Do migrant remittances affect household spending? Focus on wedding expenditures

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Abstract

We use nationally representative survey data and propensity score matching to investigate the impact of remittances from labor migrants on households' wedding expenditures. The investigation provides evidence that remittance-receiving households spend a smaller share of their budget on wedding ceremonies. Since lavish wedding ceremonies serve the purpose of increasing households' social status through conspicuous displays of wealth, the study concludes that remittance-recipient households are less likely to be engaged in conspicuous consumption than are households that do not receive remittances.

Keywords Migration · Remittances · Household expenditures · Wedding expenditures

JEL Classification F24 · F22 · D12

1 Introduction

International remittances refer to money that workers who are employed outside their countries send home. These unilateral transfers attract the attention of researchers and policymakers worldwide because of their size and potential as an external source of capital for emerging economies' development.

The body of research that studies how international remittances impact households' consumption and investment patterns in remittance-receiving countries has surged over

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the past decade. We contribute to this literature in three ways: First, we investigate whether remittances are spent on a type of conspicuous consumption, that is, status-signaling wedding ceremonies. Although the literature on the way migrants and their families use remittances is abundant, only a few studies scrutinize the impact of remittances on conspicuous consumption. The meager extant literature on the relationship reaches contradictory conclusions. For instance, households in the Philippines that receive remittances spend more on consumer goods and leisure (Tabuga 2007), while remittance income does not significantly affect conspicuous consumption in Sri Lanka (De and Ratha 2012). We address this contradiction and focus on a specific type of conspicuous consumption—excessive expenditures on wedding ceremonies.

Second, focusing on lavish wedding ceremonies as a type of conspicuous consumption allows us to compare the consumption patterns of remittance-receiving households with those of non-recipient households through the lens of informal institutions like customs and behavior patterns that the remittance research largely ignores. In particular, the literature and policymakers express concerns that traditional and cultural structures that emphasize status-oriented activities may adversely influence how remittances are spent (Ilkhamov 2013; Irnazarov 2015; Reeves 2012). These expenditures are often substantial in traditional societies. For instance, Irnazarov (2015) estimates the cost of a wedding in Uzbekistan at around US\$10,000, including dowry expenses, about twenty times the average monthly wage of an Uzbek laborer working in Russia (Petrova 2017). A similar situation occurs in neighboring Tajikistan, where *‘peer pressure and comparisons with neighbors are indeed key factors in holding lavish ceremonies in a country in which almost half of the population lives in poverty. When someone spends \$2,000 for a wedding, a neighbor will usually try to spend the same or even more money for their ceremonies’* (Najibullah 2007, p. 2). In the context of Central Asia, these lavish ceremonies are likely to divert household resources from spending on asset accumulation, health, education, and other important matters; they are even likely to push households into debt. As a result, both Uzbekistan and Tajikistan introduced bans on the size of these traditional ceremonies.

Third, we place our research in the infrequently studied transition context of Uzbekistan, a country that has seen large inflows of remittances during the last two decades. As such, this paper is related to the Kakhkharov et al. (2020) and Kakhkharov and Ahunov (2020) studies, which use the same dataset. However, in contrast with Kakhkharov et al. (2020), we specifically focus on a particular type of expenditure (wedding ceremonies) and use a different methodology. This allows us to scrutinize the link between remittances and a particular type of conspicuous consumption. As to the Kakhkharov and Ahunov (2020) work, the study merely compares mean household expenditures to draw inferences regarding the differences in expenditures of households receiving and not receiving remittances. The present research extends the analysis using rigorous econometric techniques and arrives at results contrary to the conclusions stated in Kakhkharov and Ahunov (2020). Uzbekistan’s experience could be relevant to other transition countries in Central Asia that are at a similar stage in their paths to becoming market economies and share similar histories, traditions, cultures, and levels of exposure to remittances.

Whether institutional environment and traditions similarly influence the spending behavior of households that receive remittances and those that do not have important

policy implications. If remittance-receiving households' expenditure patterns differ from those of non-recipient households, factors beyond the characteristics of households, local institutional environment, traditions, and policy-making may need to be investigated to determine the effect of these monetary flows on economic development. Moreover, if remittances are invested in human capital, education, health, or small business, their positive impact on economic growth is maximized (Acosta 2011), but if remittances are spent mainly on conspicuous consumption, their effect may not be productive to the economy as a whole (Chami et al. 2003).

This paper uses household-level data from the Uzbekistan Jobs, Skills, and Migration Survey jointly administered by the German Agency for International Development (GIZ) and the World Bank in 2013. The survey covers 1,500 households, and it is nationally representative. We, therefore, can investigate the impact of remittances on certain household expenditures items, especially traditional ceremonies. In contrast with most empirical studies in this area, which apply ordinary least squares (OLS) methodology supplemented by a sample-selection procedure or instrumental variable estimations, we use a propensity score matching (PSM) methodology to evaluate the impact of remittances on household expenditures. This methodology is often used to assess the effects of policies because it can give accurate results in non-experimental settings (Caliendo and Kopeinig 2008; Dehejia and Wahba 1999). The results of our analysis provide evidence that households that receive remittances tend to spend a smaller share of their earnings on traditional ceremonies and a greater share on other large non-food items than do households that do not receive remittances. These results show that remittance recipients are less likely to engage in conspicuous consumption.

The rest of the paper is organized as follows. Section 2 reviews the literature on the topic, while Sect. 3 presents the data and the research methodology. Section 4 reports the results, and Sect. 5 draws conclusions and discusses policy implications.

2 Literature review

Arguing that almost everyone wants to display wealth and attain the rank associated with it, Adam Smith (1759) was among the first scholars to suggest the significance of conspicuous consumption as a motivator of human behavior. The rigorous theoretical study of social status and conspicuous consumption dates back to Veblen (1899), who defines conspicuous consumption as consumption that has the purpose of demonstrating one's economic position to others. Ireland (1994) and Bagwell and Bernheim (1996) further developed the theory of conspicuous consumption as a signal of wealth. Since then, conspicuous consumption has become a well-researched area, but most research still focuses on luxury goods and ignores luxury experiences like expensive wedding celebrations. This paper investigates this unconventional type of households' conspicuous consumption in the context of international remittances received in Uzbekistan.

Lavish celebrations of weddings and other life events to enhance the status of households are common in developing countries and the transition economies of the former Soviet Union. Exorbitant celebrations are documented in scholarly discourse for India (Bloch et al. 2004; Rao 2001), Namibia (Pauli 2013), Tajikistan (Marat 2008),

and Kazakhstan (Werner 1997), among other countries. These expenditures could be considered reasonable if they help maintain social bonds and networks to cope with poverty (Rao 2001). Still, many observers find that conspicuous consumption frequently comes at the expense of basic and more productive needs, such as education and healthcare (Charles et al. 2009; Linssen et al. 2011).

The expenditure decisions of households are related to a large extent to the reasons why migrants send remittances. Therefore, Lucas and Stark (1985) develop a theoretical framework for micro-level investigations on remittances and pin down three principal motivations for sending remittances at the household level. These are pure altruism, pure self-interest, and tempered altruism or enlightened self-interest. The problem is that in many cases, these motives could account for a similar type of migration and remittance behaviors.

A valuable framework for studying remittances, migration, and household expenditures is the New Economics of Labor Migration (NELM), developed by Stark (1991) and colleagues to link remittance behavior to migration decisions. According to NELM, households decide to send a household member to work in another country to improve the family's well-being by maximizing joint income and minimizing risks. Therefore, the primary purpose of remittances is to provide additional funding, insurance in case the primary source of family income falters, and financial protection for a rainy day. The NELM is an original, sensible, and functional framework used extensively in studies of remittances and migration. However, the NELM framework assumes that households act rationally and neglects the role of informal social institutions (e.g., traditions, positions, norms, community, extended family, informal associations) as determinants of behavior (Aslan 2011; Hagen-Zanker 2010). In the context of Uzbekistan, the present research shows that these informal social institutions and traditions have less influence over the spending decisions of households that receive remittances than they do over households that do not, indicating that remittances are transforming social institutions.

