidence to support remittance as the catalyst for poverty reduction. The paper identifies the need for exploration of relationship between remittance and poverty using a new dataset. Hence, this paper aims to investigate the association between remittances and rural poverty using the microdata set of Household Risk and Vulnerability Survey 2016-18.

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 et al., 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 et al., 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

Thapa and Acharya (2017) examine the effect of remittances on household expenditure patterns in Nepal applying propensity score matching methods. Wagle and Devkota (2018) examine the dynamics of foreign remittances and their impact on poverty in Nepal. Thapa and Acharya (2017) and Wagle and Devkota (2018) have attempted to disclose the association of remittance with household expenditure pattern and poverty in Nepal respectively. Thapa and Acharya (2017) are based on NLSS-III, while Wagle and Devkota (2018) uses data of three rounds of NLSS. Remittance recipient households tend to spend more on consumption, health, and education as compared to remittance non-receiving households (Thapa& Acharya, 2017). Similarly, Wagle and Devkota (2018), despite using different methodology from Thapa and Acharya (2017), have derived similar result. They conclude that foreign remittances enhance economic well-being and support in poverty reduction.

Apart from Nepalese literature, Ang, Sugiyarto, and Jha(2009) examine the role of remittances in increasing household consumption and investment in Philippines using IV approach. Similarly, Raihan et.al (2009) examine the impacts of international remittances on household consumption expenditure and poverty in Bangladesh using CGE and logistic regression. Likewise, Bui, Le, and Daly (2015) examine the micro-level impacts of domestic and overseas remittances on household behavior in the case of Vietnam using OLS. Raihan et.al (2009) and Bui, Le, and Daly (2015) conclude that remittances have positive and significant impact on household's food and housing related expenditures along with expenses on education and health. After all, the probability of the household becoming poor decreases by 5.9% if it receives remittances Raihan et.al (2009). The result derived by them are akin to that of Thapa and Acharya (2017) and Wagle and Devkota (2018).

In contrast, Ang, Sugiyarto, and Jha(2009) have concluded that remittances negatively influence the share of food consumption in the total expenditure. Also, 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. However, logistical regression shows that remittances help to lift households out of poverty, which is in conformity with former literature. Hence, the contrasting result of Ang, Sugiyarto, and Jha(2009) might be due to difference in methodology. Apparently, the logistic regression revealed the similar result to that of Raihan et.al (2009) and Bui, Le, and Daly (2015).

Myriad of international literature attempts 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 association 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 et al., 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:

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

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

Where P_i denotes poverty, S_l is the vector of individual characteristics, H_j is the vector of household characteristics, Z_k 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:

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

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

Following Raihan et al. (2009), equation (3) and equation (4) 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. |
| 10 | Fallow | Fallow denotes fallow land and measured in square meters. It is a continuous variable in log form. |
| 11 | Upland | Upland denotes a form of land and is measured in square meters. It is a continuous variable in log form. |
| 12 | 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. |
| 13 | Remit | It is a binary variable where '1' represents a household that received remittance and '0' represents a household without remittance. |
| 14 | RemitRs | 'RemitRs' denotes the total amount of remittance received by a household in 2018. It is a continuous variable. |
| 15 | 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. |
| 16 | Ethnicity | It is a categorical variable with 10 ethnic groups. Brahmin Hill has been taken as a reference category. |
| 17 | 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:

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

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 causality 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.

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 households 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 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

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

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.

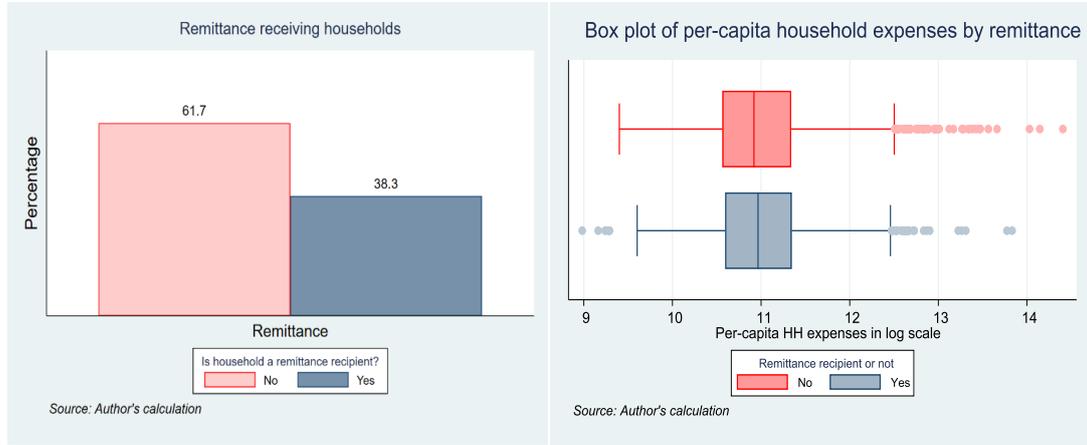
4.2 Descriptive Analysis of Remittance and Poverty

