

***Remittances and Changing Household Spending Strategies:  
Evidence from the Life in Kyrgyzstan Study, 2011–2013***

Annelise Hagedorn\*  
*The Pennsylvania State University*

Donghui Wang  
*The Pennsylvania State University*

Guangqing Chi  
*The Pennsylvania State University*

Department of Agricultural Economics, Sociology, and Education,  
Population Research Institute, and Social Science Research Institute  
The Pennsylvania State University  
University Park, PA 16802, USA

\*Corresponding author: [acd199@psu.edu](mailto:acd199@psu.edu)

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*ABSTRACT*

Globalized labor migration and remittances play an important role in alleviating household poverty and providing supplemental income in many countries. Central Asian countries, which have experienced dramatic political changes, economic reform, and rapid demographic shifts in the post-Soviet Union era, are some of the most heavily remittance-dependent in the world. However, the impacts of remittances in Central Asia have been given inadequate scholarly attention. In this research, we focus on Kyrgyzstan, a landlocked, mountainous country with a largely rural population that is the second most heavily remittance-dependent country in the world. We aim to understand the relationship between remittance receipt and household spending in seven categories of expenditures: food, consumer goods, housing, medical expenses, events, communication and transportation, and other expenses. We used fixed-effects seemingly unrelated regression models to analyze panel data developed from the 2011–2013 waves of the Life in Kyrgyzstan Study. The findings suggest that increases in household remittance receipt are associated with spending (1) a smaller share of the household budget on food and housing and (2) a larger share on events and other expenses, such as legal and educational expenses. Through focus on a heavily remittance-dependent country, the findings may reflect circumstances and spending patterns that emerge as dependence on remittances becomes more acute. As global shifts increase the presence of remittance money in many countries' economies, understanding effects of remittances in those countries that already are heavily remittance dependent can help to inform policies.

Key Words: Remittance, labor migration, livelihood, household expenditure, Kyrgyz Republic

## *INTRODUCTION*

Many studies of remittances and migration focus on the intentions, behaviors, and motivations of migrant people (Adams 2011; DeJong 2000). Equally important, however, are the households that remain in the communities of origin and the impacts that migration has upon them. Money, goods, and other support sent from migrants to households in their communities of origin can serve as important supplements to overall household income, or even the primary sources of income and investment.

Households that are already vulnerable to economic or climactic shocks can rely greatly on income from outside the home community. In the high mountains of Central Asia, for example, much of the population of Kyrgyzstan is susceptible to disenfranchisement as climate change threatens the livelihoods of a largely rural population, and economic growth is slow and uneven (Piersall and Halvorson 2014; Muktarbek Kyzy et al. 2015). Migration to the capital city or abroad to countries like Russia has proven to be a popular outlet for Kyrgyz households to diversify their income sources. Although much of the migration literature has focused on Latin America, previous studies in Kyrgyzstan and other Central Asian countries show migration and remittance receipt is important in the lived experiences of Central Asian people (Clément 2011; Catrinescu et al. 2011; Kroeger and Anderson 2013; Muktarbek Kyzy et al. 2015). In 2011, 1.71 billion USD of remittances were received in Kyrgyzstan, and that number increased in 2013 to 2.28 billion USD. This sum made up 31.1% of the Kyrgyz gross domestic product (GDP) in 2013, making it the second most remittance-dependent country in the world, following its neighbor Tajikistan (World Bank 2016b).

How are the spending patterns of Kyrgyz households affected by the receipt of remittance money? This paper examines the impact of remittance receipt on Kyrgyz household expenditures

in seven areas: food, consumer goods, housing, medical expenses, events, communication and transportation, and other expenses. Using three waves of data from the years 2011-2013 from the Life in Kyrgyzstan Study, a nationally and regionally representative panel study of households and individuals in Kyrgyzstan, this study uses fixed-effects seemingly unrelated regression (SUR) models to examine remittance receipt in a country that is heavily remittance dependent. The importance of remittance money to the economy—as well as the social, environmental, and economic barriers to other livelihood strategies—makes understanding Kyrgyz remittance receipt a timely and policy-relevant topic of study.

#### *REMITTANCES AND HOUSEHOLD EXPENDITURES*

Remittances are the money sent from migrants living and working in one location to a household or individual living in the community of origin. International migration and remittances constitute a growing share of the global economy. The World Bank estimates that in 2013 just over half a trillion US dollars of personal remittance money was received globally (World Bank 2016a). Remittance money can be used in productive investments; in education, health, or infrastructure; to stabilize the acquisition of basic needs; or to increase consumption (Adams and Cuecuecha 2013; Chami et al. 2003).

With the increase in globalization and industrialization, and the subsequent labor migration of many working-age adults, the flow of money from migrants to left-behind households is of great interest to international policy and development, especially in developing countries. Developing countries receive up to twice as much money through remittances as they do through formal aid (World Bank 2008).

Though remittance money can have a large impact on households, studies suggest that only around half of migrants remit (de la Briere et al. 2002). Many theories have been suggested to explain why migrants choose to remit or not (Adams 2011; Carling 2014). Rapoport and Docquier (2006) posit that migrants remit to help the left-behind household, to ensure the left-behind household is protected from external shocks, or to invest in the left-behind household. Brown and Poirine (2005) suggest that remittances may be a form of repaying debts to parents. However, it should be noted that households may also receive remittances even without a migrant member working elsewhere (Adams 2011). These remittances may be repayment of a loan or for assistance with a move to a new location.

