

# Remittances, Household Welfare and the COVID-19 Pandemic in Tajikistan

By

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**September 2020**

## **Abstract**

Remittance inflow is now the largest source of external financing to developing countries, but little research has yet firmly established the effect of remittance on household welfare. We investigate the case of Tajikistan, one of the most heavily remittance-dependent countries in the world. We use a panel dataset collected nationwide and employ instrumental variable (IV) estimation to confirm a positive relationship between receiving remittance and household welfare after correcting endogeneity. Moreover, we find that the effect of remittance on household spending is more pronounced in households whose head is male, older, or less educated. Then, we combine our estimated coefficients with the projected decline of remittance inflow as a result of the COVID-19 outbreak and show the pandemic's adverse effect on household spending per capita.

Key words: COVID-19; remittance; migration; Tajikistan; household welfare.

JEL Classification Codes: F22, F24, O12, O15

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## **Acknowledgements**

This study was conducted as part of the project “Study on Remittances and Household Finances in the Philippines and Tajikistan” carried out by JICA Ogata Sadako Research Institute for Peace and Development. We would like to thank our colleagues at JICA-RI including Akira Murata for facilitating and contributing to the survey design and data collection processes. In conducting the survey, JICA-RI is grateful to the government of the Republic of Tajikistan, especially the Ministry of Labor, Migration and Employment of Population of RT (MLMEP), the World Bank and the JICA Tajikistan Office team for their support. We also thank Ilhom Abdulloev, Megumi Muto, and Shimpei Taguchi for their constructive comments and Pragya Gupta for her excellent research assistance. The views expressed in this paper are our own and do not represent the official positions of either the JICA Ogata Sadako Research Institute for Peace and Development or JICA.

## 1. Introduction

Migrants' sending remittance inflow is now the largest source of external financing for developing countries. In 2019, the remittance inflow to low- and middle-income countries (LMICs) was the largest in history at 554 billion U.S. dollars, which far surpassed the amount of official development assistance (ODA) and even overtook foreign direct investment (FDI) (World Bank, 2020a). Given the growing importance of remittance inflow to developing countries, the impact of the Coronavirus disease 19 (COVID-19) is potentially devastating to those countries as it causes economic downturns in destination countries under lockdowns and oil price crashes, and limits people's ability to send remittance as a result of stringent movement restrictions in host countries or even the cancelation of planned migrations (IOM, 2020). The World Bank warned that remittances to low- and middle-income countries are projected to fall by 19.7% on average, ranging from a 27.5% decline in Europe and Central Asia to a 13% decline in East Asia and the Pacific (World Bank, 2020b).<sup>1</sup> Indeed, some national statistics have already revealed that remittance inflow to developing countries started to decline after the outbreak (Kikkawa et al., 2020).

To our knowledge, however, there has been little research establishing a solid relationship between receiving remittances and household welfare and thus it is difficult to argue the impact of the COVID-19 pandemic on household welfare in terms of a decline of remittance inflow. A challenge for the analysis is to establish a causal relationship between remittances and household spending; a useful approach is to utilize longitudinal data to correct unobserved factors and address endogeneity using a valid instrumental variable or exogenous shocks to households. Yang (2008), which used the appreciation of the Philippine peso during the 1997 Asian financial crisis as an exogenous shock to examine the effect of international remittances on household, is

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<sup>1</sup> <https://www.worldbank.org/en/news/press-release/2020/04/22/world-bank-predicts-sharpest-decline-of-remittances-in-recent-history>.

a representative study using this approach. He found that the episode positively and significantly affected capital accumulation, entrepreneurship, and educational spending in origin households, but had no significant effect on household consumption. In recent years, there have been a variety of studies reporting the positive impact of remittances on household welfare in the context of Kenya (Jena, 2018), Vietnam (Cuong and Linh, 2018; Amare and Hohfeld, 2016), Malawi (Kangmennaang, Bezner-Kerr, and Luginaah, 2018), Bangladesh (Wadood and Hossain, 2017), Pakistan (Javed, Awan, and Waqas, 2017) and other countries. However, these studies are less rigorous in terms of empirical methodology relying on cross-sectional data. A popular way to circumvent the identification issue is to employ PSM (propensity score matching) since it is difficult to find appropriate instrumental variables for remittances. An exception is Amare and Hohfeld (2016), which employs a fixed effect estimation using GDP per capita of the destination region as the instrument in the context of domestic migration in Vietnam.

In this paper, we focus on the case of Tajikistan. It is well known that Tajikistan is one of the countries most dependent on migration and the inflow of remittances from abroad. Figure 1 illustrates the development of remittance inflow and its share out of GDP over two decades. In 2002, remittance occupied 6.4% of GDP; the inflow of remittances expanded shortly after, increasing the proportion of GDP to more than 40% in 2007. This level remained high until the mid-2010 except a couple of years during the economic depression caused by the 2008 global financial crisis. While the amount of remittances and its contribution to the GDP slightly declined since the mid-2010s, the GDP ratio kept more or less 30% and is estimated to be 28.2% in 2019, the fifth highest in the world.<sup>2</sup> Migrants are quite prevalent in the country with two-fifths of households including at least one member working abroad (JICA-RI, 2020). Thus, a substantial decline in remittance inflow after the COVID-10 outbreak may seriously affect the welfare of

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<sup>2</sup> The proportion of remittance inflow out of GDP was the highest in Tonga (37.6%), followed by Haiti (37.1%), South Sudan (34.4%), and Kyrgyz Republic (29.2%) in 2019.

these households in the country.

Of additional concern, Tajik migrants are highly concentrated in Russia as low-skilled workers (JICA-RI, 2020). Historically, Tajikistan is a former Soviet Republic in Central Asia that has maintained close economic tie with Russia. Indeed, more than 90% of the Tajik migrants choose Russia as their destination to work as marginal laborers in the construction and service sectors. The lack of diversification of destination countries and employment sectors work makes Tajik labor migrants vulnerable to changes in the Russian economy and migration policy. The decline of remittance inflows since the mid-2010s in Figure 1 was affected by the large macroeconomic turbulence in Russia in 2014 and the change in Russia's migration policy in 2015. Moreover, most migrants from Tajikistan are working-age men residing in rural areas who had no job before leaving the country. They were motivated to migrate since more than half of the working age population did not participate in the labor market in Tajikistan and informal employment is dominant even among the employed (JICA-RI, 2020). The jobs available in the destination countries are as simple workers irrelevant to migrants' educational or professional backgrounds.<sup>3</sup>

This paper utilizes a nationally representative household panel survey collected in 2013 and 2018 in Tajikistan to estimate the empirical relationship between remittance income and household welfare by 2SLS (two-stage least squares) instrumenting the remittance income by regional GDP per capita of the destination for migrants and of Tajikistan for non-migrants. Then, we combine our estimated coefficients with forecasts on the substantial decline of remittances by the COVID-19 pandemic and show that the adverse effect on household spending per capita on total and non-food items is gauged to be a 1% decline in one year, with a larger negative effect of 5% for educational spending.