Carling (2014) uses a “scripts” approach to explain the expenditure behavior of remittance recipients and transformations in social and non-economic institutions. This approach in the context of the present paper is more appropriate because the NELM's focus on economic utility may obscure the relational aspects of remittances (Åkesson 2011), which appear to be a dominant factor for interpreting the expenditures patterns of Uzbek households receiving remittances. Indeed, migrants may “authorize” (one of the scripts suggested by Carling (2014)) particular expenditures on the migrant's behalf, households may “pool” (another script proposed by Carling (2014)) their resources for the wedding ceremony purposes. Modern information and communication technologies (ICT), in turn, enable migrants to monitor how remittances are spent, which imbues expenditures with the identity of the remitter (Åkesson 2011). Thus, the “scripts” framework differs from the NELM because it may explain the spending behavior of households based not exclusively on motivations to remit but also on expectations of a remitter how the remitted money should be spent. These expectations, in turn, could be impacted and shaped by the environment migrants live and work that could result in shifts in the perceptions of appropriate spending behavior that is prevailing in their home country.

Even though the empirical evidence that a big part of remittances is spent on conspicuous consumption remains limited, several studies voiced concerns about wasting the income from remittances in the status-oriented consumption of goods and services (Airola 2007; Carling 2008; Zarate-Hoyos 2004). Day and Içduygu (1999) use interviews with migrant households to demonstrate some cases of conspicuous consumption. Likewise, Tabuga (2007), using quantile regressions, shows that remittance-receiving households allocate more to conspicuous consumption in the Philippines than their peers that do not receive remittances. Since data for leisure were not disaggregated, Tabuga recommends a more detailed study of leisure, and we respond to this call by focusing on a specific type of family occasion (wedding ceremonies) for the case of Uzbekistan. Contrary to these findings, De and Ratha (2012) document that remittances in Sri Lanka do not have a statistically significant impact on another type of conspicuous consumption—the accumulation of ‘luxury’ assets like motor vehicles and land.

Studies applying advanced econometric methods to identify the relationship between remittances and household expenditures in Central Asia remain scant. One of the few such examples is Clément (2011), who applies PSM analysis to a dataset for Tajikistan to show that households that receive remittances spend more on food, non-food items, and health than do households that do not. Analogously to Kakhkharov et al. (2020), Clément (2011) finds no evidence of a significant effect of remittances on education expenditures.

Uzbekistan is the most populous (33.5 million inhabitants) and the primary migrant worker sending country in the former USSR. Russia and Kazakhstan are the main destinations for the predominantly seasonal labor migration of migrant workers from Uzbekistan. Estimates indicate about 2.5 million Uzbek labor migrants are abroad, with some two million working in Russia (IWPR 2021). These migratory flows have complex repercussions on the societies and economies of Russia, Kazakhstan, and impoverished Uzbekistan. Labor out-migration eases unemployment-fueled social tension and political instability (Laruelle 2007). For example, despite travel restrictions introduced during the Covid-19 pandemic, the total volume of recorded remittances from Russia to Uzbekistan reached US\$ 4.24 billion in 2020 (Central Bank of Russia 2020). This makes up roughly 7.6% of Uzbekistan’s GDP. Remittances from Kazakhstan appear to be small at US\$ 351 million (TASS 2021). However, the long land border between Uzbekistan and Kazakhstan and the visa-free regime may have facilitated the informal flow of remittances. The figures for officially recorded remittances may significantly underestimate the volume of total remittances (Kakhkharov et al. 2017).

Empirical research on the relationship between remittances and household consumption in Uzbekistan is scant. Kakhkharov et al. (2020), using data from the World Bank/GIZ Uzbekistan Jobs, Skills, and Migration Survey, find that remittance-receiving households spend a significantly smaller part of their budgets on food and health, and a larger part of their total expenditures on non-food consumption. Since Kakhkharov et al. (2020) use instrumental variable estimations to correct for endogeneity and this strategy relies on the robustness and quality of available instruments, the results are highly sensitive to the quality of the instruments (Adams 2010).

Ritual ceremonies in Uzbekistan, especially wedding celebrations, have been an object of study for researchers from many areas, including anthropology, sociology, and ethnography. Agadjanian and Makarova (2003) argue that the practice of giving and taking gifts and holding expensive wedding ceremonies in Uzbekistan is rooted in the Soviet system, where investment opportunities were limited, and shortages of goods were widespread, so households showed their status through the accumulation and display of consumer goods. Since the Soviet system placed particular importance on marriage, weddings became the central occasion for demonstrative exchanges of wealth between families (Humphrey 1983). Makarova (1999) notes that this form of conspicuous consumption reached extraordinary lengths in Uzbekistan because of the tradition of gift exchanges and building networks through these exchanges.

Despite almost thirty years of transition to a market economy and a greater variety of choices for consumers, investment opportunities in Uzbekistan remain inadequate. The challenges Central Asia and Uzbekistan face regarding improving their investment climate are related to institutional governance, such as the government's effectiveness, regulatory quality, the rule of law, corruption, and the peculiarities of the legacy of the Soviet period (Kakhkharov 2019; Kakhkharov and Akimov 2018). Central Asian countries rank among the lowest in the world in the World Bank indicators of the quality of governance.

Notwithstanding some regional variations in the wedding-related exchanges of gifts, both the groom's and the bride's sides are expected to make significant contributions to the exchanges and spend heavily on the wedding itself. For instance, Irnazarov (2015) estimates that wedding costs may exceed twice the annual per-capita income in Uzbekistan. Urinboyev and Svensson (2013) emphasize the role of weddings in providing ritualistic symbolism through which individuals and groups can display their social status and power and shape their relationships with one another. Wedding celebrations may even blur the boundaries between gifts and bribes in a country whose economy tends to be based on informal and kinship networks. Ilkhamov (2013) identifies two reasons that most remittances are spent on traditional rites like weddings: (i) the perception of such ceremonies as a kind of investment in solidarity networks and (ii) the desire to maintain social status and prestige in the local community. Ilkhamov (2013) concludes that these expectations often turn out to be illusory and that they drive already low-income families into deeper poverty. Social anthropologist Reeves (2012) shows that the earnings of labor migrants in Kyrgyzstan have become the main source of money for ritual feasting, including wedding celebrations. However, Linssen et al. (2011) regression analyses show that the quest for social status through lavish weddings in India may not bring satisfaction or happiness, as those who spent more on conspicuous consumption, regardless of their income, reported lower levels of subjective well-being.

3 Data description and methodology

3.1 Data

Data for this study come from the survey on jobs, skills, and migration of citizens in Uzbekistan developed and conducted jointly by the German Society for International Cooperation (GIZ) and the World Bank in 2013. The survey is representative at the national, regional, and urban/rural levels. The survey employed two tools: a core questionnaire and a skills questionnaire. The sample size of the core questionnaire was 1500 households (8,622 individuals). One adult per household was randomly selected to partake in the skills questionnaire, so the second questionnaire's sample consisted of 1500 individuals (Ajwad et al. 2014).

The focus of the core questionnaire was on education, employment, migration, health expenditures, remittances, government transfers, financial services, subjective poverty, housing conditions, and household expenditures. The skills questionnaire, in turn, contains modules on labor and work expectations, migration and preparation for migration, language skills, and technical skill training.

Table 1 demonstrates the descriptive statistics, which shows that 28% (404 out of 1432) of households received remittances and that about 78% of those households had a migrant laborer in another country.¹ Therefore, it appears that it is predominantly households with migrants that have access to remittances, while 22% of households may be receiving remittances from extended family members, friends, or distant relatives. The mean household size is greater for households that receive remittances than households that do not (6.28 individuals vs. 5.49), which may signify a high dependency ratio that drives labor migrants out of Uzbekistan in search of higher income to support dependents. The share of household members aged 60 and older is higher among households that do not receive remittances and do not have labor migrants. Perhaps in the absence of an adequate public aged-care system in Uzbekistan, the younger generation usually takes care of the older generation. Young people with no old age people in their household may be free to travel abroad. The share of employed individuals (in all types of jobs) is lower among remittance-receiving households, probably because these households send migrants to work in other countries. In addition, 74% of the remittance-receiving households are in rural areas, so labor migration in Uzbekistan originates primarily from rural Uzbekistan, where traditions and rituals are likely to be especially entrenched. Households that receive remittances also have less higher education, so most laborers from Uzbekistan go abroad to do unskilled works (UNDP 2008). More than 40% of household members work in the occasional, temporary, or informal sector.