The impact of remittance money on receiving households has been mixed. In the broadest sense, there are both positive and negative viewpoints on the effects of remittance receipt, and theories have swung between the two. On the positive side, many policy makers hope that money received through remittances will be invested in securing the household's basic needs, work towards long-term household and community economic development, or contribute to personal savings. Numerous studies have documented productive use of remittance money, through investments into education, health, and housing (Adams and Page 2005; Castaldo and Reilly 2007; Acosta, Fajnzylber, and Lopez 2008). Adams and Cuecuecha in 2010 and 2013 compare spending among families with internal migrants, those with international migrants, and those who do not receive remittances, and they find that remittance receipt is associated with less spending on food and greater spending on investments like education and housing. Remittance receipt has been shown to reduce poverty (Adams and Page 2005; Bertoli and Marchetta 2014), and McKenzie and Rapoport (2007) found that as more people migrate abroad, the distribution of remittances can begin to reduce income inequality.

On the negative side, contradictory findings have suggested that remittance money, in some cases, is not used for long-term investments but instead allows for conspicuous consumption or has little impact on investments (Clément 2011; Chami et al. 2003; Tabuga 2007). Migration of family members has also had the negative effect of early school exit among left-behind children, particularly among older children in the poorest households (Dietz et al. 2015; Kroeger and Anderson 2013).

A literature review by Adams (2011) offers an explanation for these weak or contradictory findings, suggesting that issues of endogeneity, reverse causality, and selection bias may influence the results of household surveys on remittance receipt. Generally speaking, the choice to migrate and send remittances is not randomly spread throughout the population, so remittance-receiving households may have unobserved characteristics that influence relationships between these households and other variables of interest in a study. One of the suggestions offered was to use panel data when studying households receiving remittances. In a panel study on Filipino household expenditures and remittances, Yang (2008) examined changes to exchange rates and corresponding patterns of investment among families of migrants. He used the panel data to examine changes to spending patterns within individual households before and after the Asian financial crisis and found the changing exchange rate to be associated with increased engagement in entrepreneurial activities in the home community and more spending on children's education. We build upon Adams' (2011) suggestion and use a fixed-effects model across our panel data. We also incorporate SUR models to control for the interrelated nature of spending patterns within households.

## *STUDY SITE*

Kyrgyzstan is a landlocked Central Asian country with high mountains. Since the collapse of the Soviet Union and the establishment of Kyrgyzstan as an independent state in 1991, the country has gone through a series of social and economic ebbs and flows, including rapid agricultural reform and two political uprisings (Pankow and Jermakowicz 1995; Anderson and Pomfret 2000; Muktarbek Kyzy et al. 2015). The population remains largely rural, with 61% living outside metropolitan areas. Kyrgyz people are often employed informally, with 40% of workers in 2013 identifying as self-employed and only 30% earning a steady wage (Dubashov et al. 2015). Many Kyrgyz people choose to migrate abroad to work to supplement the household's earnings.

In 2011, the National Statistical Committee of Kyrgyzstan estimated that there were 457,000 Kyrgyz workers abroad, with newer estimates projecting that number has risen to almost one million (Vinokurov 2013). This figure means that between 15% and 25% of working-age adults work abroad. Like many Central Asian nations, the majority of international migrants from Kyrgyzstan work in Russia (92%), with others working in Kazakhstan, the European Union, or the United States (Vinokurov 2013). It is expected that remittances will continue to play a large and important role in the Kyrgyz economy in the future. Kyrgyzstan's signing onto the Treaty on the Eurasian Economic Union on August 12, 2015, opened more possibilities for labor migration and remittance flow between the nation and other members of the union.

Previous research on remittance receipt within Kyrgyzstan has emphasized its importance to households and communities. Kyrgyz households with a migrant household member, and those households receiving remittances, are more likely to provide money and receive nonmonetary support or labor from others in the community, acting as insurance to those they know in times of trouble (Chakraborty, Mirkasimov, and Steiner 2015). Additionally, Schoch et al. (2010) found that rural Kyrgyz households often rely on a combination of animal husbandry

and remittances from a labor migrant to sustain their livelihoods. Remittances can supplement participation in important community celebrations, buy needed materials, supplement school costs, and have great influence on household expenditures in other ways (Muktarbek Kyzy et al. 2015; Danzer et al. 2013). With a large, nationally representative study of Kyrgyz households over three years, this research builds on previous studies to offer a clearer picture of the economic impacts of remittance receipt on household-level economic decisions.

### *DATA*

Data for this study come from the Life in Kyrgyzstan (LIK) Study, a panel household and individual survey. The survey was conducted in the seven *oblasts* (states) of Kyrgyzstan and the capital city of Bishkek and is representative at national and regional levels. About 3,000 households and 8,000 individuals were surveyed. Households were selected to participate in the study through a two-stage, stratified random sampling. In the first stage, communities or neighborhoods were drawn from the cities of Bishkek and Osh and from rural and urban portions of the seven oblasts. Twenty-five households were selected to participate from each of the communities or neighborhoods. By the fourth wave of data collection, 2,450 households, or 81.6% of the 2010 sample of 3,000 households, continued to participate in the study. For more information on the LIK data and sampling strategy, please refer to the work by Esenaliev (2016).

For this study, we use three waves of data from the LIK survey, for the years 2011 to 2013. The initial 2010 wave of data was excluded from this analysis due to inconsistencies in measurement of household expenditures. The surveys used for these three waves of data ask participants about their household expenses and divide these expenses into three broad categories: food, nonfood, and events.