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<sup>3</sup> Tajikistani young people who are expecting to migrate often refuse professional education and choose to work at unskilled jobs in Russia, earning much more than they would as skilled workers in Tajikistan. This is a phenomenon called a “forsaken schooling trap” (Abdulloev et al., 2019; Abdulloev, 2020).

This paper is comprised of the following sections. Section 2 explains the dataset used in this study. Section 3 examines the relationship between remittances and household welfare through external macroeconomic shocks. Section 4 uses the estimated results to argue the potential impact of the COVID-19 pandemic on household welfare in Tajikistan. Section 5 concludes.

## **2. Data description**

The dataset used in this study is a nationally representative household panel survey conducted in Tajikistan in 2013 and 2018. The first wave of the survey in 2013 is the Tajikistan Labor, Skills and Migration survey, one of the surveys comprising the “Central Asia Longitudinal Inclusive Society Survey (CALISS)” conducted in three Central Asian countries including Uzbekistan and Kyrgyzstan in addition to Tajikistan. The CALISS 2013 survey was conducted by the World Bank and German Federal Enterprise for International Cooperation (GIZ); the second wave of the survey was implemented and sponsored by the Japan International Cooperation Agency (JICA) in 2018 to track the Tajikistan sample of the CALISS.

The first wave of data collection was conducted in June, July, and the beginning of August in 2013.<sup>4</sup> The sample of the first wave survey was a nationally representative sample of 2,000 households surveyed in the 2012 Tajikistan Living Standard Survey (TLSS).<sup>5</sup> The sample of the 2012 TLSS was stratified based on Oblasts (region) and urban/rural areas in each oblast.<sup>6</sup> The sample of the primary sampling unit (PSU) was selected with a probability proportional to the number of households using the census of 2011 with 20 households in each of the PSUs selected at the second stage based on the census. In the survey, the most knowledgeable person responded

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<sup>4</sup> The field survey was implemented by 150 fieldworkers from the firm Zerkola.

<sup>5</sup> In addition, the 2013 survey oversampled the population of the capital territory of Dushanbe with 1,300 households. The 2018 survey did not track those households.

<sup>6</sup> There are 9 strata; Dushanbe Urban, GBAO (urban and rural), Sughd (urban and rural), Khalton (urban and rural) and RRS (urban and rural). The urban RRS (Districts of Republican Subordination) was oversampled to ensure a sufficient number of observations to compare results across regions.

to the questionnaire, which surveys the household roster with their educational attainment, labor supply, and migration as well as household income, expenditures, and remittances.

The 2018 survey followed up the households from Tajikistan.<sup>7</sup> The survey was conducted with heads of households and migrant workers who were in the household at the time of the survey. The major part of the questionnaire replicates the questions in the 2013 survey with some additions focusing on migration and remittances. Among 2,000 households surveyed in 2013, 1,716 or 86% households responded to the 2018 survey and thus the attrition rate is 14%.<sup>8</sup>

Table 1 reports the summary statistics of the variables used in this study.<sup>9</sup> We use the data from the households that were surveyed during both the first and second rounds. The summary statistics are presented by survey year. The outcome variables in this study are nominal monthly consumption aggregate per capita and the decomposition (food, non-food and education).<sup>10</sup> The total consumption is 419.1 somoni in 2013 and 506.3 somoni in 2018 on average. While average food spending accounts for more than half of total consumption in 2013, the share declines to less than a half in 2018. In contrast, nonfood and education spending increased between 2013

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<sup>7</sup> Panel surveys at the household level were conducted in Tajikistan (the Tajikistan Living Standard Survey in 2007, 2009, and 2011) but no tracking effort had been made since 2013. The 2018 survey added a series of focus group discussions to get the quantitative data from the structured survey with anecdotes from households with and without migrant workers as well as with migrant themselves (JICA-RI 2020).

<sup>8</sup> The most common reason for replacement was difficulty to track and trace the sampled households at their recorded addresses, most of which were urban households that had moved. Two-hundred eighty-four households from the sample of the 2013 survey were added to make the sample size of the follow-up survey 2,000.

<sup>9</sup> We compare the characteristics between the attrite and the non-attrite, and confirmed that there is no statistically significant difference for the means of log per capita consumption, log per capita food consumption, log per capita nonfood consumption, and log per capita educational expenditure, which are our dependent variables in the regression analyses.

<sup>10</sup> The denominator of all “per capita” variables from the household survey is the number of household members excluding migrating members. Non-food consumption covers spending excluding education and health; this includes spending on cosmetics and personal care products, personal care services, household supplies and cleaning products, articles for cleaning, domestic services, laundry and dry cleaning, fuels and lubricants for personal vehicles, passenger transport by road or railway (excluding expenses to travel to school and health care facilities), internet and postal service expenses, pet food, pet supplies and services, entertainment, cigarettes, tobacco and cigars, newspapers and magazines, clothing and footwear, household articles, books, films, hobbies and services, services for maintenance and repair of personal vehicles and accessories and spare parts, home improvements, small electric items and appliances, other personal effects, personal effects for travel, excursions and holidays (excluding school excursions), air or sea travel, payment for part-time courses (excluding private tutoring), insurance, taxes (excluding VAT and income tax), marriage gifts, costs for ceremonies, gambling losses.

and 2018. We use two variables for remittances that a household received. One is an indicator variable to take 1 for a household that received any remittances in the past 12 months or 0 for a household without remittances. The proportion of household that received any remittance income was 43.9% in 2013 and 38.3% in 2018. The other remittance variable is the amount of remittance per capita that a household received in the past 12 months. When computing this variable, the households that received remittances in the past 12 months but refused to answer or didn't know the amount of remittances are excluded and the sample size decreased from 1,716 to 1,598.<sup>11</sup> The mean remittance income per capita was 400.1 somoni in 2013 and 236.8 somoni in 2018.

