

# Worker's Remittances and Poverty in Kyrgyzstan

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## Abstract

This paper aims to evaluate the impact of internal and international remittances on poverty in Kyrgyzstan using household survey data for 2011. Following Adams and Cuecuecha (2010) two-stage multinomial logit model suggested by Bourguignon *et al.* (2007) is used. Methodology use instrumental variables to solve the selectivity bias issue and then estimates counterfactual expenditure of households. Households are classified as international remittance receiving, internal remittance receiving and remittance non-receiving. For evaluation of remittances impact on poverty counterfactual expenditures are compared with observed actual expenditure by household types. Expenditure level for 2011 for definition of national poverty line in Kyrgyzstan is used as the benchmark for poverty impact of remittances. Results show that international remittances considerably decrease poverty level. Per capita expenditure of international remittance receiving households would be lower than expenditure of poverty line for 2011, if they did not receive remittances. Internal remittance receiving households also would decrease expenditures, but it would still be higher than poverty line.

## 1 Introduction

Remittances sent by migrants outside of Kyrgyzstan are important income source of the economy. According to the World Bank (2012) Kyrgyzstan ranks 3<sup>rd</sup> among the top 10 recipients of migrant remittances as a share of GDP. According to the World Bank forecasts in 2013 Kyrgyzstan will receive remittances as 31 per cent of GDP. Such large amount of remittances inflow contributes to mitigate deficit of balance of payments and is seen as one of the major factors in sustaining livelihood of most rural population. Because of the high proportion of consumptive expenditures in spending of remittance receiving households, channeling them into productive investment is one of the important issues for government agencies. However, understanding factors behind the use of remittances is fundamental for decision-making in policies attempting to regulate not only remittances, but also household expenditures in general in order to increase their investment activities.

Arguments on the economic consequences of remittance are controversial. Classical and widely accepted view is that remittances are rarely used in productive investments, but mostly channeled to current consumption. Chami *et al.* (2003) points out three major stylized facts on economic consequences of remittances derived from country-case studies: first, majority of remitted funds are spent on consumption; second smaller part goes into saving or investment; and third investments done with remittances are not necessarily productive in terms of the overall economy.

In most of the empirical studies investment is defined in real terms as physical capital investment or enterprise investments. Although spending on housing, land, education and health constitute major items in expenditure structure of remittance receiving households. Treatment of these expenditures as non-productive from long-run economic point of view is questionable. Since, durable goods increases living conditions, while expenditures on education and health are human capital investments, which in the long run are beneficial to economy. Some of the empirical studies conclude that remittances positively contribute to education status of remittance receiving households and communities (for instance, see Lopez-Cordova, 2004; Hanson and Woodruff, 2003; Cox, Edwards and Ureta, 2003; Yang, 2005). This capital formation approach to remittances provided the ground for possible "brain-gain" argument.

Strong kinship relations might cause use of remittances in festive events. Use of remittances on non-productive consumption can indirectly contribute to non-remittance receiving households. Expenditures considered as non-productive, such as on construction, funeral and weddings can generate employment and income through multiplier effect (Taylor *et al.* 1996; Mazzucato *et al.* 2006).

However, given these optimistically oriented evidences, studies on countries analogous to Kyrgyzstan by income level, such as Ghana by Adams *et al.* (2008) and on Tajikistan by Clément (2011) find no evidence on productive use of remittances as investment or education. In other words the question whether remittances are used productively is debatable and may vary by country specifics.

Nevertheless, as mentioned empirical evidences suggest that dominant use of remittances on consumption does not automatically imply that remittances are non-productive. Current consumption at least may result in indirect effect for non-migrant families and overall economy or some part of non-productive expenditures may be beneficial for human capital formation. Evaluation of possible effects of remittances requires full understanding of determinants behind its usage.

There are only few studies focused on remittances in Kyrgyzstan. Atamanov and Van Der Berg (2010) analyze the determinants of remittances for permanent and seasonal migrants and conclude that altruism and insurance drive remittances from seasonal migrants, while for permanent migrants bequest, loan repayment and exchange motives may be important. Atamanov and Mogilevsky (2009) using Computable General Equilibrium model simulations state that increase in remittances positively impacts all households in terms of the increased consumption and production.

To authors' best knowledge there are only two studies on the impact of remittances on expenditure of households in Kyrgyzstan. Ukueva and Becker (2010) analysing the effect of remittances on the purchase of durable goods using the Kyrgyzstan Integrated Household Survey (KIHS) data of National Statistical Committee of Kyrgyz Republic (NSCKR) and concludes that remittances positively impact purchases of durable goods.