Households in the LIK survey are defined as families and other people who share a common residence or household budget. Migrant and college student household members are included as part of the household roster. For this analysis, our focus is on families who receive remittances and the changes to their household spending over time rather than comparing the presence or absence of a migrant member or remittance receipt across different households. From the original sample of 2,863 households identified in 2011, 2,565 households (89.6%) participated in all three waves of the project. Approximately 14.2% of households reported receiving remittances at some point during the three years of the study.

We draw on methods employed by Adams and Cuecuecha (2010, 2013) to categorize household expenditure patterns into six investments: food, consumer goods, housing, medical expenses, communication and transportation, and other expenses. We also add a category, labeled “events,” for money spent on holidays, rituals, and their associated parties, for a total of seven expenditure categories. This form of conspicuous consumption and public giving can be particularly important in rural Kyrgyzstan (Rubinov 2014). Table 1 displays the description of each expense category and the portion of the total budget spent on each category in each of our three years of panel data.

[Table 1 about here]

Across all three years of the study, the majority of household money is spent on food. In 2011, half of spending went to food. In 2012, the share of spending on food declined to 42%, and in 2013, it had modest increase to 44% of the household budget. Across all three waves of data, the shares of spending for each category remained relatively stable, with food as the greatest expense, followed by housing and consumer goods, while medical expenses and events costs constituted the smallest shares of the household budget.

Table 2 shows the consumption categories measured in the local currency, the Kyrgyz *som*. We adjusted inflation based on each year's Consumer Price Index. The table indicates great variations in the dollar amounts spent, as the standard errors obtained for each category are quite large. Across the three years, there were significant differences in the average amount of money households spent on all seven expenditure categories. However, while the average amount of remittances received by families varied across the years, the differences were not statistically significant.

[Table 2 about here]

## METHODS

The most widely adopted functional form for analyzing household expenditure patterns was proposed by Working (1943) and Leser (1963) and is often referred as the Working–Leser specification (Castaldo and Reilly 2007). This approach expresses the share of expenses for certain goods as a function of total expenditures. Following the Working–Leser specification, we begin our analysis by modeling households' consumption patterns for a single year—in this case, the year 2011. The model can be written as follows:

$$C_{ij} = \alpha_i + \beta_i \ln(\exp_j) + \theta_i \ln(\text{remit}_j) + \gamma_i X_j + u_{ij} \quad [1]$$

where  $C_{ij}$  is the share of the expenditures on goods  $i$  in the total expenditures for household  $j$ .

Adding up  $i$  for each household  $j$  requires  $\sum_i C_{ij} = 1$ . The variable  $\ln(\exp_j)$  is the logarithm of the total expenditures for household  $j$ ,  $X_j$  is a vector of household-related characteristics, and  $u_{ij}$  is the error term.  $\alpha_i$  is the intercept, which captures the baseline expenditure share on goods  $i$  while holding other covariates at zero value; while  $\beta_i$ ,  $\theta_i$  and  $\gamma_i$  are the marginal effects of  $\ln(\exp_j)$ ,  $\ln(\text{remit}_j)$  and  $X_j$  respectively. To incorporate the structure of the panel data, we

extend the model, incorporating time-varying components. The final model is expressed as follows:

$$C_{ijt} = \alpha_i + \beta_i \ln(\text{exp}_{jt}) + \theta_i \ln(\text{remit}_{jt}) + \gamma_i X_{jt} + \delta_{ij} + u_{ijt} \quad [2]$$

where  $C_{ijt}$  is category  $i$ 's share of expenditures for household  $j$  at year  $t$ . In our case, category  $i$  ranges from 1 to 7, as illustrated in Table 1;  $\text{exp}_{jt}$  is household  $j$ 's total expenditures at year  $t$ ;  $\text{remit}_{jt}$  is the total remittance amount household  $j$  received at time  $t$ .  $X_{jt}$  includes a vector of time-varying household characteristics, including household composition (number of household members, number of young and old dependents, marital status of the household head), economic activities (household income, participation in agricultural activities or not), and self-reported climate shocks (drought, flood, cold winter, and frosts), as well as year dummy variables.  $\delta_{ij}$  indicates time-invariant household and expenditure-specific attributes;  $u_{ijt}$  is the error term. Model 2 is estimated using a fixed-effects model. The fixed-effects estimation makes it possible to take into account unobserved heterogeneity across each household.

Although the expenditure share on each category  $i$  can be modeled separately with a list of household characteristics and climate change variables, different expenditure shares are in fact inherently interrelated and add up to 100%. In our case, the final model comprises a total of seven equations such that each expenditure category  $i$  serves as a dependent variable and each error term  $u_{ijt}$  is correlated among various expenditure categories  $i$ . To tackle this problem, we adopt seemingly unrelated regression (SUR), which allows the error to be correlated across equations (Moon and Perron 2006).

As a way of adding a final check to our results, we also model the effect of remittances, household characteristics, and climate variables using the logged version of the Kyrgyz *som*. There are two reasons to use the log-transformation: (1) income (and remittances and

expenditures) is highly skewed and does not follow a normal distribution, and (2) it eases interpretation. We tried several combinations of variable specifications and selected share of income as the clearest and most accurate interpretation of the data, with logged Kyrgyz *som* as a supplemental check.

