

## **Remittance, poverty and inequality: Micro-simulation for Nepal**

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### **I. Introduction**

The international remittance has emerged as a most important source of private capital flows for several developing countries (DCs) in recent decades as its inflow to developing DCs reached \$325 billion in 2010 against \$30 billion in 1990 (World Bank, 2011). Particularly, Nepal has experienced relatively even larger increase in emigration and remittance. For instance, the annual flow of Nepalese people for work to the countries other than India has increased from few thousand in early 1990s to about 300 thousand in 2010 (Department of Foreign Employment, [DOFE], 2011). The number would be much larger if we include migrants who are working in India, with whom there is a reciprocal agreement to enter without visa. As a result, the annual remittance inflow increased from \$50 million in early 1990s to \$3 billion in 2009 and remittance-GDP ratio went up as large as one-quarter in 2009 (World Bank, 2011). Meanwhile, the head count poverty declined remarkably from 42% to 31% during 1996-2004, despite the modest economic growth and political turbulence in one hand, the inequality (measured by Gini coefficient) increased sharply from 0.34 to 0.41 during this period on the other (CBS, 2006, p. i-iii). Given these developments, this research addresses the question: Is the increase in

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migration and remittance the main driving force behind the reduction in poverty and the increase in inequality in Nepal?

To assess the impact of remittance on poverty and income distribution, the previous studies have used two general approaches: (i) remittance as ‘exogenous transfer’ (see, for example, Stark, Taylor & Yitzhaki, 1986) and (ii) remittance as ‘potential substitute’ for other household earnings (e.g., Barham & Boucher, 1998). Although the results might vary with the approaches used, and the statistical techniques adopted to generate counterfactual consumption as well as the differences in the maturity of migration-remittance process and sources of remittances, there are no studies that disaggregate to account the evolution of the process over time in a country across regions and source of remittances using the second approach - the more flexible one.

So, our study attempts to answer whether the increased migration and remittance is the main cause of decrease in poverty and increase in inequality in the case of Nepal by examining how differences in prevalence of migration and sources of remittances have diverse impacts on poverty (magnitude) and inequality (magnitude and direction) over time considering remittance as ‘potential substitute’. effects using balanced panel data of 962 households from two rounds of Nepal Living Standards Survey (NLSS) conducted by Central Bureau of Statistics (CBS) of Nepal<sup>12</sup>, we apply fixed effects model to control of the household fixed effects in contrast to most of the previous studies that had used instrumental variables (IV) and Heckman Selection methods (see, for example, Lokshin, Bontch-Osmolovskim, & Glinskaya, 2007; Zhu & Luo, 2010) to control for the endogeneity of remittance income.

## **II. Empirical Methodology**

Following Bhattacharya (1985) and Stark (1991), we consider migration-remittance process as a household welfare maximizing behavior and use following fixed effects model to deal with potential endogeneity of remittance:

$$\ln(\text{PCE}_{it}) = \alpha + \beta R_{it} + \gamma X_{it} + \delta G_i + \eta E_i + d_t + f_i + \varepsilon_{it} \quad (1)$$

where,  $\ln(\text{PCE})$  is the natural logarithm of per capita consumption (PCE) of a household  $i$  and measures household welfare,  $d_t$  is a time dummy,  $f_i$  captures time invariant factors for each household and  $\varepsilon_{it}$  are idiosyncratic errors that change across  $t$  as well as  $i$ .  $R_{it}$  is a remittance

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<sup>12</sup> The first round (NLSS I) was conducted in 1995/96 (hereafter 1996) while the second round (NLSS II) was carried out in 2003/04 (hereafter 2004). For further details on the sampling procedure see CBS (2004).

related regressor that represents either a dummy for whether a household received remittance or the log of one plus actual remittance income received. The parameter of our interest,  $\beta$ , captures the gain in household welfare, measured by log of per capita consumption, due to the migration-remittance decision.  $X_{it}$  is a set of household and community characteristics. The household characteristics include household size and its composition, characteristics of household head such as age, sex, education level, migration history and occupation, per capita pension income, dummies for the service flow of durables purchased at least one year prior to the survey and dummies for agricultural land holding. We use six regional dummies ( $G_i$ ) to control for spatial premiums on consumption, and migration costs associated with socio-physical proximities (Fafchamps & Shilpi, 2008). We also use four binary indicators  $E_i$  to control for caste and ethnicity characteristics. To capture community level externalities on welfare, we use ward level mean household consumption, and proportions of population above 15 years who were illiterate or passed the high school level national exam (SLC), employed or self employed, and engaged in agriculture or non-agriculture occupation.