The “economic performance (*ECON*)” variable, which is used as an instrumental variable in the estimation, is constructed by taking the weighted average per capita GDP of the country of residence of each adult household member including overseas migrants. Since the majority of Tajikistan migrants head to Russia, we use regional Russian GDP for their destination area.<sup>12</sup> More specifically, the “*ECON*” variable is constructed as:

$$ECON_{it} = \ln \frac{\sum_{k \in \mathcal{K}(i)} g_{kt} \times n_{kit}}{\sum_{k \in \mathcal{K}(i)} n_{kit}}$$

Here,  $\mathcal{K}(i)$  refers to the set of countries where the members of household  $i$  live,  $g_{kt}$  is the log national GDP (regional GDP for Russia) per capita in country  $k$  in  $t$  (2013 or 2018) that are converted to Russian ruble, and  $n_{kit}$  is the number of household  $i$ 's adult members aged 15 or over who live in country  $k$ . This *ECON* can be interpreted as the household's degree of exposure to the macro-economic performance of the destination country, taking the Tajikistan's economy as the reference point. The mean of  $\exp(Econ)$  was 103,715 rubles in 2013 and

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<sup>11</sup> Zero is assigned for the households that did not receive any remittances in past 12 months.

<sup>12</sup> In 2013, the destinations spanned across 12 countries and 36 Russian regions. In 2018, migrants were distributed across 8 countries and 44 Russian regions.



150,642 rubles in 2018.

Turning to household characteristics, the number of household members was 6.2 in 2013 and 7.1 in 2018 and the number of children was 2.2 in both years. The number of household members who are employed was 2.2 in 2013 and went down 1.8 in 2018. The number of skilled members, defined as those who attained above a secondary technical school degree, slightly increased but was less than one in both years. The average age of the head of household was 52.6 in 2013 and 55.4 in 2018. Lastly, to capture the time variant regional economic situation, we use average monthly net income from jobs at each stratum of our sampling, which was 340.3 somoni in 2013 and 339.6 somoni in 2018. This variable is the average of reported monthly wages and profit from business or farms across all employed adults (including the self-employed) in each of 9 strata.

### 3. Empirical analysis

In this section, we estimate the empirical relationship between remittances received and household welfare. We start with the following specification to examine the effect of remittances on a variety of outcomes to indicate household welfare directly:

$$Y_{it} = \beta_0 + \beta_1(REMITTANCE_{it}) + \beta_2\mathbb{X}_{it} + \beta_3(STR\ Wage_r) + \epsilon_{it} \quad (1)$$

where  $i$  indexes households, and  $t$  refers to the survey round with 0 indicating 2013 and 1 indicating 2018. The dependent variables  $Y_{it}$  are logarithm of nominal monthly spending per capita on total consumption and its decomposition to food, non-food, and education. The main explanatory variable “ $REMITTANCE_{it}$ ” takes two forms: (1) an indicator to take 1 for households that received any remittance income and 0 otherwise, and (2) logarithm of nominal monthly remittance income per capita.  $\mathbb{X}$  is a vector of household characteristics that includes

household size, the number of children, the employed and the skilled adults in a household, and the squared age of the head of household. In addition, we include the logarithm of average wage at that stratum to which a household belongs. Lastly,  $\epsilon_{it}$  is a well-behaved error term.

Since the dataset is longitudinal, we take a first difference to control for time-invariant unobserved heterogeneity for each household. Thus, we estimated the following specification:

$$\Delta Y_{it} = \beta_1(\Delta REMITTANCE_{it}) + \beta_2\Delta X_{it} + \beta_3(\Delta STR Wage_r) + \Delta\epsilon_{it} \quad (2)$$

Our baseline model is an ordinary least squares (OLS) estimation to obtain the coefficients of equation (2). Later, we will conduct a two-stage least squares (2SLS) to address the endogeneity of the remittances.

Table 2 shows the results of the estimations. Columns (1) to (4) show the coefficients using the specification without average wage at stratum and Columns (5) to (8) report those with average wage at stratum. Table 2(1) reports the coefficients when the main explanatory variable is an indicator for remittance receiving. We observe that the coefficients on the remittance indicator are positive but not significant for total consumption as well as food consumption and non-food consumption. Unexpectedly the coefficient is negative for educational spending but not statistically significant. Table 2(2) reports the coefficients when the main explanatory variable is the logarithm of remittance income. In Columns (1) to (4), we see that the coefficient on remittance income is positive and significant for both total spending and food consumption and a 1% increase in remittance is associated with a 0.005-0.006% increase in spending. However, those coefficients are not statistically significant when we include average monthly income at stratum as a covariate in Columns (5) to (8).

So far, we examine the relationship between remittances and household welfare directly. However, there may be some concern about the endogeneity issue since household welfare

outcomes are likely to be affected by remittances and vice versa, or because a third factor could affect both remittances and household welfare. Remittances are often motivated to finance spending in home countries which makes the OLS estimate on consumption biased. Thus, we need to address the issue of endogeneity in our second specification using an instrumental variable (IV) approach. So, we turn to employ a 2SLS estimation using an index of the macroeconomic performance of the destination countries for migrants and Tajikistan for non-migrants as an instrumental variable (“economic performance (*ECON*)” variable).

We assume that *ECON* is exogenous to the amount of remittances in each household conditional on household fixed-effect and other covariates. This assumption implies that *ECON* picks up supply-side shocks on migrants’ remittances reflecting labor market conditions in destination countries, but we acknowledge the possibility that the variable may be correlated with demand-side shocks that would cause biases of the coefficients. Specifically, it might be the case that a household's latent characteristics and the choice of destination are closely associated; high endowment migrants are also likely to choose a high-income destination country. We also notice that it might be hard to establish an exclusion restriction here since economic performance outside Tajikistan will have direct effect on household welfare in the country through trade and financial channels affecting wage and employment prospects.

In the first stage, we regress the remittance variables (indicator for households with remittance and the amount of remittances) on logarithm of the “*ECON*” variable and other covariates.

$$\Delta REMITTANCE_{it} = \beta_1(\Delta ECON_{it}) + \beta_2\Delta X_{it} + \beta_3(\Delta STR Wage_r) + \Delta \epsilon_{it} \quad (3)$$

The notations are the same as in specification (2) except *ECON*, which is the weighted for the average per capita GDP of the country of residence (or the region in Russia) of each adult

household member. This specification exploits variations of GDP per capita in destination to explain variations in the amount of remittance across households.