¹ All descriptive statistics tables in this paper show that the sample size varies from one variable to the next and that the number of observations in the regressions is lower than the highest observations in the descriptive statistics tables because of missing values.

Table 1 Descriptive statistics, means comparison *t*-test. *Source*: Uzbekistan Jobs, Skills, and Migration Survey

	Households without remittances		Households with remittances		Difference	P-value
	Mean	Households	Mean	Households		
Household size (number of household members)	5.49	404	6.28	404	- 0.79	0.00
Multi-generational household	0.50	450	0.55	450	- 0.06	0.04
Share of children under 7 years old	0.12	404	0.12	404	0.00	0.96
Share of household members 60 and older in working-age households	10.43	404	6.67	404	3.77	0.00
Share of members in their working age (16 to 60 years old) in households	63.81	404	69.17	404	- 5.36	0.00
Share of female members aged 16 to 60	53.43	404	48.56	404	4.88	0.00
Dummy: 1 if a household sent a migrant in the past, 0 otherwise	0.06	404	0.78	404	- 0.72	0.00
Dummy: 1 if a household is located in a rural area; 0 otherwise	0.59	450	0.74	450	- 0.14	0.00
Self-employed with hired labor as a share of members aged 16 to 60	27.00	404	14.88	404	12.12	0.00
Self-employed without hired labor as a share of members aged 16 to 60	9.24	404	3.70	404	5.53	0.00
Household members employed in an occasional job as a share of members aged 16 to 60	5.07	404	3.71	404	1.36	0.10

Table 1 (continued)

	Households without remittances	Mean	Households with remittances	Mean	Difference	P-value
Household members employed in a temporary job as a share of members aged 16 to 60	1011	6.53	404	4.20	2.33	0.03
Household members employed in a permanent job as a share of members aged 16 to 60	1011	31.57	404	17.26	14.31	0.00
Household members employed in an informal job as a share of members aged 16 to 60	1011	30.02	404	21.42	8.60	0.00
Dummy: 1 if a household head has a higher education; 0 otherwise	1050	0.20	450	0.13	0.07	0.00
Dummy: 1 if a household head is a female; 0 otherwise	1050	0.24	450	0.20	0.05	0.05
Dummy: 1 if a household head is married; 0 otherwise	1050	0.74	450	0.80	-0.06	0.02
Dummy: 1 if a household head is an agricultural worker; 0 otherwise	1050	0.13	450	0.16	-0.03	0.16
Head retired	1050	0.37	450	0.29	0.08	0.00
Head's age	1050	53.25	450	52.70	0.55	0.47

3.2 Methodology

A method that is sometimes used to identify the impact of remittances on household expenditures is comparing the means of interest for remittance recipients and non-recipients to reveal the differences between the two. However, this method assumes the recipient and non-recipient households are randomly assigned, as in a controlled experiment, or that their characteristics are identical (Kakhkharov and Ahunov 2020). Still, households that send a migrant laborer and receive remittances may differ substantially from households that do not. For instance, one household having more dependents than another could affect the outcome variables, making it almost impossible to establish if differences in the observable outcomes are due to treatment effects of remittances or the difference in the number of dependents (Kakhkharov and Ahunov 2020). Even so, a juxtaposition of means could help set the stage for further analysis of how households whose exposure to remittances differs spend their income.

Although in some contexts, it might be incorrect to see migrants as “members of specific households in the country of origin (Brown et al. 2014), the surveys and research in the context of Uzbekistan indicate that the model of the household assumed in this study fits the social reality of migration. For example, responding to the Juraev (2012) survey, 28 out of 30 households informed that the decision regarding the migration of a family member was taken in a family council. As to the motivation of the families to send a member to work abroad, households in the survey indicated “construction of a house,” “gathering money for a wedding,” a desire to buy a car for the family, and a need for start-up capital for entrepreneurship activity as the driving factors in making the migration decision. All of these factors appear to be household-level goals. Therefore, it is apparent that households jointly decide to send a family member to work abroad with the hope of receiving remittances that will be pooled within the household. The temporary and seasonal character of migration in Central Asia might be a factor too, as in most cases migrants are expected to return home for holidays or permanently and remain part of their household.

In addition to comparing the means, we estimate the effect of remittances on household expenditures using PSM methodology and control for several characteristics that may impact the receipt of remittances. In the present research context, the PSM method introduced by Rosenbaum and Rubin (1983) involves matching households that receive remittances with those that do not but have close propensity scores comparable based on the observed characteristics. The average treatment effect is given by the difference in expenditure patterns between the two groups. The matching method has the edge over other methods used to study the impact of remittances (e.g., IV, OLS supplemented by the Heckman two-step procedure) because it does not require parametric functional form and exclusion restrictions (De and Ratha 2012). In addition, Dehejia and Wahba (2002) show that PSM’s estimates of the treatment effects are superior to those of the parametric techniques.

The PSM is the appropriate approach for empirical investigations of households’ expenditure decisions because the PSM helps reduce the selection bias linked to observed differences in the socioeconomic characteristics between households that

receive remittances and those that do not. Since the treatment is assumed to be random for households with similar values in the explanatory variables, we can use the outcomes of similar households that were not treated to estimate untreated outcomes. In other words, for each household that receives remittances, we attribute the missing outcome by finding other households in the data whose predictors are similar but not exposed to the treatment.

For the PSM methodology to produce good results and to decrease the chance of bias, the treatment group (remittance recipients) and the control group (non-recipients) must be located in the same market, the outcome variables must be measured using the same methodologies for both groups, and the dataset must cover a large number of characteristics that would capture ‘non-ignorable’ determinants (Heckman et al. 1997; LaLonde 1986; Smith and Todd 2005). All these conditions based on observable characteristics are met in the present research. However, we must admit that unobserved pre-migration factors cannot be orthogonal to the migration/remittance decision.

The empirical approach can be summarized as follows. D_i is a dummy variable that equals 1 if a household i is a treated household (i.e., the household receives remittances), and 0 otherwise. Y_{i1} and Y_{i0} are outcome variables that describe household expenditure patterns for unit i , conditional on the presence and absence of the treatment, respectively. The treatment effect for any i measures the difference between the outcome indicator with the treatment and the outcome indicator without the treatment and is given by:

$$\Delta Y_i = E(Y_{i1} | D_i = 1) - E(Y_{i0} | D_i = 0)$$

While we can observe the outcome that is affected by the treatment, the non-treatment outcome is not observable because, in cross-sectional household surveys, one cannot observe a household in two states (receiving and not receiving remittances) at the same time, so the parts of the equations $E(Y_{i1} | D_i = 1)$ and $E(Y_{i0} | D_i = 0)$ are observable from the survey, whereas $E(Y_{i1} | D_i = 0)$ and $E(Y_{i0} | D_i = 1)$ are not. This is the fundamental missing value or counterfactual problem that the Rosenbaum–Rubin framework deals with in the PSM framework. PSM estimators pair each treated observation (households that receive remittances) with the counterfactual observation in terms of its propensity score to solve the evaluation problem.

The critical conjecture of PSM methodology is the *conditional independence assumption*, which requires the common variables that affect treatment assignment and treatment-specific outcomes to be observable (Rosenbaum and Rubin 1983). This assumption allows us to pair households that receive remittances with other households like them, except that they do not receive remittances.

The first step of the PSM methodology is to estimate the households’ probability of receiving the treatment (i.e., receiving remittances) using observed socioeconomic variables and any probability model (Caliendo and Kopeinig 2008). We use a logit model to deduce these propensity scores—the predicted probability of receiving remittances conditional to the characteristics included in the model. In the second step, using the estimated propensity scores, we match remittance-receiving households with non-recipient households chosen using nearest-neighbor matching with replacement and kernel matching. In nearest-neighbor matching with replacement, we match each

remittance-receiving household with a household with no remittance income that has the closest propensity score to that of the remittance-receiving household. The replacement option allows a household with no remittance income to be used as a match more than once. Although matching with replacement could affect estimates' variance, the alternative approach (matching without replacement) increases the potential for bias by matching with control observations whose scores may differ significantly. In short, allowing replacement improves the quality of matching and decreases bias.