Remittance is the primary source of livelihood for rural households. Figure 2 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. The median per-capita household expenses are slightly higher for households receiving remittance.

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).

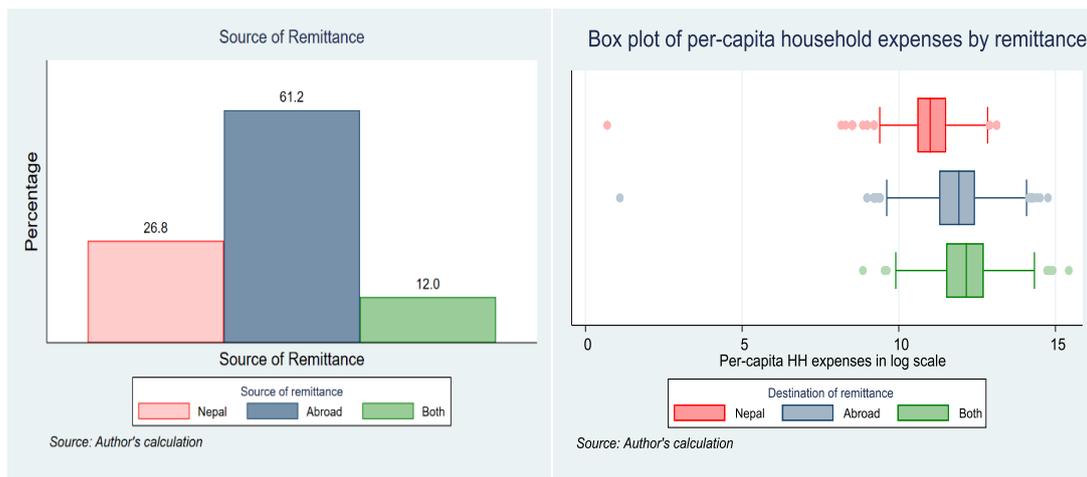
¹ The same result has been reported by Walker, Kawasoe, and Shrestha (2019).

Figure 2: Remittance receiving households



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 3). The median per-capita of Households with migrant worker in both Nepal and Abroad is higher in comparison to other two categories. Remittance inflow of whopping Rs. 879 billion in 2018 also supports the fact that the majority of Nepalese receive remittance from abroad (NRB, 2019b).

Figure 3: Source of remittance

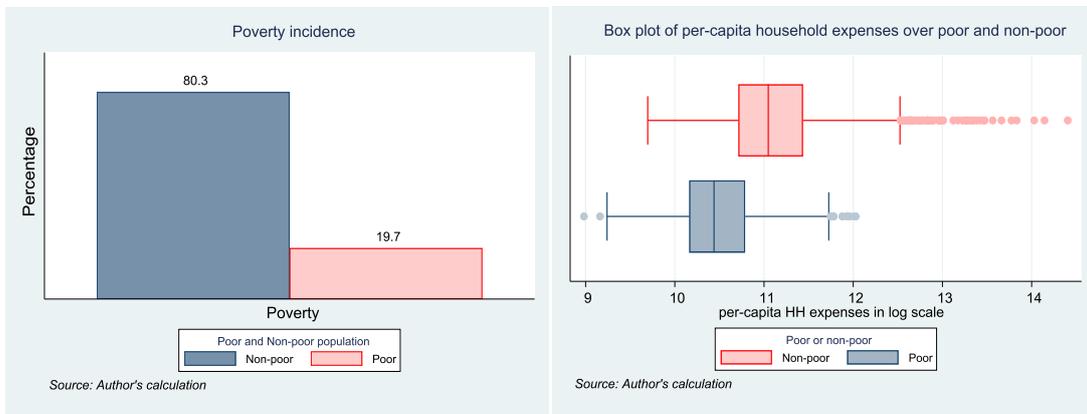


Likewise, Magar ethnic group has the highest remittance recipients. 44.2 percent of households with uneducated heads received remittances, and 39.1 percent of