Table 3 presents additional household characteristics, dividing them between the characteristics that we classified as fixed and those that vary over time (Wooldridge, 2010). The logged transformations of income and remittances, participation in agricultural activities, household characteristics, and experiences of climactic shocks were considered time-variant characteristics. The average remittances and household incomes increased over the course of the three years. A household was classified as participating in agricultural activities if on the survey it was indicated that at least one member was engaged in agricultural work. The average percent of respondents' households with a member engaged in agricultural work increased between 2011 and 2012, leveling off in 2013. Agricultural work can be particularly important in Kyrgyzstan, since most of the population lives in rural areas and agricultural investments into livestock continue to offer an outlet for status and prestige in rural communities. Household characteristics included the marriage status of the household head and the size of the household. Household size was counted as the number of people who were considered part of the household, and the average household size grew over the three-year period. Those over age 60 were considered older dependents, and those under age 6 were considered child dependents. The climactic shocks were self-reports by the household head, indicating that the household had experienced any of the following four household shocks in the past year: drought, flood, a cold winter, or frosts. Susceptibility to climactic shocks is particularly important in a country largely composed of high-mountain and agricultural communities, where changes to climate can have direct and

immediate impacts on the health and wealth of the families living there. Responses to these experiences varied with the years.

Time-invariant characteristics were those that we held constant over the three waves. They were characteristics of the household head, such as age, gender, and ethnicity. The average age of the household head was around 50 years old, most were men, and most were ethnically Kyrgyz, though a substantial minority were Uzbek.

[Table 3 about here]

## *RESULTS*

Table 4 presents the final hybrid model of fixed effects and SUR. As a comparison, we also examined the estimates that use only fixed effects; those results are presented in the appendix. Compared with the estimates that use only the fixed-effects model, the hybrid model is more efficient, as it combines information on different equations (Felmlee and Hargens 1988). When interpreting the model, it should be noted that all estimates indicate the variations that occur within households over time, rather than between different households.

As a household received more remittances, there was a significant effect on the share of money spent on food, housing, events, and other expenses. With increased remittances, households spent a smaller share of the household budget on food and housing and spent a greater share on events and other expenses. This finding may indicate that with increased remittances households are able to move past basic needs, such as providing food and home upkeep and maintenance. Instead, they may have enough money to spend a greater share of their income throwing holiday parties or paying off loans, while smaller shares of their income can still adequately cover other expenses.

[Table 4 about here]

The logged measure of income was associated with significant decreased spending on food, medical expenses, and events, while the share of spending on communication and transportation increased, but increased spending on consumer goods, communication and transportation, and other expenses. When income from remittances and other sources are combined, the total money spent has an impact on the share of income going to every category. As a household's total funds became larger, the household spent a smaller share of this money on food, consumer goods, and communication and transportation. Increased available money was also associated with spending a greater share of the total money on housing, medical expenses, events, and other expenses.

Households with at least one member participating in agricultural activities spent less on food and communication and transportation. This finding may result from the ability of households with a member participating in agricultural activities to supply some of their own food from a nearby garden or farm. These households spent a greater share of household funds on consumer goods, housing, events, and other expenses.

Households' demographic characteristics also held some influence over spending patterns. Households with a married head spent a larger share of money on food and housing but a smaller share on events and other expenses. Household size had a significant effect on every expense category. As households grew in size, they spent a greater share of household money on food and consumer goods, but significantly less money on all other expenses. The dependents of the household had mixed influences on spending patterns. An increased number of older people in the household is associated with a larger share of household money going toward housing and medical expenses. This finding may be expected, as elders generally require more health-care services. Households with older dependents also spent less on consumer goods, communication

and transportation, and other expenses. Families with increasing numbers of dependent children under age six spent a smaller share on food but a greater share on events.

Self-reported climactic shocks had some impact on household spending. Those households that reported experiencing droughts or cold winters spent more on food. Both droughts and floods were associated with a smaller share of the household capital spent on housing. All four climactic shocks were significantly associated with medical expenses, though only frosts were associated with an increased share of spending. Frosts were associated with greater spending on consumer goods and events. Although droughts and cold winters were associated with increased spending on communication and transportation, frosts were associated with decreased shares of spending in that category. Droughts and floods increased the share of money for other expenses, while frosts were associated with spending less.

[Table 5 about here]

Aside from looking at the spending categories measured as a percentage of total household expenditure, we also measured spending in the local currency. These results are presented in Table 5. In terms of the effect of remittances, findings were fairly consistent with the results presented in Table 4. For example, increases in remittances were significantly associated with decreases in spending on food and housing services and increases in spending on events. However, using *soms* resulted in a significant association between remittances and consumer goods rather than one between remittances and other expenses. This may be due to the large variation in *soms* spent on consumer goods across the three years. As to the magnitude of the effect, as both spending and remittances are log-transformed, the estimated coefficients  $\beta$ s can be interpreted as the elasticity (Wooldridge 2010). Specifically, 1% increases in the amount

of remittances yield 0.7% decreases in spending on food, 1.1% decreases in consumer goods, 1.4% decreases in spending on housing, and 3.0 % decreases in spending on events.

While the share of money spent on food and housing would decrease with increasing remittances, it is surprising that the actual monetary amount decreases in these categories as remittances increase. A possible explanation is that Kyrgyz households may be making investments into animals, seeds, tools, or other expenses and consumer goods that could assist with self-provisioning or do-it-yourself home repair. These would allow households to spend less on food and housing and would eventually pay off the monetary investment into these goods.