Next, we use the estimated dependent variable of remittances at the second stage regression.

$$\Delta Y_{it} = \beta_1(\overline{\Delta REMITTANCE}_{it}) + \beta_2 \Delta X_{it} + \beta_3(\Delta STR Wage_r) + \Delta \epsilon_{it} \quad (4)$$

Again, the notations are the same as in (2) with the exception of the main independent variable, which is now the estimated value obtained from the first-stage regression (3).

Table 3 (1) shows the results taking an indicator for households with remittances as a dependent variable. Column (1) reports the result of the first stage regression which shows that the coefficient on “*ECON*” is positive and significant. The first-stage F-statistics is 341.1 asserting that the instrument is not weak. Columns (2) to (5) of Table 3 (1) convey the second stage of the 2SLS estimation results. Contrasting to Columns (1) to (4) of Table 2 (1), those columns show that the coefficients on remittance income are positive and significant except for food spending, which is positive but not significant. The size of the coefficient for total consumption is 0.292, showing that total consumption is 29.2% larger for households with remittances than households without remittances. The size is similar for nonfood spending (27.5%) and much larger for education spending (206.6%). Columns (6) to (10) of Table 3 (1) show the results by adding the average wage at each stratum as a covariate. The pattern of the coefficients on a dummy variable for households with remittances is almost similar.<sup>13</sup>

Table 3 (2) shows the results taking the logarithm of per capita remittance income that a household received as a dependent variable. Column (1) reports the result of the first stage regression that confirms that the coefficient on “*ECON*” is positive and significant and the F test

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<sup>13</sup> A possible reason why the coefficient is not significant in food spending is that the baseline survey in 2013 was conducted during the Ramadan month when spending patterns for food differ from normal months because of fasting.

shows that the instrument is not weak. Columns (2) to (5) of Table 3 (2) convey the second stage of the 2SLS estimation results. Similar to those of Table 3 (1), the coefficients on remittance income are positive and significant except for on food spending, which is positive but not significant. The size of the coefficient for total consumption is 0.0285, showing that a 1% increase in remittance income received is associated with a 0.03% increase in total spending. The size of the coefficient is slightly larger for non-food spending (0.0353) and larger for education spending (0.193), implying that those spending items are more affected by a change in remittance. In particular, we see that a 1% increase in remittance income is associated with a 0.19% increase in educational spending. Columns (6) to (10) of Table 3 (2) show the results by adding the average wage at stratum as a covariate. The pattern of the coefficients on logarithm of per capita remittance income is almost same.

So far, we show that remittances are not positively and significantly associated with household spending in the simple OLS estimation, but they do have a positive and significant effect on household total, non-food, and educational spending when we employ a two-stage least squares (2SLS) estimation to address endogeneity. Now, we turn to examine the relationship between remittances and household welfare by type of household to address heterogeneous effects. Table 4 reports the estimated results across sub-groups using the specification without the average wage at stratum, which corresponds to the specification in Columns (2) to (5) of Table 3 (1) and Table 3 (2) without strata average wage as a covariate. While not shown in the table, the first stage estimate confirms that the coefficient on the *ECON* variable is positive and significant. Moreover, the results do not change if we use the specification with strata average wage.

Looking at the upper part of Table 4, which uses a dummy for households with remittance as dependent variable, we see that the coefficients are positive and significant for male-headed households but they are not for female-headed households except on education spending. If we

divided the sample by the age of the head of the household at age 52 (the median age of the heads in 2013), the coefficients on total spending are positive and significant for households whose head is older, and they are positive and significant for educational spending for both older and younger headed households. Moreover, when we divide the sample by the educational attainment of the head of the household, the coefficients are not significant for households whose heads are more highly educated while they are positive and significant for households whose heads are less educated, except for on food spending.<sup>14</sup> The pattern of the coefficients is the same in the lower part of Table 4, which takes the amount of remittances as a dependent variable.

As a robustness check, we perform the same IV estimation by limiting the sample to only households with migrants in 2013. Since we believe that the most fundamental selection-bias in the decision of whether or not and where to migrate is already well-addressed by the fixed-effect estimation, we thus expect that the results of this sub-sample analysis will not differ from the main results. Table 4 shows the results using the logarithm of remittance income as the main explanatory variable. As expected, the coefficients are almost the same as those in Table 3(2).<sup>15</sup>

In summary, our results show remittances have a positive and significant effect on household total as well as non-food and educational spending. Moreover, we find that the effect of remittances on household spending is more pronounced in households whose heads are male, younger, or less educated.

#### **4. Discussion**

We have examined the relationship between remittances and household spending and found a positive relationship between them, as described in the previous section. We confirmed

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<sup>14</sup> We define a head as higher educated if he/she obtains a degree of tertiary education.

<sup>15</sup> Though we omitted it to save space, we performed the analysis by type of head of household by limiting our examination to households with migrants in 2013 as well. The coefficients are virtually the same as those shown in Table 4.

that remittances are associated with total spending as well as non-food and educational expenditures, showing that remittances are closely linked with household welfare in Tajikistan. While our results align with Yang (2008) in terms of the positive effect on educational spending, we show an affirmative and significant effect of remittance on total spending, which Yang (2008) found not to be significant.

Now, we use our results to discuss the implications of the COVID-19 pandemic on household welfare through remittance inflow based on our estimation results, which has not been actively explored.<sup>16</sup> The COVID-19 pandemic is an ongoing phenomenon and the situation in Tajikistan and destination countries is rapidly changing. The first case was officially confirmed in Tajikistan on April 30, much later than in other countries. Until then, the country was slow to take measures to prevent the pandemic, imposing less strict restrictions on movement across the national border and lockdowns in cities compared to neighboring Kyrgyzstan and Uzbekistan.<sup>17</sup> Since May, Tajikistan closed schools, universities, and general shops while avoiding a total lockdown. During this time, the number of confirmed cases expanded rapidly, approaching 6,000 within two month and the number of deaths exceeded 50. Under the circumstances, most of Tajiks expecting to migrate have been forced to stay in the country because Russia has been more seriously affected by the pandemic.<sup>18</sup>

On the other hand, the first case was confirmed on January 31 in Russia, three months before in Tajikistan. The number of confirmed cases started to increase beginning in March and the country shut the national border and declared a period of no working until May 11, which

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<sup>16</sup> There are a couple of studies on consumption in response to the pandemic. Baker et al. (2020) showed that household spending, particularly on foods, increased in March, followed by a sharp decline of 50% in the U.S. Chen et al. (2020) reported a sharp decline of 32% in consumption on average and as high as a 70% drop in Wuhan, a recovery to the pre-COVID level in March, followed by a drop again by 20% in April due to the risk of a second wave of the outbreak.