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 4: Household poverty incidence



About 1 in every 5 households in rural Nepal are poor and there is substantial difference in the median per-capita household expenses among poor and non-poor (Figure 4). 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.

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 logit regression to correct for heteroskedasticity error terms (Solon et al., 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 0.57² 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 (Table 4). 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 (Table 4).

Education is a significant factor in reducing poverty (Table 4). 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 falling into poverty decreases by about 1.1 percent with every 10 percent increase in remittance inflow to households.

² See Annex 6 for procedure of calculation of odds ratio.

Table 4: Impact of remittances on rural poverty³

| Poverty | Logged Remittance (Rs.) | | Remittance received or not | |
|---|-------------------------|------------------|----------------------------|------------------|
| | 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

Aforementioned, remittance receiving households are 2.3 percent less likely to get caught in poverty which is similarly to the result of Raihan, Khondker, Sugiyarto, and Jha (2009) where they find that the probability of the household becoming poor

³ The complete regression result is presented in Annex 1 and Annex 2.

decreases by 5.9 percent if it received remittances. Ang, Sugiyarto, and Jha(2009) also find that remittances help households lift out of poverty. Using three rounds of NLSS, Wagle and Devkota (2018) conclude that foreign remittances support in poverty reduction. The study has not included interaction terms; also, it is a one-shot analysis. So, panel data analysis can indeed provide a better insight on relationship between remittances and poverty.

VI. CONCLUSION

The role of remittances on poverty in Nepal have been explored but using a decade old dataset of NLSS-III. About 58 percent of rural households received remittances in 2011 (NLSS III, 2010-11) but our study finds that 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.

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. A 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

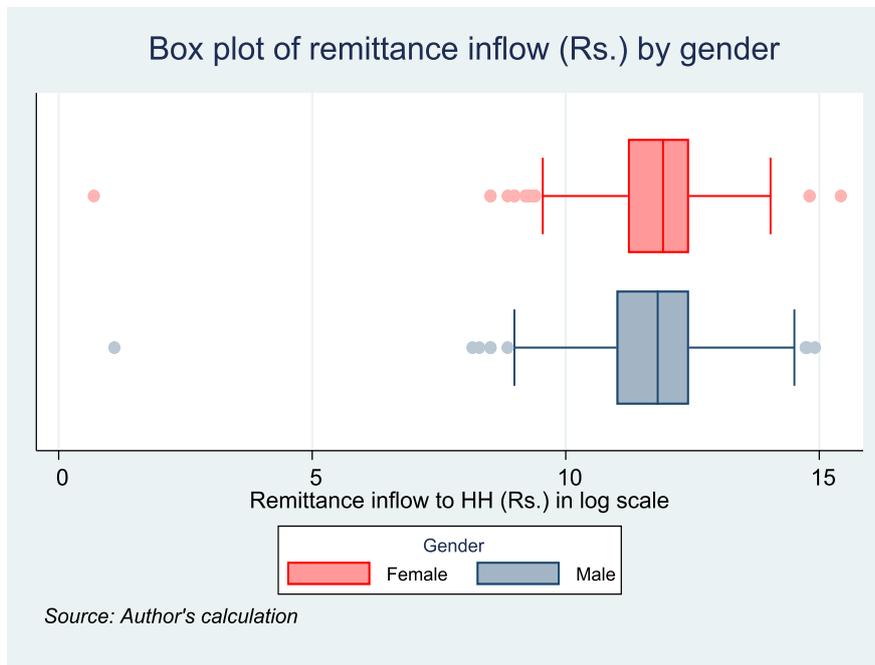
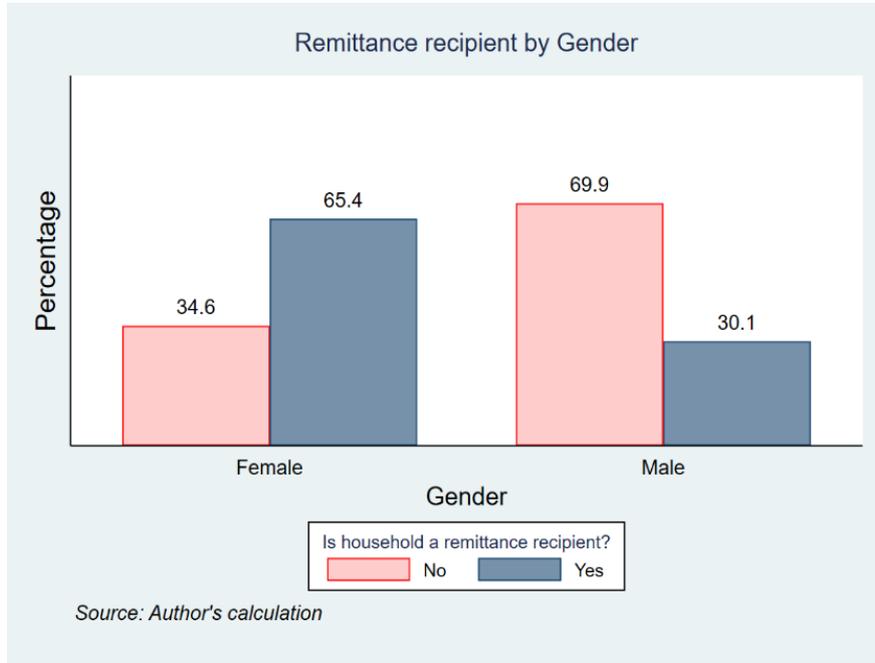
Annex 3.3: Remittance recipient households by education