Based on the above model (1), we use the fixed effects estimates to construct counterfactual consumption patterns under two scenarios: (a) *no household receives remittance* and (b) *1% increase in the proportion of remittance receiving households* with error term ( $\varepsilon_{it}$ ) having student t-distribution with 30 degrees of freedom and heteroskedasticity and generate 10,000 values of  $\ln(\text{PCE})$  as:

$$\ln(\text{PCE}_{it}) = \hat{\alpha} + \hat{\beta}R_{it} + \hat{\gamma}X_{it} + \hat{\delta}G_{it} + \hat{f}_i + \hat{\varepsilon}_{it} \quad (2)$$

where  $\hat{\varepsilon}_{it}$  are random draws from the selected distribution and ( $\hat{\alpha}, \hat{\beta}, \hat{\gamma}, \hat{\delta}, \hat{f}_i$ ) are given by the fixed effects estimator. The predicted values of  $\ln(\text{PCE})$  for these households are used to compute mean per capita household consumption, indices of poverty<sup>13</sup> and inequality<sup>14</sup> and analyze the impact of overall and source-wise remittance (i.e. domestic, foreign, Indian and other countries) on these indices at national and regional levels.

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<sup>13</sup> Following Foster-Greer-Thorbecke (FGT, 1984), we use three main measures of poverty – head count poverty (P0), poverty gap (P1) and poverty gap squared (P2) – to measure the effects on incidence, depth and severity of poverty, respectively using both national poverty lines [2,114 Kcal per day (NPR 5,089 per year) for 1996 and 2,144 Kcal per day (NPR 5,216 per year at constant price of 1996) for 2004] and international poverty line [PPP US\$1/day at constant price of 1993 and its double].

<sup>14</sup> We use the Gini index, a widely used measure, to explore the impacts of remittance on income (consumption) distribution.

### **III. Results**

The fixed effects estimation<sup>15</sup> results show that the coefficient of remittance dummy is significant at 10% level: the per capita consumption of remittance receiving households is 6.54% higher than that of non-recipient households, other things being constant. The coefficient of remittance income is also significantly positive (at 1% level): if per capita remittance increases by 1%, then per capita consumption increases by 0.017%, other things being the same. The small elasticity value suggests that our estimation might not capture the full welfare effect of remittance.

Table 1 shows simulation results for both remittance dummy and remittance income models for 1996 and 2004. First, using the remittance-dummy model, if no household receives remittance, the mean consumption would decrease by 1.4% in 1996 and 2.1% in 2004 with respect to baseline simulation values (Panel A and B). The results for the remittance-income model are similar, but the magnitudes are about 50% larger in both scenarios (Panel C and D).

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<sup>15</sup> The results are not shown here and may be available from the authors upon request. We also do instrumental variable fixed effect estimation using the proportion of adult population that is absent for more than 6 months during survey year and the proportion of remittance receiving households as instruments. Hansen J-statistic and the KPLM statistics indicate that the instruments are valid and relevant. The Sargan test suggests that we do not find any endogeneity of remittance caused by *time invariant* factors.

Table 1  
Impacts of remittance on consumption, poverty and inequality by source of remittance

Measures	Baseline		No DOM		No IND		No OTHR		
		No REM		REM		REM		REM	
	C/F	% Δ	C/F	% Δ	C/F	% Δ	C/F	% Δ	
A. Remittance – Dummy Model (in 1996):									
Consumption Per Capita	7,400	7,295	-1.41	7,341	-0.80	7,360	-0.54	7,394	-0.07
Head Count (P0)	42.54	43.52	2.29	43.05	1.19	43.06	1.20	42.57	0.06
Poverty Gap (P1)	12.07	12.49	3.42	12.27	1.63	12.3	1.91	12.08	0.06
Poverty Gap Squared (P2)	4.69	4.89	4.26	4.78	1.93	4.81	2.45	4.69	0.04
Gini Coefficient	0.333	0.333	-0.03	0.333	-0.15	0.334	0.30	0.333	-0.09
B. Remittance - Dummy Model (in 2004):									
Consumption Per Capita	9,452	9,258	-2.06	9,352	-1.06	9,389	-0.67	9,408	-0.47
Head Count (P0)	29.94	31.32	4.61	30.6	2.21	30.6	2.21	30.08	0.49
Poverty Gap (P1)	7.36	7.83	6.36	7.58	3.02	7.60	3.34	7.39	0.43
Poverty Gap Squared (P2)	2.61	2.80	7.49	2.70	3.61	2.71	3.97	2.62	0.40
Gini Coefficient	0.354	0.355	0.17	0.354	0.00	0.356	0.54	0.353	-0.28
C. Remittance - Income Model (in 1996):									
Consumption Per Capita	7,396	7,227	-2.28	7,298	-1.34	7,335	-0.83	7,384	-0.16
Head Count (P0)	42.57	43.97	3.30	43.32	1.77	43.27	1.64	42.59	0.05

Poverty Gap (P1)	12.06	12.66	5.02	12.34	2.34	12.4	2.81	12.07	0.06
Poverty Gap Squared (P2)	4.68	4.98	6.40	4.81	2.79	4.86	3.79	4.68	0.06
Gini Coefficient	0.333	0.332	-0.39	0.332	-0.42	0.334	0.39	0.332	-0.21
D. Remittance - Income Model (in 2004):									
Consumption Per Capita	9,451	9,108	-3.62	9,286	-1.75	9,346	-1.11	9,359	-0.97
Head Count (P0)	30.00	32.28	7.60	31.04	3.49	31.06	3.56	30.32	1.06
			10.5						
Poverty Gap (P1)	7.37	8.14	4	7.72	4.82	7.77	5.43	7.44	1.00
Poverty Gap Squared (P2)	2.61	2.93	1	2.76	5.72	2.78	6.65	2.63	0.96
Gini Coefficient	0.354	0.354	-0.14	0.354	-0.14	0.357	0.82	0.352	-0.62

Source. Authors' calculation using NLSS I and II panel data.

