

Remittance and its Effect on Poverty and Inequality: A Case of Nepal

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Abstract

This paper examines the impact of remittance on poverty and income inequality in the context of Nepal using cross-sectional national survey- Nepal Living Standard Survey, third edition (NLSS3) of 2010-11. We employ a Heckman two-step estimation model with instrumental variables and constructed counterfactual income to investigate the real impact of remittances. We find that remittance has helped in the reduction of poverty ratio by 5.3% but deepened the poverty gap by 7.37% and severity by 9.25%. In terms of inequality, remittance has helped to reduce inequality within the remittance receiving group, however, it also contributed to rising income inequality when compared to non- remittance receiving group.

Key words: remittance, poverty, inequality, Nepal, counterfactual.

JEL codes: F22, F24, I32, O15

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1. INTRODUCTION

Remittance is one of the major sources of foreign currency for developing and less developed countries, even surpassing the amount of foreign aid. In 2019, remittances accounted for more than USD700 billion across the world and estimated to remain so in 2020 (WDI, 2022). In the case of Nepal, the scale of migration and remittances is big and pervasive. Indeed, the remittances inflow has been steady over the years amounting over USD 8 billion since 2018. The contribution of remittance on Nepal's GDP is one of the highest in the world which peaked at 27.6 % in 2015. The ratio stands at 24% in 2020 (WDI, 2022). The reason behind this is laggard domestic economy and restricted employment opportunities in the country (Acharya and Leon, 2013; World Bank, 2011), landlocked location (Choe and Pradhan, 2011), globalization, and integration (Martin 2001). A bulk of skilled and unskilled workforce, living in rural areas, seeks for employment opportunities by internal and/ or external migration. Internally, they move to urban areas, particularly the capital, Kathmandu and externally, in foreign countries such as India, Southeast Asia, and Gulf countries (Acharya & Leon, 2013; MOLESS, 2020).

Nepal, being a least developed country also suffers from setbacks on the front of poverty and inequality. Its GDP per capita has seen some good growth in recent time, nevertheless it just stands at current USD 1155 in 2020 (WDI, 2022). Although the poverty condition is improving over the decades, the situation is still shaky. In terms of income inequality, the Gini coefficient stood at 32.8 % for 2010 and it is perceived that it has increased over the years. Studies have suggested that the high level of remittances has also contributed to reduction in trade deficit as well as post-earthquake reconstruction, and poverty reduction in Nepal (World Bank, 2016). The impact of remittance could also be reinforced by the easing effect to foreign exchange pressure. However, this trend has caused shortage in domestic labor market (Martin, 2001). With the upward trend of foreign employment, the dependency on remittance would continue to rise (SAARC, 2014).

The term 'remittance' includes the cash and non-cash items from both formal and informal channels, although normally it is limited to indicate monetary or other cash transfers transmitted by migrant workers. There has been limited quantitative research on the influence of remittances on household poverty and inequality at the national level. Two possible reasons seem to explain this gap. The first is due to the difficulty of generating data at a national level; therefore, several studies have focused on a small and unrepresentative household surveys. The second is an absence of useful data on the size and volume of remittance transfers of households (Adams, 2004). Since the remittance comes from both formal and informal channel, a large amount of them may not be fully incorporated in the official data. According the standard components of remittances framework of IMF's statistical Year books (2009), there are generally three forms of remittances, including compensation of employees, personal transfers as well as supplementary items related to remittances. It is a challenging task to fully record all of these flows since a large amount of them is from informal sector.

1.1 Remittance and poverty

With remittances, recipient households could increase their disposable income and consumption, thereby being resilient with economic shocks (Martin, 2001; World Bank, 2011). Remittances and social welfare received by the targeted households, could contribute to poverty reduction in targeted area, especially in rural areas (Adams, 1991); produce positive effect on household income risk, investment and production decisions (Stark and Levhari, 1982); support family's consumption even during adverse economic shock (Azams and Gubert, 2005). Empirical studies have shown that it has been effective in reducing poverty in recipient countries.

Adams (1991) finds that, in rural Egypt, international transfers reduced the poverty headcount by 9.8 per cent. Adams and Page (2005) find that international remittance has a direct benefit on the poverty reduction in 71 developing countries; they estimated that a 10% increase per capita international remittance will lead to a 3.5% decrease in the share of people living in poverty. Adams (2004) find

evidence in Guatemala that, both internal and international remittances have positive effects on the reduction of poverty, and poorest households receive around 50-60 percent remittance as income. Using data from rural Mexico, Edwards et al. (2005) find that remittances have different poverty reduction effects across districts, with the highest percentage change is in international remittances. Specifically, a 10% increase in international remittance would lead to at most -1.68% in poverty rate, -1.65% change in poverty gap (depth) and -1.64% change in squared poverty gap (severity). In Algeria, the finding shows that migration has a significant effect on reducing poverty by nearly 40 percent, where the effects differed sharply in extreme poverty of two regions (Margolis et al., 2015).

Using a sample from Mali, Gubert et al. (2010) find that earnings of the remittances receiving families are higher than non-receiving ones. Using household data from rural southern Morocco and compare the effect of migration family income with that of counterfactual no-migrant family, Bouoiyour and Miftah (2014) concluded that remittance have lessen the vulnerability of households to poverty. Edward et al. (2005) finds that in the rural areas on southern Morocco, the poverty level and the fragility of non-poor families are effectively reduced by remittances. Acosta et al. (2008) using a large cross-country panel data find that remittance in Latin America could contribute to mitigation of poverty and inequality.