| 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 |

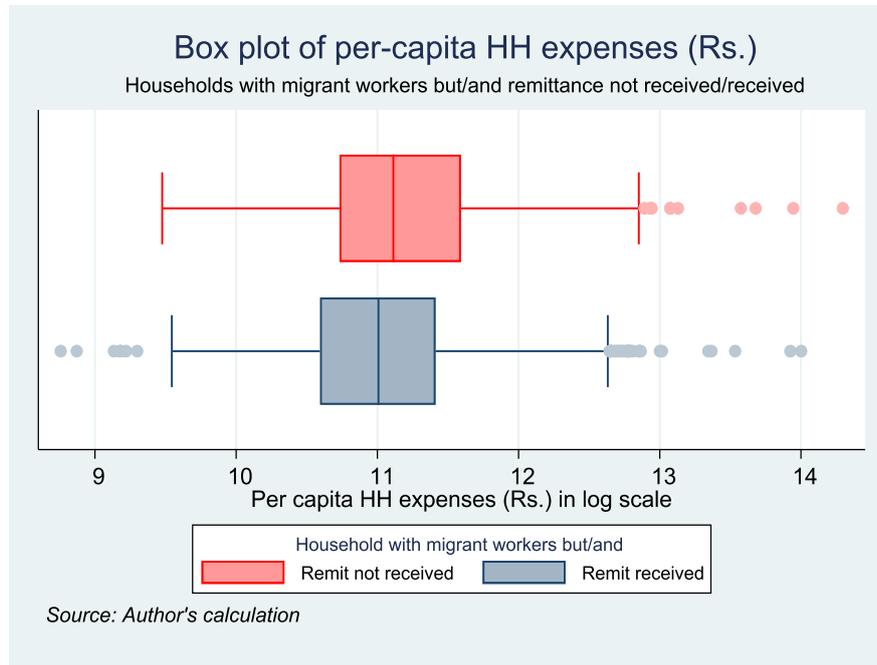
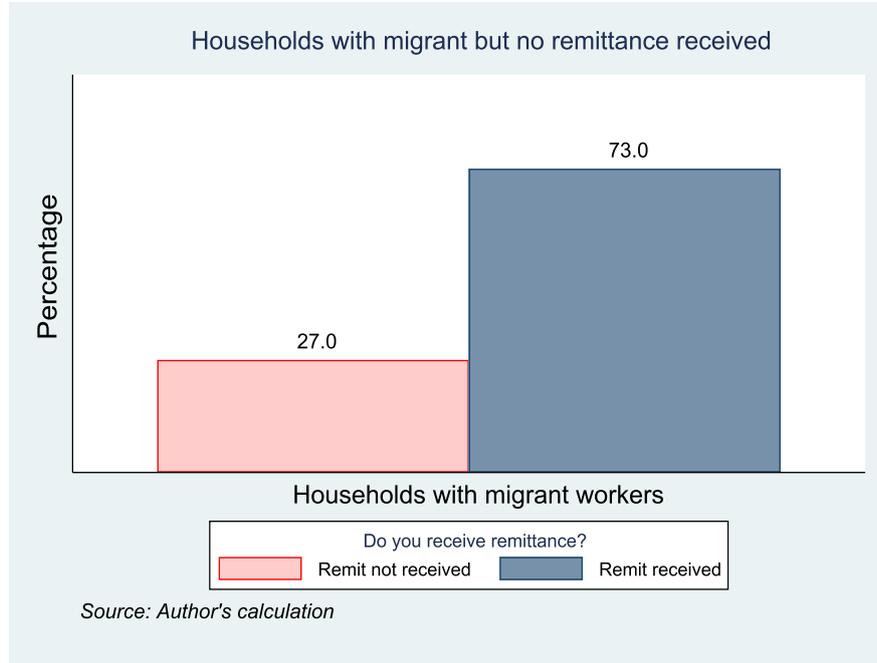
Source: Author's calculation