<sup>17</sup> Tajikistan was one of few countries to hold professional sporting matches such as soccer games during the pandemic.

<sup>18</sup> According to Nikkei Asian Review, “Last year, there were around 500,000 Tajik migrants working in Russia, but many of them are now stuck in Tajikistan.” <https://asia.nikkei.com/Spotlight/Coronavirus/Tajikistan-finally-confronts-virus-as-Central-Asian-economies-reel>

was extended two times. In addition, the Russian government has imposed a variety of measures such as closing schools, museums, and theatres and cancelling events as well as lockdowns in many large cities. As of the end of June, the confirmed number of cases in Russia ranked third in the world after the United States and Brazil, with more than 600,000 cases and 8,600 deaths.

There is a growing uncertainty about how the COVID-19 pandemic is affecting the world economy and it is difficult to forecast the consequences of the disaster.<sup>19</sup> But we can argue the potential impact of COVID-19 pandemic on household welfare. We start with the coefficients in Columns (2) to (5) of Table 3 (2). The coefficients are 0.0285 for total spending, 0.0353 for non-food spending and 0.193 for educational spending. In addition, there are some forecasts of the effect of the COVID-19 pandemic on remittances. In April, the World Bank (2020b) reported remittance inflow to Europe and Central Asia will decline by 27.5% as a result of the pandemic (World Bank, 2020b). More recently, the Asian Development Bank (ADB) released a report on the effect of the pandemic and showed that remittance inflow to Tajikistan is expected to decline by 27.9%, the second worst decline among Asia-Pacific countries (Kikkawa et al. 2020).<sup>20</sup>

Bringing our empirical relationship and the remittance forecast together, we can argue the negative impact on household spending. Given the ADB's forecast, we expect that total spending will decrease by 0.8%. The negative effect will be larger for non-food spending (1.0%) and educational spending (2.4%). Given this simple computation, we see that the COVID-19 pandemic brings a serious effect on non-food and education spending. Those exercise may be conservative since we confine the channel of the COVID-19 pandemic on household spending to a change in remittances. Moreover, the effect of the COVID-19 pandemic would be non-linear

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<sup>19</sup> Similar this paper, Murakami, Shimizutani, and Yamada (2020) perform exercises to predict the potential impact of the COVID-19 pandemic on the receipt of remittances and household welfare in the context of migrant-sending communities in the Philippines.

<sup>20</sup> The negative impact to Tajikistan refers to “the economy-wide remittance loss under the worst-case scenario (% of baseline).” The worst-case scenario assumes that it takes a year for domestic outbreak control and resumption of economic activities and that the economic impact of COVID-19 persists during the year and disappears halfway into the final 3 months of the outbreak.



and more detrimental to the economy under more devastating scenarios, depending on the lasting effect of the pandemic.

## **5. Conclusion**

This paper focuses on Tajikistan, one of the most heavily remittance-dependent countries in the world, to examine the relationship between remittances and household welfare. We use a panel dataset collected nationwide prior to the outbreak and employ an instrumental variable (IV) approach to confirm a positive relationship between receiving remittances and household welfare after correcting for endogeneity. Then, we combine our estimated coefficients with forecasts on the decline of remittances made by international organizations and show the adverse effect on household spending per capita.

The pandemic is still ongoing and the situation in Tajikistan and destination countries is rapidly changing. Despite much uncertainty, we believe in the significance of discussing the potential impacts of COVID-19 on international remittances and remittance-dependent households in Tajikistan using a dataset compiled prior to the outbreak because it is difficult to perform a survey on households under the pandemic. Future research should use the actual data in migrant-sending countries after the COVID-19 outbreak to quantify the adverse effects on household living standards. Migration and remittances depend on a serial decision-making process within a household including several steps. Thus, disentangling the effect of the COVID-19 pandemic on each migration process, is no doubt an important agenda for future research.

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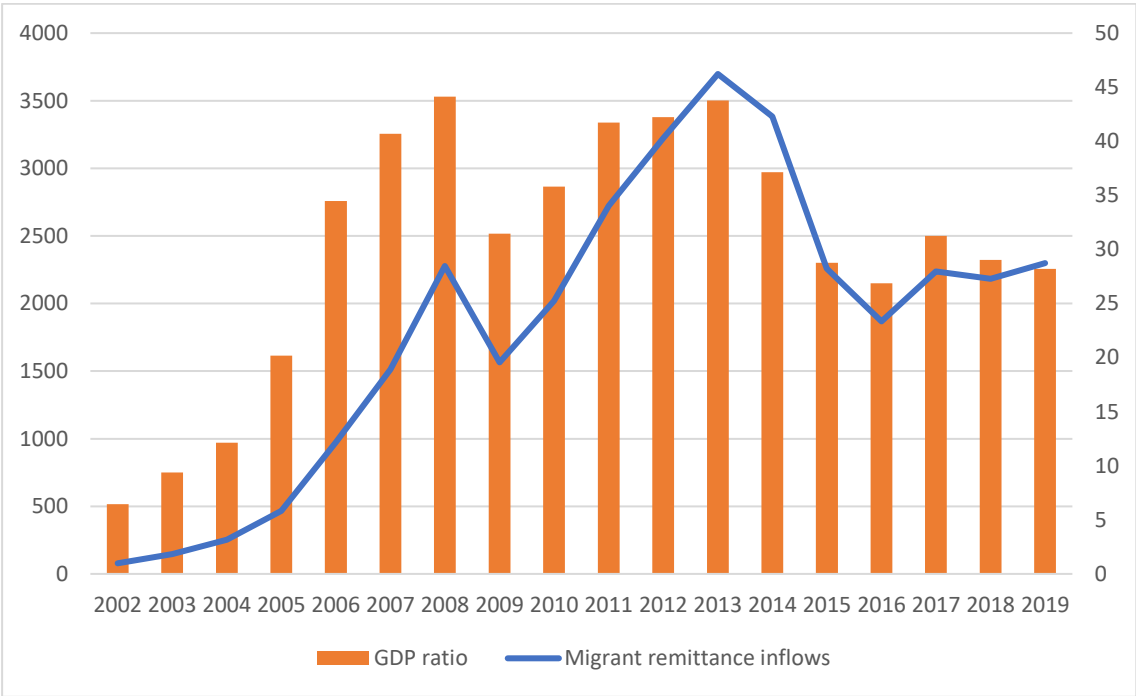
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**Figure 1 Remittance inflow to Tajikistan (2002-2019)**