The kernel-matching estimator compares the outcome variable of each treated unit to the average outcome of a group of non-treated households, where the weight of each household in the comparison group is proportional to the proximity of the household's outcome to that in the comparison group. One of the advantages of this approach is that it lowers the variance by using more information, but a major drawback is that it may use observations that could be bad matches. To determine the control group's weights, we use bi-weight kernel-matching, where households with no remittance income but a high propensity to be in the group of remittance-receiving households are assigned double weight. In so doing, we ensure that we select the most similar households, and by applying both methods and conducting balancing tests, we can determine whether the results are robust to matching methods.

To test the robustness of our results, we also applied additional matching techniques – radius and Mahalanobis distance matching. Dehejia and Wahba (2002) suggest radius matching, the basic idea of which is to use not only the nearest neighbor within each caliper but all of the comparison members within the caliper. An advantage of this method is that it uses only as many comparison units as are available within the caliper and therefore allows for usage of extra (fewer) units when suitable matches are (not) available (Caliendo and Kopeinig 2008). Mahalanobis distance matches observations that are closely based on a distance called the Mahalanobis distance. For two observations to have a Mahalanobis distance of 0, they must have the same covariate values. The more different the covariate values, the larger the Mahalanobis distance. The advantage of Mahalanobis matching is that if it is possible to find control observations close to the treated observation on the Mahalanobis distance, each pair will have similar covariate values, and the distribution of the covariates in the treatment groups in the matched sample will be equal.

One of the limitations of PSM is that it assumes that a set of observable variables captures all of the relevant differences between the treated and untreated groups, so the non-treatment outcome is independent of treatment status, conditional on those characteristics (Jimenez-Soto and Brown 2012; Smith and Todd 2005). The unobserved variables like motivation, perseverance, and altruism that may affect remittance decisions may also affect the remittance decision. To decrease the potential for such a hidden variable bias, we use many explanatory variables, as recommended in the literature (LaLonde 1986; Smith and Todd 2005).

4 Results and tests

4.1 Results

Table 2 compares the means of household expenditures, in logs of Uzbek soums, as a share of total expenditures and a percentage of total income for households that receive remittances and those that do not. The results indicate that households that receive remittances have higher income and spend more on large items of household consumption (car maintenance, home improvement, small electric items, and appliances), clothing & footwear, and ambulatory health care. Other differences are insignificant both economically and statistically.

Table 2 shows that the income of remittance recipients is twice their expenditures, whereas the income of households without remittances exceeds their expenditures by only 61%. What's more, households that do not receive remittances spend a larger share of their total expenditure budgets and a larger share of their total income on food and non-food items. In comparison, remittance recipients spend a larger share of both on large items of household consumption. In addition, households that do not receive remittances spend a greater share of their income on wedding gifts than those that receive remittances. The share of income they spend on traditional ceremonies in their income is also greater, but this is only statistically significant at a ten percent confidence level.

Estimating what determines whether a household will receive remittances is part of applying PSM analysis. The variables to be included must be relevant to the decision to send remittances. To avoid endogeneity-related issues, the independent variables must not directly impact household expenditures other than through remittances. Omitting variables that may influence this decision may result in biased estimates (Dehejia and Wahba 1999). Therefore, the selection of the covariates must be based on sound knowledge of the institutional setting and the results of previous research (Caliendo and Kopeinig 2008; Sianesi 2004; Smith and Todd 2005).

We identified several explanatory variables in the propensity score estimation based on prior literature. In particular, these variables include household characteristics (household size and the number of children and elderly dependents, adults of working age, and women), location (urban, rural), and characteristics of the head of household (education, sex, marital status, age, occupational status related to agriculture or not), and past migration experience. These characteristics are all standard determinants of remittances used in PSM models that evaluate the impact of remittances on household behavior (Clément 2011; Cox-Edwards and Rodríguez-Oreggia 2009). We also included household members' employment characteristics, which might influence the decision to migrate for work (Jimenez-Soto and Brown 2012).

Propensity scores are calculated from the logit model presented in Table 3 and estimated for households that receive part of their income from remittances. The dependent variable is a binary variable that equals 1 when a household receives remittances and 0 otherwise.

The explanatory power of the logit model for receipt of remittances is good, as the pseudo-R-squared is 45%. The most significant determinant of remittances is past

Table 2 Mean differences in household spending, *t*-test: in logs, percent of total expenditures, and percent of total income

	Type of comparison	HHs without remittances		HHs receiving remittances		Difference	<i>p</i> -value
		Obs	Mean	Obs	mean		
Household income	Log of values	893	8.99	392	9.22	-0.23	0.00
	% of total expenses	893	161.7	392	201.5	-39.84	0.00
Total food expenses	Log of values	1050	7.60	450	7.58	0.02	0.72
	% of total expenses	1050	38.76	450	34.41	4.35	0.00
Basic non-food consumption	% of total income	893	36.86	392	32.61	4.25	0.07
	Log of values	1050	6.98	450	6.92	0.06	0.32
(cosmetics, personal care, household supplies and cleaning products, etc.)	% of total expenses	1050	21.74	450	19.04	2.70	0.00
	% of total income	893	23.32	392	17.89	5.43	0.01
Clothing & Footwear	Log of values	1050	6.00	450	6.34	-0.34	0.00
	% of total expenses	1050	12.13	450	12.37	-0.24	0.67
Non-food household articles and services	% of total income	893	12.59	392	11.67	0.91	0.40
	Log of values	1050	3.04	450	3.16	-0.12	0.39
(dishes, tools, linen, bank fees, notary, etc.)	% of total expenses	1050	1.79	450	1.87	-0.08	0.69
	% of total income	893	1.85	392	1.99	-0.14	0.63
Large items of non-food consumption (car maintenance, home improvements, small electric items, etc.)	Log of values	1050	3.12	450	4.02	-0.90	0.00
	% of total expenses	1050	5.46	450	10.36	-4.90	0.00
Marriage gifts (traditional)	% of total income	893	7.61	392	12.68	-5.07	0.01
	Log of values	627	4.52	290	4.56	-0.05	0.26
	% of total expenses	627	1.84	290	1.63	0.21	0.06
	% of total income	563	1.56	247	1.29	0.27	0.03

Table 2 (continued)

Type of comparison	HHs without remittances		HHs receiving remittances		Difference	
	Obs	Mean	Obs	mean	Difference in means	p-value
Costs for ceremonies marriage, birth, funeral, etc	718	5.00	336	5.10	- 0.10	0.17
	718	3.82	336	3.69	0.13	0.75
Pre-school children schooling cost	616	4.69	294	3.16	1.53	0.10
	1050	3.88	450	3.86	0.01	0.95
Total formal education expenditures, (fees uniform, textbooks, supplies, etc.)	1050	6.91	450	6.66	0.25	0.68
	893	7.11	392	7.19	- 0.08	0.94
Private tutoring	1050	0.25	450	0.39	- 0.14	0.01
	1050	0.06	450	0.08	- 0.02	0.29
Health care spending, hospitalization	893	0.06	392	0.08	- 0.02	0.37
	1050	0.50	450	0.45	0.05	0.56
Health care spending, ambulatory	1050	0.16	450	0.17	- 0.01	0.80
	893	0.24	392	0.14	0.10	0.43
Health care spending, hospitalization	1050	1.80	450	1.94	- 0.14	0.39
	1050	2.59	450	2.41	0.18	0.62
Health care spending, ambulatory	893	2.87	392	2.48	0.39	0.50
	1050	2.34	450	2.84	- 0.50	0.01
Health care spending, ambulatory	1050	6.69	450	8.83	- 2.14	0.01
	893	11.12	392	14.00	- 2.88	0.30