Annex 4

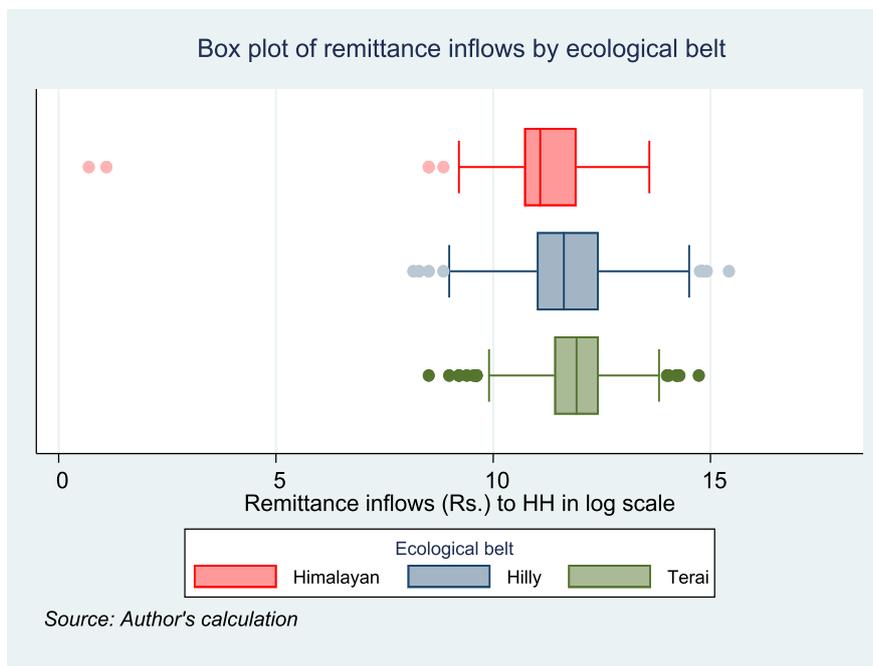
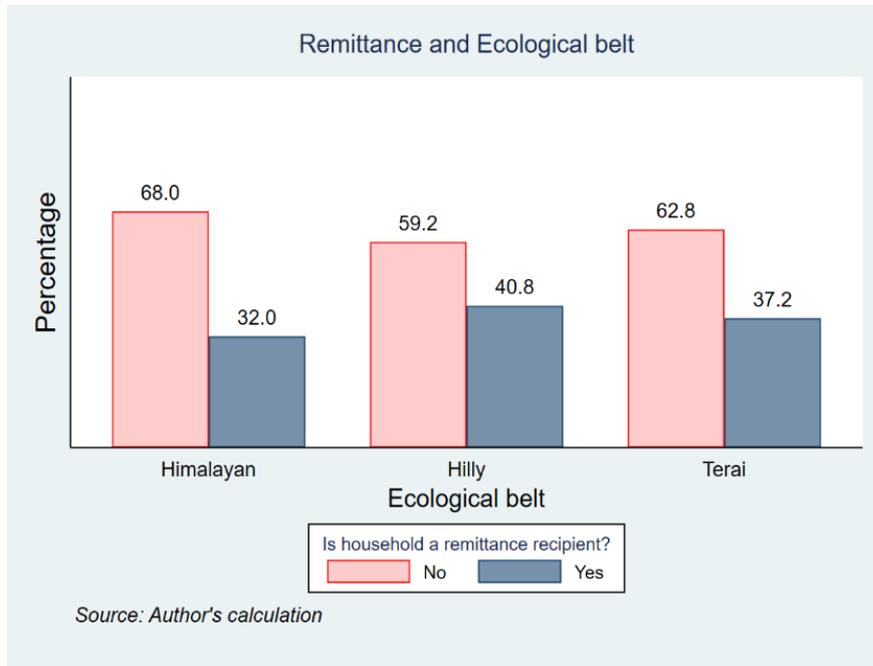
Annex 4.1: Remittance recipient by gender