**Note.** DOM, FOR, IND, and OTHR are remittance from within Nepal, foreign countries, India and other countries (except India), respectively. C/F is the scenario under which no household receives remittance from a particular destination: DOM, FOR, IND or OTHR. %  $\Delta$  indicates the percentage change with respect to the baseline. Consumption per capita is in NPR (constant price 1996). National poverty line is used<sup>16</sup>.

<sup>16</sup> The results on counterfactual *scenario (b)*, international poverty lines and regional level are not reported here and may be available upon request.

Next, regarding impacts of migration and remittance on poverty, based on the national level poverty line and the remittance-dummy model, the incidence of poverty (P0) would increase by 2.3% and 4.6% (respectively) in 1996 and 2004, the depth of poverty (P1) by 3.4% and 6.4% (respectively), and the severity of poverty (P2) by 4.3% and 7.5% (Panel A and B). If we used the remittance-income model instead, the figures would be larger: 3.3% and 7.6% increase for P0, 5% and 10.5% increase for P1, and 6.4% and 12.5% increase for P2 in 1996 and 2004, respectively (Panel C and D). The larger impact of remittance on the depth and severity of poverty (P1, P2) than on the incidence of poverty (P0) might be related to the uneven distribution of poor households among migration destinations. For instance, to cope with food and employment scarcity, ultra-poor households might migrate to the places that are less costly such as India. So, even if small transfers from India do not bring the poorest households above the poverty line (and so do not affect P0) at least these can help to bring those household nearer to it (improving P1 and P2). Moreover, less poor households can afford to send a member to relatively more costly and risky places. So, remittance helps to eradicate poverty (i.e. improve P0) rather than just bringing those poor households near the poverty line. The effects on all three FGT measures are about two-third larger in the later year because of the sharp increase in migration and the increase in the proportion of poor households in the migration process.

The above findings are robust when we use an international poverty line i.e. US\$1/day for all FGT measures or double it. The estimated impacts on poverty for US\$1/day poverty line are slightly larger than those for the national poverty line while that for US\$ 2/day are about 50% smaller than those for the national poverty line.

Furthermore, we split the effect of remittances from different sources by constructing the counterfactual scenario under which no household receives remittances from a particular source country. The results show that the effect of foreign remittance on FGT measures is mostly larger than that of domestic remittance in both years. If we further disaggregate foreign remittance into India and other countries, then Indian remittance contributes at least 80% (90% in 1996) of the impact of overall foreign remittance (Table 1). The reason for the larger impact of Indian remittance is that the ultra-poor mostly migrate to India, whereas most of the third country migrants come from less poor (or richer) households. These results hold true for scenario (b). Moreover, there is regional variation in the impact of remittance on poverty: the regions that have higher prevalence of remittance experience larger impacts.

Finally, the inequality would decrease in both years but less in 2004 if no households receives remittance indicating that as the migration process becomes more mature, costs and risks involved in migration may be reduced, as well as participation of the bottom quintile in this process may be increased which is consistent with the results of Stark, et al. (1986) in the case of Mexico. Although domestic remittance and other country remittances increase inequality, the Indian remittance is found to be income equalizer in both years.

#### **IV. Conclusion**

The econometric results show that the consumption is higher for remittance receiving households and it increases with remittance income, other things being the same. The simulation results show that if none of the households received remittances, the incidence of poverty (P0), measured by national poverty line, would have increased by at least 2.3% and at most 3.3% in 1996 and at least 4.6% and at most 7.6% in 2004; the lower bounds are for simulations using the remittance-dummy model while the upper bounds are that for remittance-amount model. Impacts on the depth (P1) and severity of poverty (P2) are even larger. Although average remittance sent by a third country migrant is more than seven times higher than that of Indian one, Indian migration is necessary for the poorest households that experience severe credit limitations. So, Indian remittance has a far larger impact on poverty reduction in comparison with domestic and other countries' remittance and it acts as an income equalizer in contrast to adverse effects of remittances from Nepal and other countries. The overall effect of remittances on income equality is negative but this adverse effect has decreased over time. These stylized facts agree with Stark, et al. (1986) and Taylor, et al. (2005).

The limitations of the study arise as consumption for a particular year may not capture the full implications on household welfare, data are limited to disaggregate remittance received from the absent member(s) and relatives or friends and we only consider the direct impacts of remittance rather than measuring the externalities of massive inflow of remittances.

Policies that facilitate to switch the migrants of poor households who are working in India to other countries might be effective to reduce poverty sharply and improve equality. In the short run, programs on migration credit and migration/remittance information dissemination for bottom income group would be appropriate. Medium and long-term policies such as educational investment and strengthening legal status of contracts among potential migrants, manpower companies and foreign employers would also be instrumental for poverty reduction.



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