Across the other variables included in the model, the direction of the effects was consistent between Tables 4 and 5. In some cases, the variables had significant effects on spending categories in Table 5 that were not significant in Table 4. For example, remittances had a significant association with consumer goods when using logged *soms*, but did not when using share of household expenses. And although many variables had significant associations with the share of household money spent on other expenses (Table 4), when considered in *soms* (Table 5), these associations were no longer significant.

## *DISCUSSION AND CONCLUSION*

This research contributes a detailed understanding of the relationship between remittance receipt and household spending patterns in a country that is heavily remittance dependent, and therefore can provide insight into patterns for other households as remittances become a greater share of their economic environments. Using data from three waves of panel data from the Life in Kyrgyzstan Study, this research finds that increases in remittance receipt are associated with spending (1) a smaller share of household money on food and housing and (2) a larger share on

events and other expenses. Measuring household expenses as shares of the household budget reflects priorities of spending, and can indicate the portion of budgets necessary to meet each of the expenditure needs.

As was seen across Kyrgyz households, food and housing comprise the largest shares of the budget, and increasing remittances were associated with spending a smaller share of the household money on food and housing. Food and housing are some of the most basic household investments, covering the needs that must be met first in any household. While increases in spending in these areas may indicate that a household had inadequate supplies of food and shelter before remittances, the results that Kyrgyz households spend a smaller share of the budget on these categories indicates that these needs may already be fulfilled, with additional money to spare for other expenses. Other studies have reflected mixed results for the relationship between remittance receipt and spending on food and housing (Clement 2011; Chami et al., 2008; Adams 2011), with migrants expecting that remittance money will be spent primarily for food and other basic needs, followed by spending on household goods, and then other expenses (Danzer et al. 2013).

Surprisingly, our results indicate that not only was increased remittance receipt associated with spending a smaller share of the budget, but also spending fewer *soms*. It is possible increased remittance money allows for greater investments that indirectly supplement these expense categories. Investments of remittance money into livestock and agricultural equipment have been documented as a strategy to help families maintain agricultural self-provisioning (Schoch et al. 2010), and this may extend to other investments in tools and informal livelihoods that reduce spending in the housing category.

While the share of spending on food and housing decreased, events, which included spending on holidays and rituals, saw an increased share of spending as remittance money increased within a household. The amount of *soms* spent on this category also increased. Though not a tangible investment (as are some of the other categories), events can be an important method of bonding with family and other community members through shared experiences in many Central Asian countries (Danzer et al. 2013; Rubinov 2014). Spending on events may allow families to spread or show off their newer source of income, and can connect migrants to the happenings of the local community (Isabaeva 2011). In a study of neighboring Tajikistan, obtaining money for weddings and celebrations was cited as the fourth most important reason for migrating abroad to work (Danzer et al. 2013). Kyrgyz remittance recipients may share this priority, or may view the remittance money as something temporary and do not want to make large or long-term investments that may not run through completion. Investments in events provide the payoff of community involvement and recognition, something that can be quite valuable in Kyrgyz systems of social interaction (Rubinov 2014).

The category for other expenses was composed of spending on legal expenses, educational expenses, and other nonfood goods and services not captured in the other categories. Legal and educational expenses are important investments in the human capital of household members (Kroeger and Anderson 2014; Muktarbek Kyzy et al. 2015). Legal fees may enable the migration process, through passports, visas, or documentation. Additionally, they may facilitate the receipt of remittances. Migrants also may designate that remittance money is to be spent on investing in the educational opportunities of younger members of the household. We found that with increases in remittances, the share of household money spent on other expenses rose. However, when measured in the amount of *soms* spent for other expenses, the relationship with

remittance receipt was no longer statistically significant. This suggests the importance of other factors that contribute to spending in this category. In particular, such a catchall category may capture the agricultural investments of families (Schoch et al. 2010), or their long-term investments into services within the community. Similarly, while the relationship between remittance receipt and the share of spending on consumer goods was not statistically significant, the amount of *soms* spent on this expense category was. Receiving more remittance money was associated with a household spending fewer *soms* on consumer goods. As all household expenditures are related, this may reflect the redirection of household funds to other parts of the budget. Or, it may reflect larger forces outside the household, such as fluctuating prices of popular consumer goods, which decrease the costs associated with buying these consumer goods.

Our use of seemingly unrelated regression (SUR) equations and fixed effects with a panel-data framework brings together the merits of both the methods and the data. Instead of estimating each expenditure category as a separate model, we used SUR, which allowed us to consider correlations on the error terms among different equations, which increases the efficiencies of the coefficient estimates (Felmlee and Hargens 1988). By contrast, compared with conventional models that use cross-sectional data, the use of fixed effects in panel data allows us to detect the actual impact of the remittances on spending patterns, as the model explores the within-household variations over time and surpasses the unobserved omitted variable biases problems (Andreß et al. 2013).

Remittance receipt will continue to play a large role in the Kyrgyz economy and the economies of other Central Asian countries. This study offers insight into the investments made by households as they begin to receive more and more remittances. The study does have a few limitations. Household remittance money, income, expenses, and all other variables were self-

reported by the household head, which may diverge from actual spending. As this data was collected in the years following the great recession, the economy of Kyrgyzstan and the value of the Kyrgyz som reflected the instability of local markets. Precautions were taken to account for these fluctuations. Additionally, Kyrgyzstan has a unique country context that can reflect experience of other Central Asian countries, but may not represent the experiences of remittance receipt elsewhere.