(Note) Generated by the authors based on the World Development Indicators, World Bank (<https://data.worldbank.org/>)

**Table 1 Summary statistics**

VARIABLES	2013			2018		
	N	mean	sd	N	mean	sd
Nominal per capita total consumption	1,716	419.1	345.8	1,716	506.3	435.8
Nominal monthly per capita food expenditure	1,716	240.4	187.8	1,716	241.3	183.9
Nominal monthly per capita nonfood expenditure	1,716	89.58	141.9	1,716	115.6	153.0
Nominal monthly per capita education expenditure	1,716	15.50	41.79	1,716	45.83	142.1
Dummy for households that received remittance in past 12 months	1,716	0.439	0.496	1,716	0.383	0.486
Remittance per capita	1,598	400.1	1,295	1,598	236.8	633.2
ECON	1,716	103,715	124,838	1,716	150,642	186,076
Household size	1,716	6.233	2.979	1,716	7.069	3.409
Number of children	1,716	2.224	1.762	1,716	2.228	1.911
Number of employed household members	1,716	2.232	1.598	1,716	1.826	1.313
Number of skilled household members	1,716	0.633	0.993	1,716	0.843	1.101
Head's age	1,716	52.61	12.82	1,716	55.40	12.46
Head's age squared	1,716	2,932	1,428	1,716	3,225	1,432
Strata average wage	1,716	340.3	75.24	1,716	339.6	75.46

(Note) Author's calculation.

**Table 2 (1) OLS estimation results (Dependent variable: indicator for remittance)**

VARIABLES	(1) Δ ln(total spending)	(2) Δ ln(food spending)	(3) Δ ln(non- food spending)	(4) Δ ln(education spending)	(5) Δ ln(total spending)	(6) Δ ln(food spending)	(7) Δ ln(non- food spending)	(8) Δ ln(education spending)
Δ indicator to receive remittance in 12 months	0.0472 (0.0333)	0.0439 (0.0308)	0.104 (0.0734)	-0.232 (0.200)	0.0404 (0.0332)	0.0413 (0.0309)	0.0958 (0.0735)	-0.260 (0.200)
Δ household size	-0.0863*** (0.0109)	-0.119*** (0.0103)	-0.0691*** (0.0195)	0.101 (0.0639)	-0.0885*** (0.0108)	-0.120*** (0.0103)	-0.0719*** (0.0195)	0.0917 (0.0639)
Δ number of children	0.00498 (0.0124)	0.0262** (0.0122)	0.00916 (0.0247)	0.0145 (0.0680)	0.00770 (0.0124)	0.0272** (0.0122)	0.0126 (0.0248)	0.0259 (0.0683)
Δ number of employed household members	0.0138 (0.0100)	0.0348*** (0.00956)	0.0188 (0.0201)	0.0247 (0.0650)	0.0121 (0.0100)	0.0342*** (0.00956)	0.0167 (0.0202)	0.0177 (0.0649)
Δ number of skilled household members	0.0784*** (0.0192)	0.0178 (0.0171)	0.0450 (0.0410)	0.318*** (0.122)	0.0739*** (0.0191)	0.0161 (0.0171)	0.0394 (0.0411)	0.299** (0.122)
Δ head of household age	0.0322*** (0.00988)	0.0271*** (0.00893)	0.0398** (0.0197)	0.0808 (0.0593)	0.0308*** (0.00983)	0.0266*** (0.00893)	0.0380* (0.0197)	0.0750 (0.0590)
Δ head of household age (squared)	-0.000231*** (8.76e-05)	0.000210*** (7.90e-05)	-0.000302* (0.000174)	-0.000625 (0.000520)	-0.000221** (8.71e-05)	0.000207*** (7.90e-05)	-0.000290* (0.000174)	-0.000583 (0.000517)
Δ ln(Strata average wage)					-4.259*** (1.258)	-1.609* (0.889)	-5.335*** (1.843)	-17.84* (10.36)
Number of observations	1,716	1,716	1,716	1,716	1,716	1,716	1,716	1,716
R-squared	0.077	0.131	0.015	0.012	0.084	0.132	0.018	0.016

(Note) Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table 2 (2) OLS estimation results (Dependent variable: logarithm of remittance)**

VARIABLES	(1) Δ ln(total spending)	(2) Δ ln(food spending)	(3) Δ ln(non-food spending)	(4) Δ ln(education spending)	(5) Δ ln(total spending)	(6) Δ ln(food spending)	(7) Δ ln(non- food spending)	(8) Δ ln(education spending)
Δ ln(per capita remittance)	0.00575* (0.00340)	0.00524* (0.00315)	0.0119 (0.00771)	-0.0226 (0.0204)	0.00498 (0.00340)	0.00492 (0.00316)	0.0107 (0.00774)	-0.0262 (0.0203)
Δ household size	-0.0828*** (0.0115)	-0.117*** (0.0109)	-0.0644*** (0.0205)	0.110 (0.0672)	-0.0852*** (0.0114)	-0.118*** (0.0109)	-0.0677*** (0.0206)	0.0994 (0.0673)
Δ number of children	0.00382 (0.0129)	0.0248* (0.0129)	-0.00499 (0.0259)	0.0204 (0.0708)	0.00635 (0.0129)	0.0259** (0.0129)	-0.00138 (0.0261)	0.0319 (0.0712)
Δ number of employed household members	0.0125 (0.0104)	0.0332*** (0.0101)	0.0143 (0.0211)	0.0126 (0.0674)	0.0111 (0.0104)	0.0326*** (0.0101)	0.0124 (0.0211)	0.00625 (0.0674)
Δ number of skilled household members	0.0763*** (0.0198)	0.0178 (0.0178)	0.0515 (0.0422)	0.328*** (0.126)	0.0716*** (0.0197)	0.0159 (0.0178)	0.0449 (0.0423)	0.307** (0.127)
Δ head of household age	0.0311*** (0.0104)	0.0247*** (0.00931)	0.0463** (0.0213)	0.109* (0.0632)	0.0298*** (0.0104)	0.0241*** (0.00931)	0.0445** (0.0213)	0.103* (0.0629)
Δ head of household age (squared)	-0.000217** (9.35e-05)	-0.000184** (8.27e-05)	-0.000349* (0.000190)	-0.000861 (0.000558)	-0.000208** (9.28e-05)	-0.000180** (8.27e-05)	-0.000336* (0.000189)	-0.000820 (0.000554)
Δ ln(Strata average wage)					-4.007*** (1.366)	-1.682* (1.006)	-5.725*** (2.130)	-18.28 (11.67)
Number of observations	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598
R-squared	0.075	0.129	0.017	0.015	0.081	0.130	0.020	0.018

(Note) Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.