Table 3 Determinants that a household receives remittances, logit model

Household size (number of household members)	0.11 (0.27)
Share of members under the age of 7	0.32 (0.80)
Share of members aged 60 and older	– 0.00 (0.01)
Share of members aged 16 to 60	0.01 (0.01)
Share female members aged 16 to 60	– 0.00 (0.01)
Dummy: 1 if a household sent a migrant in the past, 0 otherwise	3.91*** (0.20)
Dummy: 1 if a household is in a rural area; 0 otherwise	0.07 (0.20)
Share of self-employed with hired labor	– 0.00 (0.01)
Share of self-employed without hired labor	– 0.02*** (0.01)
Share of members employed in an occasional job	0.00 (0.01)
Share of members employed in a temporary job	– 0.00 (0.01)
Share of members employed in a permanent job	– 0.00 (0.00)
Share of members employed in an informal job	0.00 (0.00)
Dummy: 1 if a household head has a higher education; 0 otherwise	– 0.02 (0.25)
Dummy: 1 if a household head is a female; 0 otherwise	– 0.58 (0.36)
Dummy: 1 if the household head is married, and 0 otherwise	– 0.61* (0.36)
Head's age	2.00 (8.38)
Head's age squared	– 0.32 (1.09)
Constant	– 4.50 (15.86)
Observations	1415
Pseudo- R^2	0.45
L1	– 461.67

Table 3 (continued)

chi2	769.25
<i>P</i>	0.00

Standard errors in parentheses

* $p < 0.1$, *** $p < 0.01$

migration experience, self-employment of household members, and a married status of the head of household. The finding that migration experience increases the likelihood that a household receives remittances is consistent with Clément (2011) results. The presence of self-employed members in the household is negatively related to receipt of remittances, perhaps because migration and self-employment are substitute activities. The probability that a household receives remittances decreases if the household head is married, possibly because having an additional adult increases income and decreases the need for migration-related remittances. This interpretation is confirmed by analyzing the variation in household composition presented in Table 1 with descriptive statistics. Although the descriptive statistics indicate that half of the households are multi-generational, in only 29% of households receiving remittances, the head of the household is retired. For households not receiving remittances, this indicator stands at 37%. Juraev (2012) survey of 150 migrants also indicates that having an additional member in a family who has a monthly income increases the likelihood of migration by decreasing the family's financial burden shared with someone else. The statistically significant result for self-employed households and borderline-significant result for married heads of household indicate that migrating to send remittances home is primarily a strategy for coping with unemployment and relative poverty in Uzbekistan.

While PSM can address issues of endogeneity that arise from selection bias, we need to be satisfied that the main independent variable of interest to us is not endogenous because of reverse causality. For example, remittance-receiving households may pressure migrants to remit when they expect to have wedding celebrations causing more expenditure on wedding ceremonies and more remittances. Since our estimations show that remittance-receiving households spend a smaller share of their budget on wedding ceremonies than households that do not receive remittances, endogeneity is not likely to be an issue. Nevertheless, to ease concerns about endogeneity regarding other expenditures, we also estimated the logit model with an alternative set of variables, such as rural dummy and community level remittances. We found no significant effect on the estimations reported in this paper.²

The next step of our PSM estimations is to compare households with and without remittances in terms of their spending on certain household items. We use the estimated coefficients from the logit model to calculate the predicted probability that each household receives part of its income in the form of remittances. Thus, each household that receives remittances was matched with the non-recipient household using the nearest-neighbor matching with replacement and kernel-matching procedures. The treatment effects for remittances are reported in Table 4.

Table 4 shows that households that receive remittances spend more on large non-food items (e.g., car maintenance, home improvements, small electric appliances).

² Results are available from the authors.

Table 4 Propensity matching differences in household spending in percent of total annual expenditures

(1)	Matching method (2)	Treated (3)	Control (4)	Difference (5)	SE (6)	T-stat (7)
Total food expenses	NN2 ^a	34.26	37.39	- 3.13	2.28	- 1.37
	Kernel bi-weight	34.26	38.11	- 3.86	2.14	- 1.80*
Basic non-food consumption (cosmetics, personal care, household supplies, etc.)	NN2	19.19	23.78	- 4.59	1.77	- 2.59***
	Kernel bi-weight	19.19	21.12	- 1.93	1.60	- 1.21
Clothing & Footwear	NN2	12.19	10.89	1.30	1.36	0.96
	Kernel bi-weight	12.19	11.74	0.45	1.14	0.39
Non-food household articles and services (dishes, tools, linen, bank fees, notary, etc.)	NN2	1.88	1.65	0.23	0.46	0.49
	Kernel bi-weight	1.88	1.61	0.28	0.37	0.75
Large items of non-food consumption (car maintenance, home improvements, etc.)	NN2	10.41	6.38	4.04	1.50	2.69***
	Kernel bi-weight	10.41	6.77	3.64	1.41	2.59***
Marriage gifts (traditional)	NN2	1.62	1.75	- 0.12	0.23	- 0.53
	Kernel bi-weight	1.62	1.95	- 0.33	0.23	- 1.45
Costs for ceremonies marriage, birth, funeral, etc	NN2	3.77	3.11	0.66	1.38	0.48
	Kernel bi-weight	3.77	3.50	0.27	0.90	0.30
Pre-school children schooling cost	NN2	6.71	5.83	0.88	1.18	0.75

Table 4 (continued)

(1)	Matching method (2)	Treated (3)	Control (4)	Difference (5)	SE (6)	T-stat (7)
Total formal education expenditures (fees, uniform, textbooks, supplies, and etc.)	Kernel bi-weight	6.71	7.67	- 0.96	1.20	- 0.80
	NN2	0.07	0.02	0.06	0.03	2.08**
Private tutoring	Kernel bi-weight	0.07	0.02	0.05	0.04	1.28
	NN2	0.17	0.11	0.06	0.13	0.47
Health care spending, hospitalization	Kernel bi-weight	0.17	0.10	0.07	0.09	0.76
	NN2	2.45	3.35	- 0.90	1.04	- 0.87
Health care spending, ambulatory	Kernel bi-weight	2.45	3.07	- 0.61	0.73	- 0.85
	NN2	8.76	7.36	1.40	1.94	0.72
	Kernel bi-weight	8.76	6.02	2.74	1.59	1.73*

^aNN2 stands for 'two nearest neighbors.'

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

They spend less on food and basic non-food household items (e.g., cosmetics, personal care, household supplies). There is also evidence that remittances increase the share of healthcare expenditures and formal education, although the education expenditures account for a small portion of the households' budgets. These effects confirm that migration and its associated remittances are not a strategy for meeting basic needs for most households. As to expenditures on wedding ceremonies, the difference in the proportion of household budgets spent on traditional ceremonies (e.g., marriage, birth, funeral) is small and statistically insignificant, perhaps because data at hand show total expenditure on traditional ceremonies, but not on weddings specifically. In other words, expenditures on weddings are not reported separately from those on smaller ceremonies, such as birthdays.

To isolate expenditures on wedding ceremonies, we filtered the sample by the minimum expenditure required to conduct a wedding ceremony based on the observation that weddings are the costliest type of traditional ceremony (Ilkhamov 2013) and separated a subsample of households that held weddings in the year before when the survey was conducted. To accomplish this filtering, we used data from the Social Development Research Cooperation Project (SDRC), which was conducted in Uzbekistan in 2001, and surveyed households on the cost of wedding ceremonies. Respondents in the SDRC project reported that the minimum wedding costs were US\$ 170 in Fergana city and neighboring rural areas in 2001. Considering the dollar inflation rate of about 3% annually, the minimum cost of a wedding party in 2012 (the year when the Labor Skills Survey was conducted in Uzbekistan) was about US\$200. The local currency equivalent of this dollar amount at the prevailing curb³ market foreign exchange rate in 2012 was about UZS (Uzbek soums) 500,000, so this amount was used as a filter to select the households that conducted wedding ceremonies. Other ceremonies included in this expenditure item in the survey (funerals events) cost much less (Ilkhamov 2013). We also considered the possibility that households may have conducted two modest wedding ceremonies. However, the survey data show that only 5% of households spend more than UZS 1,000,000 (sufficient for two modest wedding ceremonies) on traditional ceremonies.