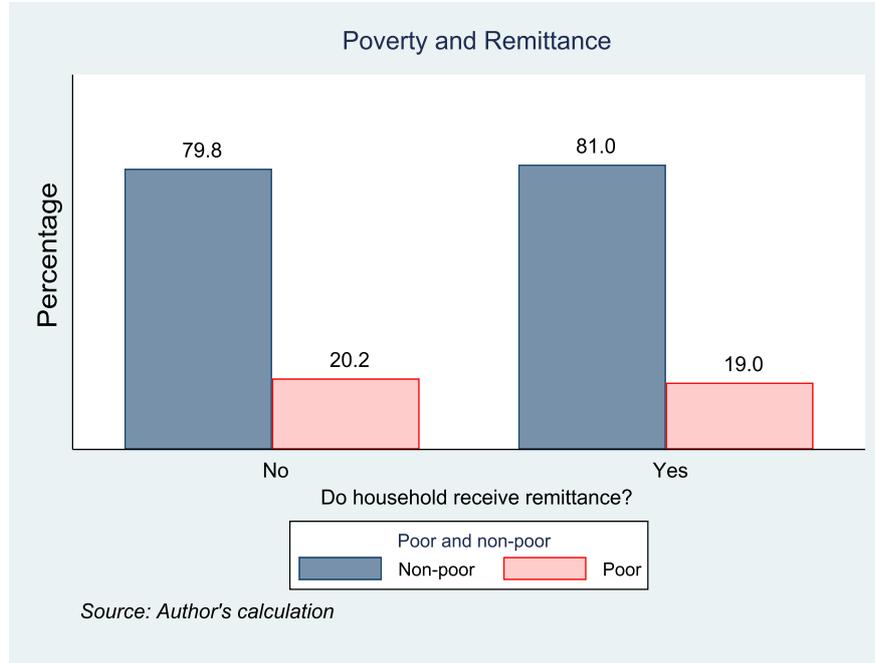
Annex 4.2: Households with migrants but no remittance received



Annex 4.3: Remittance receiving households by ecological belt



Annex 4.4: Poverty incidence among remittance-receiving and not receiving households



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.

Annex 6 : Logit Model

Linear Probability Model (LPM), which is the OLS estimation with binary dependent variable, does not ensure the fitted values to lie between 0 and 1. So, we must move to logit or probit model.

The logit coefficients and odds ratio are calculated using equation (★)

$$\ln\left(\frac{P_i}{1 - P_i}\right) \sim L_i = \beta_0 + \beta_1 X_i \text{ --- (★)}$$

Here, $\frac{P_i}{1 - P_i}$ is the odds ratio.

Hence, taking an antilog of logit coefficients gives odds ratio. The logit coefficient of total assets is -0.551 and its odds ratio is $e^{-0.551} = 0.576^4$.

The marginal effects of logit model is calculated using equation (★★)

$$\frac{\partial \Pr[y_i = 1|x_i]}{\partial x_i} = \{\Lambda(\beta' x_i)[1 - \Lambda(\beta' x_i)]\}\beta \text{ --- (★★)}$$

⁴ The detailed result is in Annex 1.