**Table 3 (1) 2SLS estimation results (Dependent variable: indicator for remittance)**

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	First stage	Second stage				First stage	Second stage			
	Dummy for receiving remittance	$\Delta \ln(\text{total consumption})$	$\Delta \ln(\text{food spending})$	$\Delta \ln(\text{non-food spending})$	$\Delta \ln(\text{educ. spending})$	Dummy for receiving remittance	$\Delta \ln(\text{total consumption})$	$\Delta \ln(\text{food spending})$	$\Delta \ln(\text{non-food spending})$	$\Delta \ln(\text{educ. spending})$
$\Delta \ln(\text{ECON})$	0.242*** (0.0131)					0.242*** (0.0132)				
$\Delta$ indicator to receive remittance in 12 months		0.292*** (0.0786)	-0.0142 (0.0704)	0.275* (0.165)	2.066*** (0.477)		0.264*** (0.0789)	-0.0267 (0.0710)	0.238 (0.166)	1.968*** (0.477)
$\Delta$ household size	-0.0489*** (0.00693)	-0.0685*** (0.0120)	-0.123*** (0.0111)	-0.0567*** (0.0217)	0.268*** (0.0736)	-0.0489*** (0.00696)	-0.0720*** (0.0120)	-0.125*** (0.0111)	-0.0614*** (0.0218)	0.255*** (0.0740)
$\Delta$ number of children	0.0343*** (0.00797)	-0.00681 (0.0131)	0.0290** (0.0124)	0.000942 (0.0258)	-0.0964 (0.0729)	0.0344*** (0.00800)	-0.00334 (0.0130)	0.0306** (0.0124)	0.00553 (0.0260)	-0.0841 (0.0731)
$\Delta$ number of employed household members	0.0384*** (0.00678)	0.00331 (0.0108)	0.0373*** (0.0102)	0.0115 (0.0215)	-0.0737 (0.0706)	0.0383*** (0.00678)	0.00272 (0.0107)	0.0370*** (0.0102)	0.0107 (0.0215)	-0.0758 (0.0703)
$\Delta$ number of skilled household members	0.0134 (0.0123)	0.0668*** (0.0201)	0.0206 (0.0173)	0.0369 (0.0413)	0.208 (0.130)	0.0132 (0.0123)	0.0637*** (0.0200)	0.0192 (0.0173)	0.0329 (0.0413)	0.197 (0.130)
$\Delta$ head of household age	-0.00287 (0.00768)	0.0305*** (0.0101)	0.0275*** (0.00897)	0.0386* (0.0198)	0.0651 (0.0621)	-0.00291 (0.00768)	0.0294*** (0.00998)	0.0270*** (0.00898)	0.0371* (0.0198)	0.0613 (0.0616)
$\Delta$ head of household age (squared)	8.03e-06 (7.12e-05)	-0.000219** (8.86e-05)	0.000213*** (7.95e-05)	-0.000293* (0.000175)	-0.000507 (0.000548)	8.32e-06 (7.13e-05)	-0.000211** (8.78e-05)	0.000210*** (7.97e-05)	-0.000283 (0.000174)	-0.000479 (0.000544)
$\Delta \ln(\text{Strata average wage})$						-0.143 (0.694)	-3.831*** (1.331)	-1.739** (0.883)	-5.063*** (1.878)	-13.58 (10.77)
Observations	1,716	1,716	1,716	1,716	1,716	1,716	1,716	1,716	1,716	1,716
R-squared	0.279					0.279				
First stage F-statistics			341.1					332.7		

(Note) Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table 3 (2) 2SLS estimation results (Dependent variable: logarithm of remittance)**

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	First stage Δ ln(per capita remittance)	Second stage Δ ln(total consumption)	Second stage Δ ln(food spending)	Second stage Δ ln(non-food spending)	Second stage Δ ln(educ. spending)	First stage Δ ln(per capita remittance)	Second stage Δ ln(total consumption)	Second stage Δ ln(food spending)	Second stage Δ ln(non-food spending)	Second stage Δ ln(educ. spending)
Δ ln(ECON)	2.710*** (0.145)					2.701*** (0.147)				
Δ ln(per capita remittance)		0.0285*** (0.00754)	-0.00188 (0.00677)	0.0353** (0.0152)	0.193*** (0.0456)		0.0262*** (0.00761)	-0.00315 (0.00685)	0.0318** (0.0153)	0.184*** (0.0457)
Δ household size	-0.618*** (0.0721)	-0.0627*** (0.0128)	-0.123*** (0.0119)	-0.0437* (0.0234)	0.301*** (0.0784)	-0.621*** (0.0725)	-0.0662*** (0.0128)	-0.125*** (0.0119)	-0.0489** (0.0236)	0.288*** (0.0791)
Δ number of children	0.360*** (0.0837)	-0.00805 (0.0136)	0.0285** (0.0130)	-0.0172 (0.0267)	-0.0920 (0.0759)	0.363*** (0.0840)	-0.00500 (0.0136)	0.0302** (0.0130)	-0.0127 (0.0269)	-0.0807 (0.0761)
Δ number of employed household members	0.443*** (0.0717)	0.00127 (0.0113)	0.0367*** (0.0108)	0.00275 (0.0224)	-0.0939 (0.0743)	0.441*** (0.0716)	0.000896 (0.0113)	0.0365*** (0.0108)	0.00219 (0.0224)	-0.0953 (0.0741)
Δ number of skilled household members	0.0929 (0.129)	0.0653*** (0.0208)	0.0212 (0.0180)	0.0402 (0.0431)	0.225* (0.134)	0.0880 (0.129)	0.0622*** (0.0206)	0.0195 (0.0179)	0.0354 (0.0431)	0.213 (0.135)
Δ head of household age	-0.0183 (0.0835)	0.0291*** (0.0106)	0.0253*** (0.00937)	0.0443** (0.0215)	0.0906 (0.0654)	-0.0196 (0.0836)	0.0282*** (0.0105)	0.0248*** (0.00938)	0.0429** (0.0214)	0.0872 (0.0650)
Δ head of household age (squared)	1.81e-06 (0.000774)	-0.000203** (9.48e-05)	- 0.000188* (8.34e-05)	-0.000334* (0.000191)	-0.000725 (0.000578)	1.15e-05 (0.000775)	-0.000196** (9.39e-05)	- 0.000185* (8.35e-05)	-0.000324* (0.000191)	-0.000700 (0.000575)
Δ ln(Strata average wage)						-4.993 (8.600)	-3.454** (1.446)	-1.893* (0.996)	-5.176** (2.191)	-12.80 (12.13)
Observations	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598
R-squared	0.321					0.321				
First stage F-Statistics			348.7					337.7		