1.2 Remittance and income inequality

With regard to effect of remittance on income inequality, there are mixed results. Some researchers concluded that remittance may have adverse effect on income inequality; others stated that effect of remittances on inequality is rather complicated. For instance, Adams (1991) concludes that remittance had negative effects on rural income distribution because households in the top quantile groups benefit the most when including remittance from abroad. Wouterse (2010) indicates that the impact of inequality depends on choice of destination, in which the intercontinental migration cause higher Gini coefficient while that of intra-African has the opposite effect. Using data from Nigeria, Margolis et al. (2015),

conclude that remittance does not have significant effects on Gini coefficients in any of the counterfactual scenarios they developed.

On the other hand, Gubert et al. (2010) find that remittance has actually reduced the Gini coefficient by 5%. Studies also indicate that migrants from middle-class or higher background are more likely to receive highest remittance (Mansoor and Quillin, 2007; World Bank, 2011). Beyene (2014) conclude that the effect of remittance on inequality in Ethiopia is unclear since no change is observed in Gini coefficients. Some scholars argue that Dutch diseases may come along with large amount of remittance inflow that shrink the local manufacture thus could make people dependent on the remittance and have less initiative to invest in productive parts (Acosta et al., 2008; Chami et al., 2005; Azam and Gubert, 2005).

1.3 Counterfactual studies

Early studies simply regard remittance as exogenous income of migrant family; these studies did not take the opportunity cost of labor migration into account. These studies compared the Gini coefficients computed by household income including and excluding the transfer remittances to examine migrant labor and remittances impact on income inequality (Rapoport and Docquier, 2006; Adams, 1991). Therefore, scholars argued that these methodologies that simply regard remittance as an exogenous transfer income tend to have negative bias towards poverty reduction and inequality.

Consequently, a number of studies defined remittance as a potential substitute for household income had the migrants stayed at home (endogenous income), and considered using econometric models to construct the counterfactual incomes of those family with temporary migration (Adams, 1989; Adams et al., 2008; Acosta et al., 2008; Brown and Jimenez, 2008; Gubert et al., 2010; Beyene, 2014). Adams (1989) estimates the impact of remittances using the sample of three villages in rural Egypt, focusing on 1000 households. In order to generate the counterfactual income, he estimates a mean regression of income of non-migrant households then uses the parameters to predict the counterfactual migrant household incomes, and then this predicted income with actual income were employed to calculate the poverty and inequality indexes in a non-

migration scenario. Acosta et al. (2008) use a cross-country panel data in 10 Latin American countries and find that remittances have negative but relatively small effects on inequality and poverty-reducing effects, even taken account of the counterfactual scenario. Brown and Jimenez (2008) use a mean regression of log income of non-migrant families while holding non-selection assumption and used the parameters to predict the log income of migrant families in Fiji and Tonga, and find that the estimated effects of remittances on poverty alleviation is more significant on counterfactual estimation than simple exogenous scenario, but the effects on inequality are negligible, and the effects are more significant for Tonga that has longer migration history. Gubert et al. (2010) compare the poverty rates and inequality levels in Mali with the counterfactual income in the absence of remittance and migration, and find that remittances had reduced poverty rate by 5-11% and Gini coefficient by about 5%. Beyene (2014) compute the counterfactual consumption in the hypothetical scenario of no remittance under a selection-correlated framework, and then compare the results with observed value in Ethiopia and find that there was a significant effect of poverty reduction of remittances while Gini index did not change.

In this paper, we analyze the effect of remittance on poverty and income inequality in the case of Nepal. We conduct empirical study by employing counterfactual scenario analysis with the use of a national-level household survey data, Nepal Living Standard Survey III (NLSS-III), that contains detailed data for migration and remittance. Drawing upon other international studies on the subject field, we believe this is first such study on Nepal focusing on counterfactual analysis. Given the important role that remittance plays in Nepalese economy, this paper contributes from two perspectives. Firstly, we look into the impact of remittance on household behavior. We do so by comparing the observed remittance receiving household and the counterfactual scenario that what if the member has not been migrated. Secondly, we incorporate remittance income in the total income to analyze the effects of poverty and inequality indexes in Nepal. We find that remittance has contributed to improvement of households' living conditions by increasing their disposable income. This has helped in reduction of poverty ratio. Nevertheless, it is to be noted that it also contributed to increase in depth and severity of poverty.. On income inequality front, the results are uncertain as

inequality is reduced within the remittance receiving community but is widened between the remittance receiving and non- remittance receiving households.

2. METHODOLOGY AND EMPIRICAL FRAMEWORK

To examine the effects of remittance on poverty and inequality, a counterfactual income equation is estimated based on a hypothetical scenario of no remittance receipts. This approach takes the opportunity cost of migrant worker into account, that is, considering the fact that remittances are potential substitute for household income had those migrants did not move abroad. It is assumed that migrants normally earn higher earnings when they migrate. The methodology follows Acosta et al. (2008) and Beyene (2014) and involves several stages. The first task is to estimate the income equation using information from the non-remittance recipient families only:

$$\ln(Y_i) = \alpha_i + \beta_i X_i + \gamma_i H_i + \mu_i \dots(1)$$

Where Y_i is income of household i ; X_i is a vector of household characteristics that affects the income; H_i is a vector of household head characteristics; β_i and γ_i are respective parameters; μ_i is error; α_i is intercept.