From this research, it is clear that the inclusion of an additional expense category for events, to account for spending on holidays and ritual celebrations, contributes valuable insight into the relationship between remittance money and household spending, particularly within the context of Kyrgyzstan. Household expenditures are closely related with one another. Remittance receipt, as either a primary or a secondary source of household income, can affect the areas in which households choose to spend money. The context of Central Asia, where international migration has long been a part of household economic livelihoods, proves an insightful area of study into the impacts of remittance receipt on household spending patterns over time.

Kyrgyzstan is the second most remittance-dependent country in the world, with remittance money making up 31.1% of its GDP in 2013 (World Bank 2016b). Remittance receipt can affect the spending decisions of many Kyrgyz households. As new opportunities for migration and remittance sending emerge, such as policies brought forth through the Treaty on the Eurasian Economic Union and others, it will be critical to understand the impacts on households left behind in the community of origin.

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TABLE 1  
CONSUMPTION CATEGORIES OF KYRGYZ HOUSEHOLDS

Categories	Examples	Share of the total consumption budget		
		2011	2012	2013
Food	Bread, milk, meat, fruit, vegetables	0.50	0.42	0.44
Consumer Goods	Clothing, shoes, fabric, personal care	0.12	0.18	0.15
Housing	Central heating, construction, maintenance and repair	0.13	0.14	0.15
Medical Expenses	Medical care, dental care	0.03	0.03	0.03
Events	Holidays, rituals	0.03	0.03	0.03
Communication and Transportation	Phones, Internet, bus, taxi, gas	0.07	0.06	0.07
Other Expenses	Legal expenses, education expenses, other nonfood goods and services	0.12	0.10	0.11

TABLE 2  
 CONSUMPTION CATEGORIES OF KYRGYZ HOUSEHOLDS  
 (IN KYRGYZ SOM, INFLATION ADJUSTED FOR EACH YEAR)

	2011		2012		2013		ANOVA
	Mean	SE	Mean	SE	Mean	SE	
Food	28,406.26	15,230.73	164,439.70	82,025.82	80,276.35	40,499.44	***
Consumer Goods	6,598.18	4,765.06	77,093.49	73,997.67	27,834.08	18,028.51	***
Housing	8,745.30	12,269.74	61,305.85	78,639.70	35,066.96	59,765.27	***
Medical Expenses	1,974.18	6,116.35	13,665.09	32,980.10	5,256.52	69,10.48	***
Events	2,550.75	8,650.27	20,031.31	67,808.64	8,555.49	27,715.56	***
Communication and Transportation	4,448.31	5,151.14	23,043.29	22,587.42	13,109.55	10,829.62	***
Other Expenses	8,286.44	13,406.04	48,037.79	69,654.77	26,620.32	35,951.02	***
Remittances (For households who received remittances)	11,755.99	102,448.10	10,977.64	105,391.70	17,952.22	159,674.00	
Remittances (All households)	10,062.64	94,870.10	8,911.03	95,047.72	14,591.22	144,117.60	

Notes: \*\*\*  $p \leq 0.001$ , \*\*  $p \leq 0.01$ , \*  $p \leq 0.05$ ; ANOVA analyses means of each year within each expenditure category.

TABLE 3  
SUMMARY OF HOUSEHOLD CHARACTERISTICS

	2011		2012		2013	
	<i>Mean</i>	<i>Std. Dev.</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Mean</i>	<i>Std. Dev.</i>
<i>Time-varying characteristics</i>						
Remittances (log transformed)	0.48	2.33	0.52	2.42	1.26	3.48
Income (log transformed)	11.84	0.72	12.02	0.72	12.16	0.76
Agricultural activity (%)	0.36	0.48	0.46	0.5	0.45	0.5
Married	0.73	0.44	0.73	0.45	0.72	0.45
Household size	4.95	2.22	5.05	2.34	5.21	2.4
# old people (>60 years)	0.32	0.61	0.34	0.62	0.37	0.64
# children (<6 years)	4.95	2.22	5.05	2.34	4.39	1.98
Drought	0.08	0.27	0.26	0.44	0.11	0.31
Flood	0.02	0.14	0.14	0.35	0.14	0.35
Cold winter	0.03	0.18	0.51	0.5	0.25	0.43
Frosts	0.01	0.09	0.35	0.48	0.2	0.4
<i>Time-invariant (fixed) household characteristics</i>						
	<i>Mean</i>	<i>Std. Dev.</i>				
Age of the household head in 2011	50.82	13.65				
Female household head	26.11%					
Kyrgyz	68.08%					
Uzbek	12.19%					
Russian	9.97%					
Dungan	3.15%					
Uyghur	1.78%					
Tajik	0.93%					
Kazakh	0.69%					
Other	3.23%					

TABLE 4  
RESULTS OF THE FIXED-EFFECTS SEEMINGLY UNRELATED REGRESSION MODELS  
(DEPENDENT VARIABLE = SHARE OF HOUSEHOLD EXPENSES)