Anderson and Kroeger (2011) investigate relationship between remittances and expenditures on education using the same Integrated Household Survey data by NSCKR for 2005-2008 years. They find that remittances and domestic transfers have not promoted investments in the human capital of children, even more negatively affected in the south and the mountain areas.

## 2 Methodology

Generally, poverty can be measured by income or expenditure. But most of the empirical literature on poverty generally uses expenditure than income. Moreover, in developing countries, like Kyrgyz Republic, presence of large scale informal economy, large share of employment in agriculture and other difficulties to accurately measure income level are major rationales for using household expenditure (for instance see: Deaton, 1997). Taking into consideration these arguments in order to estimate impact of remittances on poverty total per capita household expenditure will be used in this study.

In a general framework poverty can be argued to be affected by various factors including household characteristics, regional factors and other economic and demographic features of household. This functional relationship can be represented by the following equation.

$$EXP_i = \alpha_i + \sum \beta_j X_{ij} + \varepsilon_i \quad (1)$$

Where  $EXP_i$  is total expenditure of household.  $X_{ij}$  is a vector of explanatory variables, which in our case along with other variables includes internal and international remittances. If the households who receive both internal and international remittance were randomly drawn from the whole population, this consumption function could be estimated using OLS method. But, there is evidence that that this may not necessarily be the case. Remittance receiving households are not randomly selected and have some unobservable characteristics that make them to decide to send migrant and receive remittances, i.e. they are rather self-selected. In this case of self-selection OLS will not give consistent and unbiased estimates. Therefore, methodology applied in the research should take into account this selectivity bias issue.

There are two main approaches in evaluation of impact of remittances on household welfare in the literature: propensity matching score and instrumental variables approach. The first approach results in unbiased estimate through designing a control group. However, this approach assumes that there are no unobservable characteristics of households that might influence the decision of household to send migrant and receive remittances. In this case, as noted above, estimation will be biased. Since households receiving remittances might have unobservable characteristics that are different from households not receiving remittances and should be taken into account in predicting household expenditure (for instance see: Bettin et al., 2012).

Second approach proposes to use instrumental variables in addressing selection bias. This approach employs two-stage estimation technique. In the first stage instrumental variables and other explanatory variables are used to predict probability of remittance receiving (internal and international) by households. Then selection correction term derived from this estimation along with other explanatory variables is used in the second stage to predict household expenditure. Thus, self-selection issue is addressed in the first stage by using instrumental variables. Given the potential self-selection issue our econometric method for estimation will be two-stage multinomial logit model with instrumental variables.

Although finding of suitable instrumental variables is difficult task, following empirical literature potential instrumental variables are migration network, distance to main road and water supply for farming.

To deal with selection bias in binary-choice cases Heckman (1979) method is generally employed. But as in our analysis households are classified in three types (no remittance receiving, internal remittance receiving and international remittance receiving), we have polychotomous-choice model. Bourguignon *et al.* (2007) show that Dubin and McFadden (1984) method performs better in case of polychotomous-choice model. Because of this we follow Adams and Cuenca (2010) and use two-stage multinomial logit model. This approach estimates a different equation for each type of households, taking into account in the estimation the selection bias.

Stating that  $EXP_i$  in the equation (1) is per capita household expenditure and following Bourguignon *et al.* (2007) and Adams and Cuenca (2010) equation (1) can be rewritten as following:

$$\text{Log}(\text{EXP}_i) = \alpha_i + \sum \beta_j X_{ij} + \varepsilon_i \quad (2)$$

Thus equation (2) is consumption equation, where dependent variable is per capita expenditure and Xs are explanatory variables. However, dealing with self-selection issue requires specification of choice equation which can be formulated as:

$$Y_h^* = \alpha_i + \sum \beta_j X_{ij} + \sum \nu_j Z_{ij} + \eta_i \quad (3)$$

$h$  is the categorical variable that describes the choices of remittance situation: 1) receive no remittances; 2) receive internal remittances; 3) receives international remittances. Hence,  $Y_h^*$  is a latent function to capture a discreet observation about remittance situation of household. The vector  $Z$  represents instrumental variables and  $X$  is the vector of explanatory variables that are supposed to affect the migration decision of household. The outcome variable  $\text{Log}(\text{EXP}_i)$  is observed only if international remittance situation is chosen, that is, when  $h=1$ . Assuming that the  $\eta_i$ 's are independently and identically Gumbel distributed the choice component, as shown by McFadden (1973), can be estimated using a multinomial logit regression.