However, equation (1) may suffer from selection bias. If the households are randomly selected from the whole population, the earning equation could be estimated directly using OLS. However, if they are selected with unobservable characteristics, OLS may suffer from selection bias since different households may have different standard of living initially that influence the income. This is because the exogenous remittance income of household may be considered as unobservable characteristics thereby resulting in the overestimation of the parameters. If they are positively correlated, the results based on OLS will overestimate the effects of remittances. If they are negatively correlated, the results may underestimate the effects of remittances

In order to overcome the selectivity problem from the sample, we follow a two-step Heckman (1979) model that uses information from non-remittance receiving family to improve the estimates of the parameters in the regression model. In the first step, a probit model on the probability of non- remittance receipts is

estimated against a battery of control variables that relates to household head characteristics, family characteristics, migration information, family's economic situation and others. Further, as required by the model, instrument variables were incorporated in the model, namely, religion and language. These instrument variables must be correlated with variables that determines whether a member would migrate (the probability to receive remittance), but no correlation with the total household income of non-migrant workers namely. The resulting probit model equation is as follows:

$$M_i = \alpha_2 + \beta_2 X_i + \gamma_2 H_i + \delta I_i + v_i \dots(2)$$

M_i is a dummy variable that takes the value of 1 if a household receives remittances, otherwise 0. I_i represents instrument variables

In the second step, the household income was regressed using inverse Mills ratio (λ)⁴ from first step (equation 2) to generate counterfactual income. The counterfactual income estimations for remittance recipient families are constructed to predict the household income in the absence of remittance, under the assumption that the member of household have not migrated. Therefore, by estimating the estimated conditional mean and variance of income, the income for non-recipient households will be the same in observed and counterfactual cases. Then the counterfactual value and observed value were compared in terms of the poverty and inequality measures.

Consequently, with the aid of equation (2) inverse Mills ratio (λ) is calculated which is inserted in equation (1), in order to include the selectivity effects in the income equation to get:

$$\ln Y_i = \alpha_1 + \beta_1 X_i + \gamma_1 H_i + \sigma \lambda_i + \omega_i \dots(3)$$

Controlling for λ could make the remaining unexplained component to have the desirable independent and identically distributed properties. Hence, equation (3) provides the estimation for counterfactual household income for migrant families⁵.

4 Inverse Mills ratio is defined as the ratio of the probability density function to the cumulative distribution function in the framework.

5 Refer Heckman (1979) for details.

After generating the counterfactual predicted income of households without remittance, we use the observed values and counterfactual values to estimate the effect of remittances on poverty and income inequality following Foster et al. (1984) (FGT) index and Gini index, respectively.

The three variants of the FGT index are: the head count, the poverty gap and the squared poverty gap ratios. Poverty headcount ratio measures the proportion of population below the official poverty line. The poverty gap ratio measures the average poverty gap as a proportion of the poverty line in the population. It estimates the depth of poverty by considering how far the average poor household's income fall below the poverty line (Wouterse, 2010). The squared poverty gap measures the severity of the poor people in the population. Using three measures of poverty, we could compare the effects of remittance on level, depth and severity of poverty, respectively.

Stark et al. (1986) proposed a decomposition of income inequality that allows estimating the effects of discrete and marginal changes in remittances on the distribution of household income. If the remittances make up a large part of total income, they could have a huge impact on inequality. On the other hand, if their share of total income is zero, then their contribution to inequality should be zero. The proportion variation in Gini coefficient arising from a percentage change of remittances is equal to the initial percentage contribution of remittances in inequality minus the share of remittances in total income.

3. DATA CHARACTERISTICS AND VARIABLES

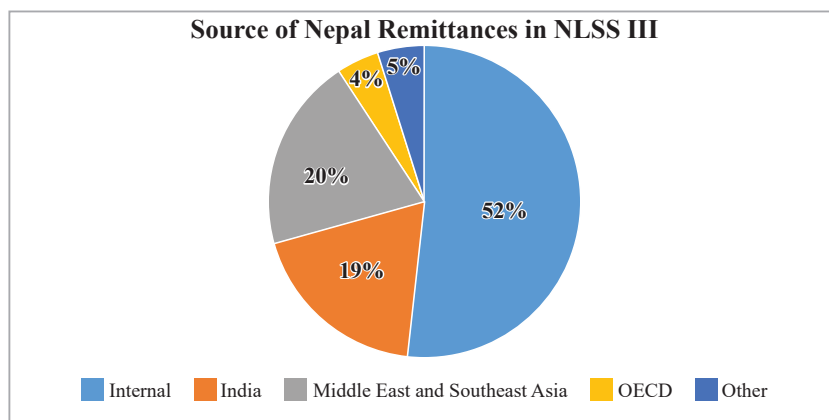
The data set used in the paper is Nepal Living Standards Survey, third edition (NLSS3) which was conducted by the Central Bureau of Statistics (CBS) of Nepal in 2010-11⁶. It consists of information on a list of broad topics, including household demographic characteristics, housing, access to facilities, migration, food and non-food expenditures, education, health, marriage, work and time use, agriculture, non-agriculture activities credit and savings, absentees and remittance, social transfers, etc.