(Note) Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table 4 2SLS estimation results (Dependent variable: logarithm of remittance); Households with migrant only**

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	First stage Δ ln(per capita remittance)	Second stage Δ ln(total consumption)	Second stage Δ ln(food spending)	Second stage Δ ln(non-food spending)	Second stage Δ ln(educ. spending)	First stage Δ ln(per capita remittance)	Second stage Δ ln(total consumption)	Second stage Δ ln(food spending)	Second stage Δ ln(non-food spending)	Second stage Δ ln(educ. spending)
Δ ln(ECON)	2.625*** (0.179)					2.610*** (0.179)				
Δ ln(per capita remittance)		0.0278*** (0.00967)	-0.0122 (0.00860)	0.0373** (0.0182)	0.136** (0.0571)		0.0275*** (0.00975)	-0.0127 (0.00867)	0.0364** (0.0184)	0.138** (0.0573)
Δ household size	-0.167* (0.102)	-0.0865*** (0.0182)	-0.122*** (0.0162)	-0.0739** (0.0306)	-0.0316 (0.103)	-0.173* (0.101)	-0.0869*** (0.0182)	-0.123*** (0.0162)	-0.0750** (0.0307)	-0.0290 (0.103)
Δ number of children	-0.138 (0.134)	0.00368 (0.0205)	0.0208 (0.0191)	-0.0136 (0.0412)	0.00100 (0.119)	-0.135 (0.133)	0.00382 (0.0205)	0.0210 (0.0191)	-0.0133 (0.0412)	6.15e-05 (0.120)
Δ number of employed household members	0.337*** (0.106)	0.00555 (0.0168)	0.00987 (0.0157)	-0.00734 (0.0318)	-0.254** (0.108)	0.317*** (0.106)	0.00459 (0.0167)	0.00840 (0.0156)	-0.0100 (0.0321)	-0.248** (0.108)
Δ number of skilled household members	0.286 (0.216)	0.0661** (0.0328)	0.0332 (0.0263)	0.103* (0.0603)	0.316 (0.221)	0.228 (0.214)	0.0632* (0.0327)	0.0287 (0.0263)	0.0945 (0.0609)	0.336 (0.223)
Δ head of household age	-0.0828 (0.125)	0.0119 (0.0162)	0.0206 (0.0155)	0.0405 (0.0288)	0.0601 (0.0968)	-0.0899 (0.125)	0.0115 (0.0162)	0.0200 (0.0155)	0.0394 (0.0288)	0.0628 (0.0971)
Δ head of household age (squared)	0.000972 (0.00124)	-5.17e-05 (0.000151)	-0.000113 (0.000140)	-0.000371 (0.000257)	-0.000398 (0.000865)	0.00102 (0.00124)	-4.87e-05 (0.000151)	-0.000108 (0.000141)	-0.000363 (0.000257)	-0.000418 (0.000867)
Δ ln(Strata average wage)						-27.49** (13.55)	-1.447 (2.138)	-2.212 (1.789)	-4.007 (3.336)	9.728 (9.992)
Observations	661	661	661	661	661	661	661	661	661	661
R-squared	0.336					0.339				
First stage F-Statistics				212.2					210.8	

(Note) Robust standard errors in parentheses. \*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1.

**Table 5 Estimation results by sub-groups**

	(1)	(2)	(3)	(4)
Sub-groups	$\Delta \ln(\text{total consumption})$	$\Delta \ln(\text{food spending})$	$\Delta \ln(\text{non-food spending})$	$\Delta \ln(\text{education spending})$
	(1) Dependent variable: 'Dummy for households with remittance			
Male Head	0.319*** (0.0941)	0.0413 (0.0791)	0.367* (0.194)	2.108*** (0.585)
Female Head	0.174 (0.142)	-0.173 (0.149)	0.0212 (0.319)	1.469* (0.762)
Head's age >= 52	0.225** (0.0931)	-0.0261 (0.0871)	0.0285 (0.213)	1.664*** (0.578)
Head's age < 52	0.172 (0.119)	-0.0861 (0.111)	0.260 (0.241)	1.284* (0.710)
Higher educated head	0.192 (0.192)	0.156 (0.146)	0.0720 (0.350)	0.775 (1.255)
Lower educated head	0.305*** (0.0859)	-0.0429 (0.0789)	0.308* (0.183)	2.287*** (0.511)
	(2) Dependent variable: $\Delta \ln(\text{per capita remittance})$			
Male Head	0.0316*** (0.00902)	0.00451 (0.00757)	0.0470*** (0.0177)	0.195*** (0.0558)
Female Head	0.0155 (0.0137)	-0.0202 (0.0144)	0.00267 (0.0308)	0.131* (0.0741)
Head's age >= 52	0.0244*** (0.00922)	-0.000202 (0.00873)	0.0134 (0.0190)	0.168*** (0.0568)
Head's age < 52	0.0173 (0.0108)	-0.0109 (0.0102)	0.0340 (0.0226)	0.117* (0.0666)
Higher educated head	0.0158 (0.0200)	0.0166 (0.0159)	-0.00438 (0.0372)	0.0996 (0.135)
Lower educated head	0.0302*** (0.00811)	-0.00468 (0.00746)	0.0410** (0.0165)	0.208*** (0.0477)