According to the Dubin and McFadden method if the choice model and the consumption model have correlated error components, then consumption equation can be corrected by including selection correction term, which is derived from the estimation of choice equation. Then, consumption equation (2) can be modified as following:

$$\text{Log}(\text{EXP}_i) = \alpha_i + \sum \beta_j X_{ij} + \sum \lambda_{ih} + \varepsilon_i \quad (4)$$

where,  $\lambda_{ih}$  is the selection correction term related to choice  $h$ . Significance of this term as variable in estimations of this equation will imply that selectivity in unobservable components matters for households receiving international and internal remittances. Putting it differently, if it is significant then estimations without this selection term would be biased.

Therefore two stage multinomial logit method consists of two stages: in the first stage remittance receiving or non-receiving choice equation is estimated using instrumental variables along with other explanatory variables; and in the second stage consumption equation is estimated using selection correction term from the first stage along with other explanatory variables. As our purpose is to evaluate impact of remittances on poverty total per capita expenditure of households will be used as the dependent variable in consumption equation (4).

### 3 Data and Variables

This study is based on the 2011 data of "Life in Kyrgyzstan" survey done by DIW Berlin which includes data of 3,000 households. The survey includes wide range of topics including information on demographics, assets, shocks, social networks, income and expenditure of households. Along with this the survey contains special data on migration and remittances. With respect to migration the survey questionnaire includes questions on number of migrant, education level, destination, employment status and duration of staying abroad. In remittances section questions on size of remittances, area of use these remittances and several other questions on household opinion on remittances. Income section of questionnaire gives the detailed information on sources of income: wage, income from agricultural enterprises or other enterprises, government social transfer payments, internal remittances and remittances sent from abroad. This data on expenditure and income of households and other characteristic data give possibility to examine the impact of remittances on expenditure pattern of households.

	No remittances	International remittances	Internal remittances
Household size	4.67	5.9	4.2
Household head sex (male=1; female=0)	0.281	0.251	0.312
Mean age of household head	50.7	52.3	53.05
Ratio of number of children in age below 5 to total household size	0.107	0.092	0.100
Ratio of number of children in age between 6 and 17 to total household size	0.197	0.174	0.179
Ratio of male adult member of household to household size	0.316	0.366	0.259
Residence (urban = 0; rural = 1)	0.574	0.671	0.610
Central region	0.424	0.123	0.332
South region	0.381	0.818	0.437
North region	0.195	0.059	0.231
Mean annual per capita total income ( in Kyrgyz som )	45247	40073	46843
Mean per capita total income exculding remittances ( in Kyrgyz som )	45247	28593	33067
Mean remittances share in total income	0.0	33.7	29.7
Mean total expenditure per capita ( in Kyrgyz som )	41449	29300	42959

**Table 1.** Summary data on remittance non receiving, receiving international remittances and internal remittances households; **Source:** 2011 Life in Kyrgyzstan Survey, DIW Berlin.

Data on household budget income structure are used to classify households into three categories: receiving no remittances, receiving international remittances and households receiving domestic or internal remittances. Since remittances are measured from household budget records, remittance receiving status is not related with the existence or number of migrant household members. All remittances are cash remittances as reported in income source part of the questionnaire.

Table 1 presents summary data on households depending on their remittances status. Out of 3000 households relevant data for our survey available for 2832 households, of which 423 (14.9 per cent) received international remittances, 295 (10.4 per cent) received internal remittances, and 2114 (74.6 per cent) receives no remittances. In average remittances represents almost 33 per cent for both international and internal remittance receiving households. Households receiving international remittances in average are larger and have more male adults. Regional differences in migration tendency in Kyrgyzstan are evident. Most of the households in south region of the country receive both international and internal remittances. If to exclude remittances, then annual mean per capita income of households considerably decreases for households receiving international remittances: from 40 thousand som to 28 thousand som.

Estimation of the two-stage selection model requires inclusion of the instrumental variable, which are important for remittance receiving status in the first-stage choice equation. Studies on remittances used different instrumental variables: migration rate, rainfall shock, other short term shocks etc (for instance see: Hanson and Woodruff, 2002; McKenzie and Rapoport, 2007; Yang, 2005; Adams and Cuecuecha, 2010). In this study we specified two instrumental variables: interaction terms of issue of water supply for farming with land size owned by household; and wage income share in total per capita income of household.