⁶ NLSS is being conducted in Nepal once in almost one decade. The first two such versions were NLSS1 and NLSS2 in previous decades. NLSS3 is the latest version that is available at the time of this research.

The survey covers the whole country, including both rural and urban areas. The country, as per the survey, is divided into 75 administrative units (districts), and grouped into three ecological belts from north to south, namely, the mountains, the hills and the tarai. Further, in terms of developmental areas, the country was divided into five areas: eastern, central, western, mid-eastern and far-western areas⁷. Given the population density and the economic activity centered in the capital, Kathmandu, it includes detailed data on Kathmandu.

The NLSS III consist information on 5,988 household heads that includes 28,670 family members and 6,074 absentees. The data is rich and enables researchers to quantify household level of migration and remittances, and test the impacts of these variables on household income, inequality and poverty. Further, it provides detailed data on household agriculture production, non-agriculture work, wage work and external transfers that helps us to calculate gross income of the household. Specifically, the gross household income is the sum of three sources: non-agriculture income, agriculture income and remittances income.

Figure 1: Source of remittances in Nepal (NLSS3)



Source: NLSS3

Figure 1 presents the major sources of remittances in NLSS3. As could be seen, over half of remittances are internal, mainly from Kathmandu, the capital. In terms of sources of foreign remittances, the major places are India, middle-east and Southeast Asia.

⁷ NRs = Nepalese Rupees

Table 1 presents summary of the data for whole sample as well as for remittance receiving households and non-remittance receiving family.

Table 1: Summary statistics of households' characteristics

	All sample		Remittance receiving family		Non-remittance receiving family	
	Average	Std. Err.	Average	Std. Err.	Average	Std. Err.
Household Characteristics						
Number of households (cross-section)	5,596		3,019		2,577	
Age of household head	46.09	14.2	46.32	14.81	45.82	13.45
Household size	4.92	2.32	4.68	2.47	4.99	2.11
Male over 15	1.37	0.98	1.19	0.98	1.58	0.93
Average year of education per capita	3.78	2.99	3.61	2.94	3.95	3.03
Total gross income per capita	41,370.81	53,058.50	42,660.48	50,660.94	39,859.93	55,708.23
Share of remittance in total gross income per household (%)	27.12	37.15	48.51	37.83	0	0
Other Characteristics						
Log (housing value)	10.89	4.54	11.11	4.28	10.65	4.8
Log (value of agriculture land)	9.49	5.89	9.91	5.67	9	6.1
Log (financial asset)	3.84	4.44	4.09	4.33	3.55	4.55
Log (borrowing)	6.62	5.25	6.86	5.22	6.34	5.28
Log (lending)	1.17	3.28	1.3	3.4	1.02	3.12
Access to facilities						
Distance to nearest primary school (km)	0.99	11.05	0.86	1.01	1.15	16.25
Distance to nearest public hospital (km)	13.21	19.94	13.44	22.25	12.95	16.83
Distance to nearest Paved road (km)	13.15	28.8	11.44	23.72	15.16	33.69

The first set of observations is with regard to household characteristics. The age of household head of remittance-receiving family is in-average slightly older (46.32) than that of non-remittance recipient family (45.82). The household size, number of male over 15 years old, and average year of education of non-

remittance receiving families is slightly larger than remittance receiving ones. It hints that most migrants who moved out were young male adults and with higher education level, and the people left were mostly elderly and with lower education level. Also, it is important to note that average gross income per capita per year is higher for remittance receiving household (NRs 42,660.48 vs. 39,859.93)⁸. The explanation could be so that since the migrants are moving out, the members left out are mostly child and elders. Therefore, the household income may be lower in general. This also indicates that the migrant labors are mostly the economic backbone of the family before they moved out.

On other characteristics between the two groups, it is evident from Table 1 that remittance receiving families possess higher property value in terms of housing, agriculture land and financial asset. Also, in terms of credit, their access to finance seems to be more regular in both borrowing and lending behavior. With regard to access to facilities, the distance to nearest primary school and distance to paved road in remittance receiving families are shorter than that of their counterparts, while those recipient families tend to have a longer distance to public medical facilities.

Table 2 further provides information on the characteristics of household with at least one migrant member vis-à-vis non-migrant household. All the figures are much higher for non-migrant household which supports the argument above that most of the youth with relatively higher education went out seeking for opportunity. Importantly, the year of education per person is much higher (6.38 years) for migrant (remittance recipient) families than that of non-migrant (non-remittance recipient) families (3.78 years).

8 NRs = Nepalese Rupees

Table 2: Summary statistics of migrants' characteristics

	Migrant families		Non-migrant families	
	Average number	Std. Err.	Average number	Std.Err.
Kids below 16 years old	0.4	0.88	1.81	1.56
Labor between 16-64 years old	1.61	1.16	2.61	1.43
Elders above 64 years old	0.01	0.09	0.24	0.52
Total absentees (over 6 month) per household	2.02	1.73	0	0
Year of education per person	6.38	4.18	3.78	2.99

Next, we present a comparison table of mean total income per capita for two sets of households: remittance receiving and non- remittance receiving. This is done under two scenarios: by including remittance income and by excluding remittance income.