The descriptive statistics for the subsample that held wedding celebrations are shown in Table 5. The table shows that the characteristics of this subsample are broadly similar to those of the total sample.

Table 6 compares the means of household expenditures in logs of Uzbek soums as a share of total expenditures and as a percentage of total income for households that receive remittances and those that do not for the subsample of households that held wedding celebrations. This subsample's expenditure patterns are similar to those of the entire sample. Households that receive remittances have higher incomes and spend more on large items of household consumption than households that do not receive remittances.

Table 7 shows the results of estimating the determinants of households whose income includes remittances for the small subsample of households that had wedding ceremonies. Once more, the estimates are broadly similar to the logit model results for the full sample.

³ The black market for foreign exchange in Uzbekistan was the most applicable exchange rate at that time.

Table 5 Descriptive statistics. *Source:* Uzbekistan Jobs, Skills, and Migration Survey

	Households without remittances		Households with remittances		Difference	P-value
		Mean		Mean		
Household size (number of household members)	429	5.36	154	6.37	- 1.01	0.00
Multi-generational household	439	0.51	170	0.57	- 0.06	0.20
Share of children under 7 years old	429	0.10	154	0.12	- 0.02	0.13
Share of household members 60 and older in working-age households	429	11.10	154	8.18	2.93	0.08
Share of members in their working age (16 to 60 years old) in households	429	65.72	154	68.85	- 3.14	0.15
Share of female members aged 16 to 60	418	53.71	154	48.31	5.40	0.00
Dummy: 1 if a household sent a migrant in the past, 0 otherwise	429	0.05	154	0.74	- 0.69	0.00
Dummy: 1 if a household is located in a rural area; 0 otherwise	439	0.59	170	0.71	- 0.12	0.01
Self-employed with hired labor as a share of members aged 16 to 60	418	28.03	154	12.32	15.71	0.00
Self-employed without hired labor as a share of members aged 16 to 60	418	10.17	154	4.11	6.06	0.00
Household members employed in an occasional job as a share of members aged 16 to 60	418	4.79	154	2.93	1.85	0.14

Table 5 (continued)

	Households without remittances	Mean	Households with remittances	Mean	Difference	P-value
Household members employed in a temporary job as a share of members aged 16 to 60	418	6.40	154	2.77	3.64	0.04
Household members employed in a permanent job as a share of members aged 16 to 60	418	31.74	154	15.48	16.26	0.00
Household members employed in an informal job as a share of members aged 16 to 60	418	25.75	154	17.97	7.78	0.00
Dummy: 1 if a household head has a higher education; 0 otherwise	439	0.23	170	0.12	0.10	0.00
Dummy: 1 if a household head is a female; 0 otherwise	439	1.28	170	1.21	0.07	0.07
Dummy: 1 if a household head is married; 0 otherwise	439	0.71	170	0.78	-0.07	0.07
Dummy: 1 if a household head is an agricultural worker; 0 otherwise	439	0.13	170	0.13	-0.00	0.89
Head retired	439	0.41	170	0.32	0.09	0.04
Head's age	439	53.53	170	54.32	-0.80	0.49

Means comparison *t*-test. Sub-sample of households who held wedding celebrations

Table 6 Mean differences in household spending, *t*-test: in logs, percent of total expenditures, and total income

	Type of comparison	HHs without remittances		HHs receiving remittances		Difference	<i>p</i> -value
		Obs	mean	Obs	mean		
Household income	Log of values	376	8.93	148	9.07	-0.15	0.04
	% of total expenses	376	162.29	148	173.73	-11.44	0.51
Total food expenses	Log of values	439	7.49	170	7.64	-0.16	0.10
	% of total expenses	439	38.14	170	35.41	2.73	0.13
Basic non-food consumption (cosmetics, personal care, household supplies and cleaning products, etc.)	% of total income	376	36.94	148	39.65	-2.72	0.51
	Log of values	439	6.89	170	6.90	-0.01	0.91
Clothing & Footwear	% of total expenses	439	21.59	170	18.57	3.02	0.02
	% of total income	376	24.60	148	19.27	5.33	0.09
Non-food household articles and services (dishes, tools, linen, bank fees, notary, etc.)	Log of values	439	5.89	170	6.35	-0.46	0.01
	% of total expenses	439	13.71	170	13.00	0.71	0.51
Large items of non-food consumption (car maintenance, home improvements, small electric items, etc.)	% of total income	376	14.32	148	13.23	1.09	0.55
	Log of values	439	2.78	170	3.14	-0.36	0.12
Marriage gifts (traditional)	% of total expenses	439	1.72	170	1.98	-0.27	0.41
	% of total income	376	1.93	148	2.19	-0.26	0.58
	Log of values	439	2.72	170	3.58	-0.87	0.00
	% of total expenses	439	4.75	170	9.61	-4.86	0.00
	% of total income	376	7.65	148	13.66	-6.00	0.02
	Log of values	235	4.51	102	4.66	-0.15	0.03

Table 6 (continued)

Type of comparison	HHs without remittances		HHs receiving remittances		Difference	<i>p</i> -value
	Obs	mean	Obs	mean		
Costs for ceremonies marriage, birth, funeral, etc	% of total expenses	235	1.81	102	1.62	0.19
	% of total income	211	1.67	88	1.66	0.01
	Log of values	107	6.87	56	6.74	0.13
	% of total expenses	107	12.87	56	10.80	2.07
	% of total income	99	18.73	50	10.36	8.37
Pre-school children schooling cost	Log of values	439	3.75	170	3.52	0.23
	% of total expenses	439	6.39	170	6.16	0.24
	% of total income	376	6.56	148	8.22	- 1.67
	Log of values	439	0.24	170	0.18	0.06
	% of total expenses	439	0.05	170	0.05	0.00
Total formal education expenditures (fees, uniform, textbooks, supplies, etc.)	% of total income	376	0.06	148	0.09	- 0.03
	Log of values	439	0.59	170	0.34	0.25
	% of total expenses	439	0.21	170	0.15	0.06
	% of total income	376	0.42	148	0.08	0.33
	Log of values	439	1.85	170	2.04	- 0.19
Health care spending, hospitalization	% of total expenses	439	2.79	170	2.32	0.47
	% of total income	376	2.90	148	3.11	- 0.21
	Log of values	439	2.28	170	3.02	- 0.74
	% of total expenses	439	6.55	170	8.22	- 1.67
	% of total income	376	10.56	148	16.43	- 5.87
Sub-sample of households who held wedding celebrations						

Table 7 Determinants of households whose incomes include remittances, logit model

	(1)
Household size (number of household members)	– 0.28 (0.39)
Share of members under the age of 7	2.08 (1.37)
Share of members aged 60 and older	0.01 (0.02)
Share of members aged 16 to 60	0.00 (0.01)
Share female members aged 16 to 60	– 0.01 (0.01)
Dummy: 1 if a household sent a migrant in the past, 0 otherwise	3.84*** (0.34)
Dummy: 1 if a household is in a rural area; 0 otherwise	0.08 (0.31)
Share of self-employed with hired labor	– 0.01 (0.01)
Share of self-employed without hired labor	– 0.02** (0.01)
Share of members employed in an occasional job	– 0.01 (0.01)
Share of members employed in a temporary job	– 0.01 (0.01)
Share of members employed in a permanent job	– 0.00 (0.01)
Share of members employed in an informal job	0.01 (0.01)
Dummy: 1 if a household head has a higher education; 0 otherwise	– 0.16 (0.40)
Dummy: 1 if a household head is a female; 0 otherwise	– 0.44 (0.51)
Dummy: 1 if the household head is married, and 0 otherwise	– 0.12 (0.54)
Head's age	31.19* (16.76)
Head age squared	– 3.95* (2.14)
Constant	– 62.61* (32.57)

Table 7 (continued)