	(1) Food	(2) Consumer Goods	(3) Housing	(4) Medical expenses	(5) Events	(6) Communication and transportation	(7) Other Expenses
Remittances (log transformed)	-0.002*** (0.001)	-0.000 (0.000)	-0.001* (0.000)	0.000 (0.000)	0.001** (0.000)	0.000 (0.000)	0.001*** (0.000)
Income (log transformed)	-0.015*** (0.002)	0.010*** (0.002)	0.002 (0.002)	-0.005*** (0.001)	-0.006*** (0.001)	0.008*** (0.001)	0.004* (0.002)
Total expenses (log transformed)	-0.125*** (0.003)	-0.023*** (0.002)	0.035*** (0.002)	0.010*** (0.001)	0.043*** (0.002)	-0.009*** (0.001)	0.057*** (0.002)
Agricultural activity	-0.077*** (0.003)	0.007** (0.002)	0.016*** (0.003)	-0.000 (0.001)	0.020*** (0.002)	-0.006*** (0.001)	0.034*** (0.002)
Married	0.007* (0.003)	-0.002 (0.002)	0.009*** (0.003)	0.000 (0.001)	-0.009*** (0.002)	0.000 (0.001)	-0.008*** (0.003)
Household size	0.019*** (0.001)	0.002* (0.001)	-0.004** (0.001)	-0.002*** (0.001)	-0.005*** (0.001)	-0.002*** (0.001)	-0.007*** (0.001)
Number of old people (>60)	0.001 (0.002)	-0.005*** (0.002)	0.007*** (0.002)	0.008*** (0.001)	-0.001 (0.001)	-0.005*** (0.001)	-0.005* (0.002)
Number of children (<6)	-0.006*** (0.002)	-0.000 (0.001)	0.000 (0.001)	-0.000 (0.001)	0.004*** (0.001)	0.001 (0.001)	0.000 (0.001)
Drought	0.023*** (0.004)	-0.015*** (0.003)	-0.010** (0.003)	-0.005** (0.002)	-0.001 (0.003)	0.001 (0.002)	0.007* (0.003)
Flood	0.006 (0.005)	-0.015*** (0.004)	-0.008 (0.004)	-0.005** (0.002)	0.000 (0.003)	0.001 (0.002)	0.022*** (0.004)
Cold winter	0.011* (0.005)	-0.004 (0.003)	-0.001 (0.004)	-0.006*** (0.002)	-0.003 (0.003)	0.005** (0.002)	-0.005 (0.003)
Frosts	0.002 (0.005)	0.007* (0.003)	-0.004 (0.004)	0.010*** (0.002)	0.010*** (0.003)	-0.004* (0.002)	-0.021*** (0.004)
2011	0.047*** (0.008)	-0.030*** (0.005)	-0.014* (0.006)	0.003 (0.003)	-0.002 (0.005)	-0.004 (0.003)	0.021*** (0.006)
2012	-0.009 (0.008)	0.038*** (0.005)	-0.013* (0.006)	0.006 (0.003)	-0.007 (0.005)	-0.015*** (0.003)	-0.006 (0.006)

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Constant	(0.008) 2.056 <sup>***</sup>	(0.005) 0.296 <sup>***</sup>	(0.006) -0.279 <sup>***</sup>	(0.003) -0.016	(0.005) -0.398 <sup>***</sup>	(0.003) 0.095 <sup>***</sup>	(0.006) -0.598 <sup>***</sup>
	(0.036)	(0.024)	(0.028)	(0.013)	(0.020)	(0.014)	(0.026)
N	2,565						
<i>Akaike Information Criterion</i>	-135624.554						

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Notes: \*\*\*  $p \leq 0.001$ , \*\*  $p \leq 0.01$ , \*  $p \leq 0.05$ ; standard errors are in parentheses.

TABLE 5  
RESULTS OF THE FIXED-EFFECTS SEEMINGLY UNRELATED REGRESSION MODELS  
(DEPENDENT VARIABLE = LOG-TRANSFORMED HOUSEHOLD EXPENDITURES IN KYRGYZ SOM,  
INFLATION ADJUSTED)

	(1) Food	(2) Consumer goods	(3) Housing	(4) Medical expenses	(5) Events	(6) Communication and transportation	(7) Other expenses
Remittances (log transformed)	-0.007** (0.003)	-0.011* (0.004)	-0.014** (0.005)	0.004 (0.009)	0.030*** (0.008)	0.010 (0.006)	0.008 (0.007)
Income (log transformed)	0.014 (0.010)	0.087*** (0.017)	0.028 (0.021)	-0.107** (0.036)	-0.074* (0.032)	0.121*** (0.023)	-0.013 (0.027)
Total expenses (log transformed)	0.572*** (0.015)	0.755*** (0.025)	1.052*** (0.031)	1.045*** (0.051)	1.400** (0.045)	0.680** (0.033)	1.467*** (0.039)
Agricultural activity	-0.206*** (0.015)	0.002 (0.025)	0.161*** (0.031)	-0.177*** (0.052)	0.344*** (0.046)	-0.156*** (0.034)	0.225*** (0.040)
Married	0.046** (0.016)	-0.020 (0.027)	0.133*** (0.034)	-0.019 (0.056)	-0.211*** (0.050)	0.037 (0.036)	-0.086* (0.043)
Household size	0.053*** (0.007)	0.020 (0.012)	-0.009 (0.015)	-0.051* (0.025)	-0.034 (0.022)	0.001 (0.016)	-0.038* (0.019)
Number of old people (>60)	-0.020 (0.011)	-0.061** (0.019)	0.060** (0.023)	0.201*** (0.039)	-0.006 (0.034)	-0.050* (0.025)	-0.030 (0.030)
Number of children (<6)	-0.015 (0.008)	0.004 (0.013)	-0.006 (0.016)	-0.017 (0.027)	0.038 (0.024)	-0.009 (0.018)	-0.018 (0.021)
Drought	0.045* (0.019)	-0.030 (0.033)	-0.119** (0.040)	0.093 (0.067)	-0.130* (0.059)	-0.084 (0.043)	0.026 (0.051)
Flood	-0.014 (0.025)	-0.145*** (0.042)	-0.050 (0.052)	-0.202* (0.087)	0.061 (0.076)	-0.091 (0.056)	0.216** (0.066)
Cold winter	0.031 (0.021)	-0.072* (0.036)	0.014 (0.044)	-0.151* (0.074)	0.102 (0.065)	-0.031 (0.047)	-0.053 (0.056)
Frosts	-0.031 (0.023)	0.149*** (0.038)	-0.081 (0.047)	0.375*** (0.078)	0.100 (0.069)	0.038 (0.050)	-0.186** (0.059)
2011	-0.824*** (0.040)	-1.141*** (0.068)	-1.084*** (0.083)	-1.086*** (0.139)	-0.999*** (0.123)	-0.799*** (0.089)	-0.899*** (0.106)