Table 3: Per capita income of remittance receiving and non- remittance receiving households

	Non-remittance receiving household	Remittance receiving household	Percent change (No remittances vs. Receive remittances)
Mean annual per capita income (NRs) (including remittances)	39,859.93	42,660.48	-7.03%
Mean annual per capita income (NRs) (excluding remittances)	39,859.93	23,979.28	39.84%
Number	2,577	3,019	N/A

For the households who do not receive any remittance the number is going to be same in both the scenarios which is NRs 39,859. Nevertheless, for the remittance receiving households, when we include the remittance income the annual average income per capita is NRs 42,660. But for the same group when we exclude the remittance income, the average income drops to NRs 23,979, a drop of 43%. This indicates that the recipient families are heavily dependent on remittance income sent by remitters.

The vertical comparison between non- remittance recipients and remittance

recipients under two scenarios shows that, the mean per capita income for non-remittance recipients is 7.03% lower than remittance recipients, when we include remittance income (first row). However, when we exclude the remittances income from the remittance receiving households, the non-recipient households are actually higher than remittance receiving households, in general. The mean annual per capita income of non-recipient households is 39.84% higher than that of remittance recipients, when we exclude remittance income (second row).

The rationale for choosing household variables in the equation (1) and (2) is motivated by previous literature. The income information is vital to our research. It is so because it incorporates the information about remittance. Specifically, the gross household income is the sum of three sources: non-agriculture income (rent, wage, enterprise income, transfer income from government, other income such as financial income), agriculture income (farming and livestock income) and remittances income. The age of household head and number of male members over 15 affect the probability of migration and reflect the life-cycle hypothesis. The gender of household head captures the sexual discrimination factor. It is assumed that when household head is female, it is more likely that males in the family would migrate. The literacy rate of household head influences the receipt of remittances because educated people have greater employment opportunities and household head is the person to make crucial decisions (Adams et al., 2008). Families with larger household size are expected to receive higher remittance.

Regional variables are included to reflect uneven distribution of population across different economic belts. We divide the regional variables into four tiers: tarai, hills, mountain and Kathmandu. It is found that residents from the capital and South Tarai area are most likely to migrate. An urban dummy is included as the rural income tends to be lower than the income earned in urban areas. Number of earner in original household is taken into account, because not every household member will be an earner but a household with more earners may have higher total income. The number of migrant worker between the ages of 16 to 65 is included as a comparison, due to the fact that remittances were sent mostly by migrants and the number of young migrant workers will influence the flow of remittances.

Higher education level is positively correlated with the salary earned. Therefore, migrant's education is an important determinant for the level of income and remittances sent back home. Expenditure of luxury food and property value which show the pre-migration households' economic status is included because it may influence the decision on whether to leave out from family. Distance to school, hospital, paved road indicates the infrastructure of the area where the households are located.

Moreover, as indicated in equation (2), we require instrument variables that satisfy the general conditions. Previous researchers have stressed on variations in migration networks and remittances among various ethno-religious in this regard. The argument follows that migration in the past facilitates migration in the present day. This is because larger network of migrants in the past provides more contacts and job referrals for current day migrants (Adams and Chuecuecha, 2010). Migration network is positively correlated with the probability of receiving remittance however it does not directly influence household income (Acosta et al., 2008). The religious factor could be used as instrument variable because it influences the migration networks but does not correlated with the household income variable (Adams et al., 2008). Another candidate for instrument variable is spoken language. Whether or not the household head speaks top five major languages of Nepal; including Nepali, Maithili, Bhojpur, Tharu and Tamang; influences the approach to the major migration network.

4. RESULTS AND DISCUSSION

The original dataset included 5,988 households, however, 392 (about 6% of total sample) observations are found to be outliers and therefore excluded from the sample, making the final sample of 5596 households.

4.1 Selection equation

Table 4 presents estimation results of equation (2), which is a probit model with dependent variable being: if that particular household received remittance. We estimate several specifications as indicated in different columns. The first column

only considers household head characteristics, and show strong significance in household head age and sex. The magnitude of household head age is very small but the positive sign indicates that higher age is positively related with the probability of receiving remittance. In column 2, the four regional dummies are included which are highly statistically significant. The results indicate that compared to the households in mountain region, household from urban and Kathmandu are less likely to receive remittances while households from Tarai are more likely to receive remittances. In this specification, we also find that household being literate also have positive probability on remittance.

In column 3, we include other characteristics of migrants in the estimation. Number of young migrant worker poses direct positive effects, while migrant education and male over 15 years in original households exert negative effects. Column 4 adds the financial background into consideration. Columns 5 and 6 add several interaction terms to look into the effect of household characteristics with other features.

Both of the two included instrument variables Hindu (for religion) and Major language (for language) are positive and statistically significant ⁹.

Table 4: Probit model estimation of household receiving remittance

Dependent variable: whether or not a household receive remittances, using equation (2)						
	(1)	(2)	(3)	(4)	(5)	(6)
HHage	0.00868***	0.00910***	0.00241	0.00303*	0.00458**	-0.00394
	(6.62)	(6.86)	(1.63)	(2.00)	(2.82)	(-1.43)
HHmale	-0.922***	-0.978***	-0.714***	-0.717***	-0.720***	-0.700***
	(-20.63)	(-21.46)	(-14.07)	(-14.05)	(-13.89)	(-13.46)
literate	0.0173	0.145***	0.112**	0.0887*	0.0823	0.0704
	(0.45)	(3.60)	(2.61)	(2.03)	(1.88)	(1.47)
hhsiz	0.00509	-0.0134	0.0251*	0.0237*	0.0223	-0.00472
	(0.66)	(-1.70)	(2.18)	(2.04)	(1.89)	(-0.35)
urban		-0.244***	-0.172***	-0.204***	0.0939	0.0721
		(-5.14)	(-3.39)	(-3.88)	(1.07)	(0.81)
tarai		0.188**	0.295***	0.165	0.169*	0.164
		(2.58)	(3.84)	(1.93)	(1.99)	(1.92)
kat		-0.370***	-0.142	-0.278**	0.131	-0.0898

⁹ It is to be noted that majority of the people in Nepal belong to Hindu religion and speak Nepali as the main language. Therefore, no concrete interpretation could be drawn on this front.