	(1)
Observations	572
Pseudo- R^2	0.45
L1	– 184.48
chi2	297.42
P	0.00

Sub-sample of households who held wedding celebrations

Standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 8 reports the main results of this study—the treatment effects for households that held wedding ceremonies. The subsample consists of 163 households that conducted wedding ceremonies (107 non-recipients of remittances and 56 recipients), so bi-weight kernel matching is not used because the likelihood of bad matches increases substantially with the decreased size of the sample. We use nearest-neighbor matching limited to two neighbors to increase the quality of the match. Contrary to our expectations, the results show that the treatment group allocates a significantly smaller share of household budgets to wedding ceremonies—10.62% versus 19.93%—and this result

Table 8 Propensity matching differences in household spending using nearest neighbor matching (two neighbors)

Variable name (1)	Treated (3)	Control (4)	Difference (5)	SE (6)	T-stat (7)
Total food expenses	34.99	35.33	– 0.34	4.09	– 0.08
Basic non-food consumption (cosmetics, personal care, household supplies, etc.)	18.95	21.38	– 2.43	2.71	– 0.90
Clothing & Footwear	12.12	12.85	– 0.73	2.23	– 0.33
Non-food household articles and services (dishes, tools, linen, bank fees, notary)	1.95	1.80	0.15	0.86	0.17
Large items of non-food consumption (car maintenance, home improvements, etc.)	10.04	3.66	6.38	2.58	2.47***
Marriage gifts (traditional)	1.55	2.06	– 0.50	0.50	– 1.00
Costs for ceremonies (weddings)	10.62	19.93	– 9.31	3.91	– 2.38***
Pre-school children schooling cost	6.61	10.45	– 3.83	1.93	– 1.99**
Total formal education expenditures (fees, uniform, textbooks, supplies, etc.)	0.04	0.01	0.03	0.03	1.05
Private tutoring	0.17	0.14	0.03	0.16	0.17
Health care spending, hospitalization	2.35	5.44	– 3.10	1.55	– 2.00**
Health care spending, ambulatory	8.15	4.42	3.72	3.08	1.21

Sub-sample of households who held wedding celebrations

** $p < 0.05$, *** $p < 0.01$

is statistically significant. Estimations for this subsample indicate that remittance-receiving households allocate a larger share of their expenditures to large non-food consumption items than households that do not receive remittances (10.4% vs. 3.66%). The results also show that the treatment group spends less on pre-school education, perhaps because of the loss of a family member to migration and preparations for wedding ceremonies with a smaller number of adults than the control group. Hospitalization expenditures are also smaller for remittance-receiving households, perhaps because of higher expenditures for ambulatory health care in the treatment group, which may lower the need for hospitalization. Although the coefficient for this expenditure is not statistically significant in this subsample, it is borderline significant in the full sample.

Since the data on wedding expenses focus on the amount estimated from another survey, this may result in measurement error in the outcome variable. Therefore, to show the robustness of our estimations, we used alternative cut-off points and re-ran the regressions for expenditures exceeding UZS 400,000 and UZS 600,000. The results are presented in “Tables 9 and 10 in Appendix” for the respective cut-off amounts. Even though the results are statistically less significant, both tables indicate that households receiving remittances spend a smaller share of their budget on wedding ceremonies.

To test the robustness of our results to using alternative matching methods, we also applied radius and Mahalanobis distance matching techniques. The results are reported in “Tables 11 and 12 in Appendix,” and both indicate that households receiving remittances spend a smaller part of their budget on wedding ceremonies. The effect is statistically significant using the Mahalanobis distance matching.

Some of the literature on remittances considers asset accumulation, investments in housing, and motor vehicles as types of conspicuous consumption that are less productive for economic development than expenditures on human capital (Chami et al. 2003; De and Ratha 2012). However, we argue that, in the context of Central Asia, these investments may be productive, as households may use them as collateral if they need a loan in an economy in which bank lending is driven primarily by the availability of collateral (Kakhkharov and Rohde 2020). Furthermore, since about 34% of the total workforce and almost 80% of workers in the agriculture sector in Uzbekistan are informally self-employed (Ajwad et al. 2014), these assets may be crucial in obtaining small entrepreneurship loans.

Some of these results appear at first to contrast with the finding that households that receive remittances spend more on investments in human capital (Adams and Cuecuecha 2010), as our estimations indicate that these households do not spend a significant portion of their expenditures on education. Perhaps this is partly due to the structure of Uzbekistan’s education system, where secondary education is free and compulsory. However, its citizens’ enrolment rates in tertiary education are the lowest globally, with only 9% of secondary graduates pursuing further studies. The World Bank report notes that more than half of the Uzbek students enrolled in higher education belong to households in the top consumption quintile, suggesting significant financial barriers to tertiary education (Ajwad et al. 2014), which may discourage households from investing in education.

Research in the area of conspicuous consumption finds that spending on high-status items frequently comes at the expense of fulfilling basic needs (Charles et al.

2009; Linssen et al. 2011). As Frank (2001) and Heffetz and Frank (2011) show, these status-related expenditures are often inefficient transfers from spending on healthcare, education, and savings. However, it appears that such is not the case with remittances, as remittance recipients prefer to spend on home improvements, car maintenance, and electronic appliances. As to savings, empirical research that uses the same survey as that used in this paper shows that remittance-recipient households in Uzbekistan are more likely to invest their savings in small businesses than are households that do not receive remittances (Kakhkharov 2019).

Our estimations indicate that a propensity to invest in physical assets prevails over informal institutional structures reflected in the cultural traditions that drive lavish wedding expenditures. Thus, remittance-receiving households spend less on wedding ceremonies and invest in home improvement and purchase of durables. It appears that remittance-sending labor migrants, having escaped from institutional pressures of their country of origin, channel expenditures to more pressing needs of households.

An interesting finding of the Urinboyev (2013) study is that communities in Uzbekistan are undergoing significant changes and being transformed due to migratory processes. Expenditures on lavish wedding ceremonies have a special role in boosting the social status of a household. However, this investment in social status may have a lower value for migrants/remitters as they spend most of their time abroad and their social norms and values are transformed. Other factors that play out in the context of the transformed social norms are risks, hardships, and challenges an Uzbek migrant working in Russia is facing, including xenophobic attitudes in the repressive political environment. Urinboyev (2013) reported that migrants in Russia are not living there but “are struggling to survive.” When earnings come at such a high cost and transitory, migrant households may try to avoid wasting their hard-won income in exorbitant wedding ceremonies. To all appearances, what we observe is the remitters’ desire for control over the frugal use of their remittances which Carling (2014) terms “hesitant relinquishment.”

4.2 Common support and balancing tests

If the propensity scores of large numbers of remittance-recipient households lie outside the boundaries of the distribution of propensity scores for non-recipients, evaluation bias, also known as the failure of common support, maybe at work (Heckman et al. 1997). Figures 1 and 2 plot the propensity scores to check for the overlap and the region of common support between households that receive remittances and those that do not in the PSM models estimated in this study. The figures show that the overlap between the two groups of households is small when they have high propensity scores, so the nearest neighbor with replacement provides the best matches. However, at lower propensity scores, where some households receive remittances, the overlap is large, so the nearest-neighbor with replacement is probably too restrictive and likely to produce larger standard errors than bi-weight kernel-matching would. Caliendo and Kopeinig (2008) also note that the common support condition is more important for kernel-matching than the nearest-neighbor matching because kernel-matching uses all untreated observations to estimate the missing counterfactual outcome while only the

Fig. 1 Overlap in propensity scores of households with remittances and control group. Full sample

Fig. 2 Overlap in propensity scores of households with remittances and control group. Sub-sample of households who held wedding celebrations

closest neighbor is used in the nearest-neighbor matching. Figures 1 and 2 show that the number of households that fall outside the common support region is small, so failure of common support does not pose a significant problem.

To assess the performance of the PSM methodology, we checked the matching procedure for its ability to balance the distribution of the relevant variables in the control and treatment groups; that is, we tested whether the matching procedures remove the significant differences in the means of the relevant baseline variables. To this end, we computed a statistic of standardized bias before and after matching, as Rosenbaum and Rubin (1985) suggest.