Rationale behind these two variables is that Kyrgyzstan as the agricultural economy most of problems with water supply for farming will result in low productivity, which induce workers to look for another jobs and migrate. Questionnaire includes questions on types of shocks that households were affected during the last 12 month, where one option for answer is the insufficient water supply for farming and gardening. Land size also matters for household income, households with small size of land has low insufficient income from farming, which may also force household members to look for another job. Moreover, for households owning large size of lands, if water supply for farming is problematic, then influence of this factor to receive remittances is higher. Therefore, it is expected that larger the value of this interaction term, higher the probability to receive remittances.

<b>Household type</b>	
Remittance receiving household	1= non receiving
	2= international remittance receiving
	3= internal remittance receiving
<b>Explanatory variables</b>	
Log total per capita expenditure	Logarithm of per capita total household expenditure
Household characteristics	Household size - number of individuals in household
	Number of children in 0-5 ages / household size
	Number of children in 6-17 ages / household size
	Number of male adult over 15 age / household size
Household head characteristics	Household head: 0 - male; 1 -female.
	Household head age
Residence dummy	Urban - 0 ; rural - 1
Location dummy	Central region: Bishkek city and Chui oblast
	South region: Batken oblast, Osh city, Osh oblast, Djalal Abad oblast
	North region: Issyk-Kul oblast, Naryn oblast and Talas Oblast
<b>Instrumental variables</b>	
Water supply for agriculture farming is problem	No = 0
	Yes = 1
Land ownership	Land size owned in hectar
Wage income share	Share of wage income in household total per capita income

*Table 2: Variables description*

Low rate of job creation or low level of salaries in migrant-sending economy is one of the factors to migrate and receive remittances. In this study we measure domestic employment status of household indirectly through the share of wage in per capita total income of household. Higher share of wage in total income implies sufficient income from employment in the home country and do not induce to migrate.

Apart from the instrumental variables following the previous studies on expenditure pattern of households for estimation of choice equation explanatory variables on household characteristics, residence and location is included (see Table 2). In the estimation of second-stage equation of consumption instrumental variables are not included. But selection-correction term  $\lambda_{ih}$  is included.

#### 4 Estimation results

The Table 3 presents results from the first-stage equation of the multinomial logit model. The results show that household characteristics, household head characteristics and location variables are significantly related to the receipt of internal and international remittances. But the most important result in this estimation relates to the validity of the instrument variables proposed. For households receiving internal remittances both instruments are strongly significant; while for households receiving international remittances only one of them – wage income share – is significant. The estimated instrumental variables have the expected signs. For instance, the growth of wage income share in total income shows more employment and fewer migrants, which in turn causes less internal and international remittances. Similarly, the instrumental variable measuring the water farming issue and land size shows the expected sign: if water supply for farming is problematic, then it influences migration, which reasons the more remittances.

Explanatory Variables	International remittance receiving households	Internal remittance receiving households
Household size	0.3019*** (0.0325)	-0.0803* (0.0423)
Household head sex	0.3658** (0.1592)	-0.3079* (0.1680)
Age of household head	-0.0405*** (0.0058)	-0.0177*** (0.0057)
Ratio of number of children in age below 5 to total household size	-3.45*** (0.6310)	-0.4333 (0.5996)
Ratio of number of children in age between 6 and 17 to total household size	-1.81*** (0.4117)	-0.2001 (0.4252)
Ratio of male adult member of household to household size	0.9343** (0.3837)	-1.254*** (0.3869)
Residence (urban = 0; rural = 1)	-0.0420 (0.1423)	0.1188 (0.1564)
South region	2.0726*** (0.1919)	0.6166*** (0.1778)
North region	0.2378 (0.2736)	0.3395* (0.1950)
<i>Instruments:</i>		
<b>Water farming issue*land size</b>	<b>0.0553</b> <b>(0.0640)</b>	<b>0.1958***</b> <b>(0.0357)</b>
<b>Wage income share</b>	<b>-3.143***</b> <b>(0.1983)</b>	<b>-2.892***</b> <b>(0.1978)</b>
Constant	-0.0704 (0.4182)	1.22*** (0.4111)
Number of observations	422	295
Pseudo R <sup>2</sup>	0.2262	

Standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.10

*Table 3 First stage results of IV estimates*

The results of the second-stage equation for total expenditure for each type of household: household with no remittances, households receiving internal remittances, and households receiving international remittances is reported in Table 4. The results show that, disregarding the receipt of remittances, per capita household expenditures for all households were significantly negatively influenced by household size. While higher ratio of male adult member of household to household size is associated with lower levels of expenditure for non-remittance receiving households; the higher ratio of number of children in age between 6 and 17 to total household size is associated with lower levels of expenditure for internal remittance receiving households. The results further show that the selection-correction term,  $\lambda_3$ , for households with no remittances and with internal remittances is significant, suggesting that estimations ignoring the selectivity part of the model would have been biased.