Notes:

HHage= Age of household head

HHmale= Sex dummy of household head, Male=1 otherwise 0

literate= Whether or not a household head is literate

hhsizex= Size of a household (excluding migrants)

urban= Whether a household belongs to urban area

tarai= Whether a household belongs to tarai region

kat= whether a household belongs to Kathmandu valley

hill= Whether a household belongs to hilly region

numb_earner= Number of earner in a household

miworkers1665= Number of migrants between age 16 and 65

male_over_15= Number of male over age 15 in a household

migrantedu= Migrant's sum of education year in a household

lgagriland= Log (agriculture land value) of a household

lgluxfood= Log (expenditure of luxury food)

road= Distance to nearest paved road in km.

age_kat= Interaction between HHage and Kathmandu dummy

urban_earner= Interaction between urban dummy and number of earners

over15_food= Interaction between number of male over 15 and consumption of luxury food

road_literate= Interaction between distance to paved road and literate rate

earner_age= Interaction between number of earner and household head age

size_mi= Interaction of size of a household and migrant workers in 16-65 ages

Hindu= Instrument dummy whether or not household head belong to Hindu religion

majorlang= Dummy whether or not household head belong to major language groups

*** Statistically significant at the 1%

** Statistically significant at the 5%

* Statistically significant at the 10%

We can draw several interesting observations from these results. Firstly, the household head male dummy shows significant negative effects in all specifications, that is, when household head is female, the households are more likely to receive remittances. Secondly, the numbers of migrant workers between 16-65 ages are significantly positively correlated with the probability of remittance. It indicates that as the number of migrant increase, the higher possibility of sending money back home. Thirdly, it's also worth noting that the migrant's education level has negative and significant effect on the probability of receiving remittances.

Meanwhile, looking at the results from interaction terms, there is evidence that an urban household with a greater number of earners are less likely to receive remittances. Also, more aged earner and more migrants from a household are likely to receive more remittance. These results are as per our expectation.

4.2 Earning equation

In Table 5, we present the main result of Heckman second stage estimation of equation (3). The dependent variable in this case is total income per capita of household. The table also reports inverse Mills ratio that considers the selection bias in the model.

The household head characteristics show some strong relevance in the total income of family. The coefficients of household head age are positive in all 6 specifications with significance at different levels. It shows that the older the household head, the more income a household would have. However, the household income is irrelevant to the sex of household head. The household head's literacy is significantly positively correlated with income in all specifications. This strongly supports current studies about the positive income effects of education. However, the effect of household size in income is negative which reflects the lowering of average income as the dependent variable is in per capita.

**Table 5: Heckman results of income per capita for all families
(selection bias corrected)**

Dependent variable: log(total income per capita)						
	(1)	(2)	(3)	(4)	(5)	(6)
HHage	0.0115*** (5.21)	0.0115*** (4.82)	0.00406* (2.15)	0.00501** (2.64)	0.00496* (2.44)	0.0102** (3.18)
HHmale	-0.305 (-1.87)	-0.173 (-0.90)	0.0505 (0.51)	0.0274 (0.28)	0.0678 (0.69)	0.0756 (0.79)
literate	0.928*** (18.33)	0.766*** (13.15)	0.625*** (11.29)	0.602*** (11.08)	0.602*** (11.03)	0.650*** (10.91)
hhsz	-0.110*** (-11.15)	-0.0992*** (-10.01)	-0.145*** (-10.11)	-0.153*** (-10.81)	-0.152*** (-10.62)	-0.174*** (-9.97)
urban		0.533*** (6.96)	0.594*** (8.87)	0.556*** (8.05)	0.447*** (4.31)	0.447*** (4.27)
tarai		0.198* (2.00)	0.0932 (0.92)	0.0827 (0.82)	0.0831 (0.82)	0.087 (0.85)