2012	0.892*** (0.040)	1.056*** (0.068)	0.770*** (0.083)	0.712*** (0.140)	0.669*** (0.123)	0.743*** (0.090)	0.603*** (0.106)
Constant	3.842*** (0.168)	-0.341 (0.282)	-3.158*** (0.346)	-3.074*** (0.580)	-6.821*** (0.512)	-0.505 (0.373)	-7.500*** (0.441)
N	2,565						
<i>Akaike Information Criterion</i>	31459.610						

Notes: \*\*\*  $p \leq 0.001$ , \*\*  $p \leq 0.01$ , \*  $p \leq 0.05$ ; standard errors are in parentheses.

APPENDIX 1  
RESULTS OF FIXED-EFFECTS STANDARD REGRESSION MODELS  
(DEPENDENT VARIABLE = SHARE OF HOSUEHOLD EXPENDITURES)

	(1) Food	(2) Consumer goods	(3) Housing	(4) Medical expenses	(5) Events	(6) Communication and transportation	(7) Other expenses
Remittances (log transformed)	-0.001 (0.001)	0.001*** (0.000)	-0.001 (0.001)	0.001** (0.000)	-0.001 (0.000)	0.001** (0.000)	-0.000 (0.000)
Income (log transformed)	-0.012*** (0.003)	0.007** (0.002)	0.005* (0.003)	-0.002 (0.001)	-0.004* (0.002)	0.003* (0.001)	0.002 (0.002)
Total expenses (log transformed)	-0.138*** (0.004)	-0.025*** (0.003)	0.033*** (0.004)	0.010*** (0.002)	0.060*** (0.003)	-0.019*** (0.002)	0.068*** (0.003)
Agricultural activity	-0.026*** (0.006)	0.015*** (0.004)	-0.004 (0.004)	-0.001 (0.002)	0.002 (0.003)	0.001 (0.002)	0.010* (0.004)
Married	0.016 (0.010)	0.007 (0.007)	0.010 (0.008)	0.008* (0.004)	-0.014* (0.006)	-0.007 (0.004)	-0.019* (0.007)
Household size	0.024*** (0.002)	0.002 (0.002)	-0.004* (0.002)	-0.001 (0.001)	-0.010*** (0.001)	-0.001 (0.001)	-0.009*** (0.002)
Number of old people (>60)	-0.008 (0.008)	0.008 (0.005)	0.010 (0.006)	0.013*** (0.003)	-0.012* (0.005)	0.000 (0.003)	-0.015** (0.006)
Number of children (<6)	-0.006*** (0.002)	0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	0.005*** (0.001)	0.000 (0.001)	0.001 (0.001)
Drought	0.023*** (0.005)	-0.009* (0.004)	-0.008 (0.004)	-0.002 (0.002)	-0.002 (0.003)	0.002 (0.002)	-0.000 (0.004)
Flood	0.009 (0.006)	-0.019*** (0.004)	-0.004 (0.005)	-0.000 (0.002)	-0.002 (0.004)	0.008** (0.003)	0.011* (0.005)
Cold winter	0.011 (0.006)	-0.012** (0.004)	0.006 (0.005)	-0.003 (0.002)	0.002 (0.003)	0.007** (0.002)	-0.010* (0.004)
Frosts	0.007 (0.006)	0.002 (0.004)	-0.004 (0.005)	0.006** (0.002)	0.004 (0.004)	-0.005* (0.002)	-0.011* (0.004)
2011	0.053*** (0.008)	-0.037*** (0.005)	-0.009 (0.006)	0.006 (0.003)	-0.002 (0.005)	-0.006* (0.003)	0.019** (0.006)
2012	-0.007 (0.008)	0.033*** (0.005)	-0.010 (0.006)	0.006 (0.003)	-0.008 (0.005)	-0.016*** (0.003)	-0.005 (0.006)

Constant	(0.008) 2.130***	(0.005) 0.347***	(0.006) -0.298***	(0.003) -0.084***	(0.005) -0.583***	(0.003) 0.276***	(0.006) -0.666***
	(0.058)	(0.040)	(0.047)	(0.023)	(0.035)	(0.024)	(0.042)
<i>N</i>	7094	7094	7094	6671	7094	7094	7094
<i>R</i> <sup>2</sup>	0.301	0.175	0.043	0.021	0.118	0.053	0.125

Notes: \*\*\*  $p \leq 0.001$ , \*\*  $p \leq 0.01$ , \*  $p \leq 0.05$ ; standard errors are in parentheses.