Explanatory Variables	No remittances	International remittance receiving households	Internal remittance receiving households
Household size	-0.1898*** (0.014)	-0.1255* (0.0441)	-0.1737*** (0.045)
Household head sex	-0.0165 (0.046)	0.0662 (0.1111)	0.0510 (0.1460)
Household head age	0.00006 (0.001)	-0.0002 (0.0035)	-0.0013 (0.0050)
Ratio of number of children in age below 5 to total household size	-0.2300 (0.1660)	-0.5969 (0.3764)	-0.3029 (0.5620)
Ratio of number of children in age between 6 and 17 to total household size	-0.2216 (0.1190)	-0.3198 (0.2538)	-0.5048 (0.3500)*
Ratio of male adult member of household to household size	-0.2651** (0.1440)	0.0666 (0.3236)	-0.3201 (0.3270)
Residence	-0.1500*** (0.0390)	-0.2351*** (0.0709)	-0.0309 (0.1000)
South region	-0.2381*** (0.0960)	0.0577 (0.2054)	-0.3415*** (0.2290)
North region	-0.3237*** (0.0540)	-0.2698* (0.1439)	-0.4699*** (0.1160)
$\lambda_1$	0.0545 (0.4130)	0.4865 (0.2683)	0.6618 (0.7730)
$\lambda_2$	0.1847 (0.7120)	0.4477 (0.2166)	0.3886 (1.3500)
$\lambda_3$	1.1900* (0.5980)	-0.0410 (0.8940)	0.2870** (0.1840)
Constant	1.1700*** (0.1240)	1.0800*** (0.6130)	1.1700*** (0.7830)

Standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.10

**Table 4:** Selection corrected household expenditure estimates (Dubin and McFadden Method)

Based on the results of integrated household budget survey, which is calculated by National Statistic Committee of the Kyrgyzstan, the poverty level by consumer expenditures reduced from 39.9% in 2006 to 33.7% in 2010. And the cost value of the general poverty line in 2011 was valued at 25849 soms per year for capita, and the cost value of extreme poverty line was 16089 soms.

The table 4 shows the observed, predicted and counterfactual household expenditures per capita for three groups of households. The first counterfactual estimate represents the expenditure that households that chose to receive international remittances would have had without the receipt of international remittances. With the receipt of international remittances, the results show that the poverty status of these households improved. In other words, if these households have had chosen not to receive the international remittances, then their per capita expenditure amount would have reduced from 29 299 soms to 22 617.19 soms, which is lower than the poverty line for 2011.

The second counterfactual represents the expenditure that households that chose to receive internal remittances would have had without the receipt of remittances: in this case, the expenditure would decrease from 42 958 soms to 40 481 soms.

	Number of observations	Observed expenditure	Estimated expenditure	Counterfactual
No remittance	2103	41419	42117	
International remittance	422	29299	20808.12	22617.19
Internal remittance receiving	295	42958	46628.47	40481

**Table 4:** Total expenditures and counterfactual expenditure estimates

## 5 Conclusions

This paper has used a large, nationally-representative household survey from Kyrgyzstan for 2011 to analyze how the receipt of internal and international remittances affects the expenditure of household and poverty. Following Adams and Cuecuecha (2010) two-stage multinomial logit model suggested by Bourguignon *et al.* (2007) is used. Methodology use instrumental variables to solve the selectivity bias issue and then estimates counterfactual expenditure of households. Households are classified as international remittance receiving,

internal remittance receiving and remittance non-receiving. For evaluation of remittances impact on poverty counterfactual expenditures are compared with observed actual expenditure by household types. Expenditure level for 2011 for definition of national poverty line in Kyrgyzstan is used as the benchmark for poverty impact of remittances.

The key findings are: first, international remittances represent important component in household expenditure; second, the international remittances considerably decrease poverty level, by increasing the expenditure level of households. Per capita expenditure of international remittance receiving households would be lower than expenditure of poverty line for 2011, if they did not receive remittances. Third, internal remittance receiving households also would decrease expenditures, but it would still be higher than poverty line.

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