Dependent variable: log(total income per capita)						
	(1)	(2)	(3)	(4)	(5)	(6)
kat		0.719***	0.825***	0.763***	0.847**	0.916***
		(4.77)	(6.11)	(5.43)	(3.28)	(3.45)
hill		0.0348	0.064	0.0456	0.05	0.0611
		(0.37)	(0.68)	(0.47)	(0.51)	(0.62)
numb_earner			0.0235	0.0158	0.00048	0.109
			(1.12)	(0.75)	(0.02)	(1.87)
miworke~1665			-0.129*	-0.124*	-0.135*	-0.213***
			(-2.21)	(-2.18)	(-2.38)	(-3.45)
male_over_15			0.214***	0.199***	-0.301	-0.274
			(5.61)	(5.26)	(-1.48)	(-1.34)
migrantedu			0.0157***	0.0158***	0.0163***	0.0171***
			(4.2)	(4.27)	(4.38)	(4.55)
lgagriland				-0.00258	-0.00281	-0.00327
				(-0.54)	(-0.58)	(-0.67)
lgluxfood				0.109***	0.0631*	0.0685**
				(5.72)	(2.45)	(2.65)
road				-0.00221	-0.00204	-0.0000801
				(-1.96)	(-1.79)	(-0.05)
age_kat					-0.00125	-0.00311
					(-0.24)	(-0.59)
urban_earner					0.0483	0.0488
					(1.27)	(1.29)
over15_food					0.0502*	0.0481*
					(2.51)	(2.4)
road_liter~e						-0.00375*
						(-1.97)
earner_age						-0.00226*
						(-1.99)
size_mi						0.0139
						(1.9)
constant	9.544***	9.338***	10.02***	9.071***	9.563***	9.364***
	(46.98)	(41.72)	(51.26)	(32.46)	(28.63)	(27.95)
inverse mills ratio -(lambda)	0.0873	-0.116	-0.917***	-0.874***	-0.925***	-0.974***
	(0.29)	(-0.33)	(-4.49)	(-4.40)	(-4.62)	(-4.89)
No. of Obs.	5596	5596	5596	5596	5596	5596

Note:

*** Statistically significant at the 1%

** Statistically significant at the 5%

* Statistically significant at the 10%

In terms of regional dummy, household from urban areas and Kathmandu exert significant positive effects. Most coefficients of Tarai and Hill are insignificant. Interestingly, the numbers of migrant workers, of age between 16- 65, have negative coefficients and are statistically significant. Also, the education level of migrant is now positively related to household income.

Value of agriculture land does not correspond to the household income, whereas spending on luxury food has positive relation as per our expectation. The interaction terms have minimal influences. The significant negative coefficients of inverse Mills ratios justify our postulation of selection bias and confirms our approach of employing counterfactual analysis. This effectively means that the non- remittance recipient households considered under this framework are being corrected with the selection bias with the assumption that they did not migrate.

4.3 Impact on poverty and inequality

We assume that there is one adult migrant with average education background who sends back money in each remittance-recipient families. This means that in the counterfactual scenario, the household earning is divided by original household size plus a migrant. This conservative hypothesis is strongly supported by literature such as Acosta et al. (2008) and Gubert et al. (2010).

We firstly report the results of impact on poverty. In 2011, the official national poverty line in local price is NRs 19,261 (Pokharel, 2015; Central Bureau of Statistics (CBS), 2011), this is approximately USD 267.7 per year which is USD 0.73 dollars a day. This is lower than the World Bank's extreme poverty line, which is \$1.25 per day. Table 6 illustrates the impact of remittance on poverty indexes between remittance receiving and non- remittance receiving households. The first column shows gross income including remittances of all households segregated by the poverty headcount, poverty gap and squared poverty gap. They are 47.98%, 30.05% and 23.12% respectively.

Table 6: Effects of remittances on poverty

	Total income including remittances (total households)	Households without remittances	Households with remittances	Households with remittances	Total income excluding remittances (total households)	Difference (Receive Remittances vs. Counter-factual)
	Observed	Observed	Observed	Counter-factual	Observed	
	(1)	(2)	(3)	(4)	(5)	(3) vs (4)
Poverty headcount (%)	47.98	54.13	42.73	48.03	61.51	-0.053
Poverty gap (%)	30.05	37.92	23.33	15.96	44.55	0.0737
Squared poverty gap (%)	23.12	31.31	16.13	6.88	37.02	0.0925
Mean per capita income (NRs)	41,370.81 (53,058.50)	39,859.93 (55,708.23)	42,660.48 (50,660.94)	27,805.93 (24,023.84)	31,292.44 (48,587.56)	14,854.55
Number	5,596	2,577	3,019	3,019	5,596	N/A

Notes: The mean per capita income shown in (1), (2), (3) and (5) are calculated based on NLSS3 cross-sectional panel data.

Total income (including remittances) includes: rent income (from real estates), wage income (from paid work), enterprise income (from operation of family enterprises), transfer income (from government supporting programs), agriculture income (from selling of agriculture products), livestock income (from selling of livestock), and remittances income (from absentees and non-family members) and other income.

The counterfactual income (4) is generated using Heckman equation (3).

In (5), the remittance income is deducted from total gross income.

Poverty ratio is the proportion of population below the poverty line, poverty gap is the average poverty gap as a proportion of the poverty line in the population, measures the depth of poverty level

Squared poverty gap is the square of the poverty gap calculated in the third row.

In 2010, 1 Nepalese Rupee = US \$0.0134.

In 2011, the official national poverty line in local prices is NRs 19,261

Comparing columns 2 and 3 for observed data, we see that the poverty ratio in households without remittances is almost 12% higher than that of households with remittances (54.13 vs. 42.73). However, for other two measures, the reading is opposite; poverty gap (37.92% vs. 23.33%) and squared poverty gap (31.31% vs. 16.13%). Also, mean per capita income of column 2 is lower than that of column 3. This shows that poverty issue was relatively more severe in non-recipient families, and remittance seems to contribute greatly in poverty reduction.

In column (4) we present the results for non-remittance receiving household being corrected for selection bias. It shows that the real mean income for households with remittances could be higher than non-recipient households. This result is in alignment with previous findings, which indicates that mean income for non-remittance receiving household is much smaller than that of remittance recipient families (comparing column 3 and 4). This provides the evidence that remittance makes the remittance receiving household better off.

Further, we can see from the Table that the poverty gap and squared poverty gap for counterfactual scenario (column 4) are both lower than the situation when household received remittances (column 3). This shows that despite the reduced poverty headcount (from 48.03% to 42.73%), the depth and severity of poverty have risen up by 7.37% and 9.25% respectively for remittance recipient households. This positive relation between poverty gap and remittances is in line with the results of Acosta (2008). This indicates that remittances lead to increase in household earnings, but widened the gap between recipient and non-recipient households. However, this could also be explained as averaging effect of expected conditional mean. We see that although the poverty ratio is higher in the counterfactual scenario, the standard error of per capita mean income of column 4 (24,023.84) is much lower than that of column 3 (50,660.94), which shows the validity of assumption on counterfactual scenario.

In column 5, the poverty rate is 61.51% which is much higher than that of column 4 (48.03%), indicating that simply subtract remittances from total income will over-exaggerate the impact of remittances. This is because it did not take the migrant's opportunity cost of earning from local occupation. Also, the poverty gap and squared poverty gap in column 5 are larger than that in column 4,

indicating upward bias. Therefore, the outcome in column 4 is more convincing and scientific estimation in the household income without remittances.

In Table 7, we present inequality indices for different situations for both, remittance receiving and remittance non- receiving households. The observed Gini coefficient for total household including remittances is 0.6057, which is a higher than the international warning level of ‘considerable disparity’ (0.5). Comparing column 2 and 3, we can see that the inequality level for households with remittances is about 0.09 lower than that of households without remittances. This shows that the inequality is less severe in the case of remittance receiving households. Column 4 shows that the inequality index in counterfactual scenario is 0.3947, which is much lower than that of column 3 (0.5605). This suggests that remittance has actually helped to increase inequality among remittance receiving and non- receiving groups. Therefore, overall the effect of remittance is ambiguous that on the one hand the inequality has gone down within the group but increased across the groups. This result is in accordance with the Barham and Boucher (1998) and Bouoijour and Miftah (2014). The inequality situation in column 5 (0.6844) is highest amongst all the scenarios. This indicates that under this scenario, the estimation has upward bias.

Table 7: Effects of remittance on inequality

	Total income including remittances (total households)	Households without remittances	Households with remittances	Households with remittances	Total income excluding remittances (total households)	Difference (Receive Remittances vs. Counter-factual)
	Observed	Observed	Observed	Counter-factual	Observed	
	(1)	(2)	(3)	(4)	(5)	(3) vs (4)
Gini coefficients	0.6057	0.6548	0.5605	0.3947	0.6844	0.1658
Inequality weight:						
1st Quintile	0.80%	0.30%	1.80%	6.20%	0.20%	
2nd Quintile	4.30%	2.60%	5.70%	9.87%	2.20%	
3rd Quintile	10.30%	8.30%	11.60%	14.30%	7.20%	N/A
4th Quintile	21.70%	21.30%	21.90%	21.90%	19.50%	
5th Q. (TOP)	62.80%	67.60%	59.00%	47.70%	70.90%	
Number	5,596	2,577	3,019	3,019	5,596	N/A

Notes: The first row analyzed the Gini coefficients of the estimated group income situation.

In the corresponding rows of Table 7, we report the inequality distribution of the full sample in terms of quintiles. As can be seen from the Table, the population in the lowest income quintile (representing 1/5 of total sample population) constitutes only 0.8% to 6.2% of national income. Alternatively, the people from highest income quintile (5) constitute 47.7% to 70.9% of national income. This severe situation of inequality is a cause of concern for the policymakers. Further, comparing column 3 and 4, we can find evidence that the remittance has contributed to the inequality in the society.

5. CONCLUSIONS

In this paper, we firstly look into the effect of overall remittance on household behavior. Our prime interest is to identify the key variables that determine remittance flow and explanations thereof. Secondly, we analyze if the remittance flow has helped to reduce the poverty in the sampled areas and what are the effects on income inequality, if any. We base our analysis on large scale cross sectional national survey conducted by the government in cooperation with international institutions- Nepal Living Standard Survey, third edition (NLSS3), conducted in 2010-11, which is the latest in the series.

We employed Heckman two-step estimation in order to overcome the selection bias that may exist in the household receipt of remittances. We find that remittance has contributed positively in households' living conditions by increasing their disposable income. The analysis shows that remittance helps to reduce the poverty headcount ratio by 5.3%. This means that the proportion of population below the official poverty line decreased from 48% to 42.7% for remittance recipient households compared to non- recipient households. However, it also contributed to increase in the depth and severity of poverty by 7.37% and 9.25% respectively for remittance recipient households. With regard to income inequality, the results are ambiguous. We find that the inequality has increased between remittance recipient and remittance non- recipient households. Nevertheless, we also observed that the inequality declined within the remittance receiving households. The counterfactual results show that the

inequality is much smaller if the member would not have migrated. These results are consistent with earlier studies.

One important observation we find that migrants who moved out tended to be young male adults and with higher education level, and the people who were left behind tend to be elderly and with lower education level. Further, the recipient households are highly dependent on the remittance income.

One of the key limitations of the study is that it is based on old dataset. By the time of this study, this is the latest data available. Nevertheless, with newer set of data, the analysis could be more relevant to the contemporary experiences.

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