An ‘imbalance’ problem may be encountered when the treatment assignment is not random, increasing the likelihood of major differences in the distribution of characteristics between households that receive remittances and those that do not. We used

two common balancing checks: reduction in the absolute ‘standardized bias and the decrease in the pseudo-R-squared in the logit models that predict treatment before and after matching. We did not use *t*-tests for equality of means, another balancing check that is sometimes used in PSM methodology, because results from the *t*-tests are sensitive to sample size and may not be correct (Imai et al. 2008). Another deficiency of *t*-tests is that the bias reduction before and after matching is unclear (Caliendo and Kopeinig 2008).

The results of standardized bias checks are shown in “Tables 13, 14 and 15 in Appendix.” Tables 13 and 14 present the tests of the balancing hypothesis for households that receive remittances and those that do not, using both nearest-neighbor and kernel-matching for the full sample. Table 15 shows the test results for the subsample of households that had weddings celebrations. The three tables jointly show the means for the unmatched treated and control groups, the percent of initial standardized bias, *t*-statistics, and associated *p*-values for the mean difference before matching, as well as the means for the matched treated and control groups, the percent of remaining standardized bias, the percent of reduced bias, *t*-statistics, and associated *p*-value for the mean difference after matching. As the tables show, the matching method reduces bias in most of the variables.

“Tables 16 and 17 in Appendix” present the pseudo-R²-squared balance criterion, which indicates how well the explanatory variables explain the probability that the households in the two subsamples receive remittances. After matching, there should be no systematic differences in the distribution of regressors between the groups, so the pseudo-R²-squared should be lower, which Tables 16 and 17 confirm.

As a further robustness check, we also re-estimated our PSM model for expenditures exceeding UZS 500,000 with a set of covariates in the logit model where a two-sample *t*-test check does not show significant differences in covariate means for both groups. The results are presented in “Appendix B Tables 18, 19, 20, 21, 22, 23 and 24.” All estimations run with regional dummies using several matching techniques—Epanenchnikov kernel, Mahalanobis distance, radius, nearest two neighbor, and bi-weight kernel. As Tables 20, 21, 22 and 23 show, the covariates are balanced in both groups after matching. Hence, no significant differences were found, which indicates that the matching procedure can balance the distribution of the relevant variables in both the control and treatment groups. It is also remarkable, as Table 19 shows, all of the five matching methods indicate that households receiving remittances spend a smaller share of their budget on wedding ceremonies. Furthermore, despite operating with a rather small sample, the effect is statistically significant using most matching techniques. The values of the pseudo-R²-squared are also lower after matching using each of the matching techniques, as Table 24 shows.

5 Conclusion and policy recommendations

International remittances have become a prominent feature in Uzbekistan’s economic landscape. In the absence of experimental data, the results of estimating the impact of remittances on household expenditures are ambiguous. Although we observe households that receive remittances and others that do not, direct comparison of these

two groups may be problematic because receipt of remittances may be correlated with unobserved characteristics. We apply PSM methodology to the GIZ/World Bank household survey data to investigate the impact of remittances on household expenditures in Uzbekistan. When we control for factors that influence remittances, we find that households in Uzbekistan that receive remittances spend a significantly smaller portion of their budgets on wedding celebrations, a type of conspicuous consumption, than do households that do not receive remittances. Whereas previous research finds some evidence of wasting remittances on conspicuous consumption, the present study finds empirical evidence of a lower propensity of remittance recipients to engage in this kind of spending.

Spending on traditional ceremonies can be viewed positively, as these ceremonies cement social bonds and forge connections, serving as part of individuals' informal coping strategies for meeting their needs (Urinboyev and Svensson 2013). However, weddings in Central Asia are commonly used to demonstrate a family's status and compete with other households, resulting in reduced social cohesion and forcing a family into destitution (Bloch et al. 2004; Rao 2001).

Our results indicate that migration and remittances impact household expenditures not only materially by lifting budget constraints but also by transforming social norms and values. It appears that we observe what Carling (2014) termed "generic and migration-induced" aspects of remittances. Since remitters are the breadwinners, they are in a privileged situation relative to recipients and influence household spending patterns, confirming Carling (2014) conclusion that transnational relationships are rarely symmetrical.

Our research's findings suggest that the differences in wealth, savings, and consumption gaps between remittance recipients and non-recipients require further investigation, particularly in why there are such differences in households' consumption behavior. For example, remittance-receiving households may spend less on wedding ceremonies because they may have less social capital in Uzbekistan when a household member is working outside the country. Alternatively, migrant-receiving countries' economic environment features may result in migrants' developing different spending priorities, perhaps earmarking their remittances for a specific expenditure or investment item, and monitoring their use, indicating mental accounting in spending behavior. Households that receive remittances may also prioritize their expenditures differently, so they can no longer consider themselves part of the reference group in Uzbekistan, weakening the influence of the institutional setting and traditions on these households' spending behavior. Finally, all or some of these factors may be at play at the same time.

Declarations

Conflict of interest The authors declare that they have no conflict of interest.

Appendix

See Tables 9, 10, 11, 12, 13, 14, 15, 16, and 17

Table 9 Propensity matching differences in household spending using nearest neighbor matching (two neighbors)

Variable name (1)	Treated (3)	Control (4)	Difference (5)	SE (6)	T-stat (7)
Total food expenses	34.55	35.03	- 0.48	3.64	- 0.13
Basic non-food consumption (cosmetics, personal care, household supplies, etc.)	18.84	23.92	- 5.07	3.07	- 1.65
Clothing & Footwear	12.65	11.91	1.56	2.54	0.61
Non-food household articles and services (dishes, tools, linen, bank fees, notary)	2.07	1.94	0.13	0.72	0.18
Large items of non-food consumption (car maintenance, home improvements, etc.)	9.71	4.07	5.64	2.35	2.39
Marriage gifts (traditional)	1.54	2.17	- 0.62	0.35	- 1.80
Costs for ceremonies (weddings)	9.86	16.52	- 6.67	5.70	- 1.17
Pre-school children schooling cost	6.52	9.25	- 0.273	2.29	- 1.19
Total formal education expenditures (fees, uniform, textbooks, supplies, etc.)	0.06	0.01	0.04	0.05	0.90
Private tutoring	0.16	0.20	- 0.03	0.29	- 0.13
Health care spending, hospitalization	2.28	3.43	- 1.15	1.91	- 0.60
Health care spending, ambulatory	8.32	5.15	3.17	2.73	1.16

Sub-sample of households who held wedding celebrations. Ceremonies—400 and more

Table 10 Propensity matching differences in household spending using nearest neighbor matching (two neighbors)

Variable name (1)	Treated (3)	Control (4)	Difference (5)	SE (6)	T-stat (7)
Total food expenses	36.29	37.83	- 1.54	4.32	- 0.36
Basic non-food consumption (cosmetics, personal care, household supplies, etc.)	18.41	24.45	- 6.04	3.41	- 1.77
Clothing & Footwear	12.13	9.60	2.52	2.89	0.87
Non-food household articles and services (dishes, tools, linen, bank fees, notary)	1.91	2.14	- 0.23	1.11	- 0.20
Large items of non-food consumption (car maintenance, home improvements, etc.)	9.26	4.03	5.23	2.54	2.06
Marriage gifts (traditional)	1.61	1.98	- 0.38	0.38	- 1.00
Costs for ceremonies (weddings)	11.45	19.97	8.51	8.12	- 1.05
Pre-school children schooling cost	6.93	9.33	- 2.41	2.59	- 0.93
Total formal education expenditures (fees, uniform, textbooks, supplies, etc.)	0.04	0.02	0.02	0.09	0.27
Private tutoring	0.19	0.04	0.15	0.13	1.11
Health care spending, hospitalization	2.52	6.18	- 3.65	2.28	- 1.60
Health care spending, ambulatory	7.81	4.31	3.5	2.35	1.49

Sub-sample of households who held wedding celebrations. Ceremonies—600 and more

Table 11 Propensity matching differences in household spending using radius matching, at caliper = 0.1

Variable name (1)	Treated (3)	Control (4)	Difference (5)	SE (6)	T-stat (7)
Total food expenses	34.99	36.48	- 1.49	3.63	- 0.41
Basic non-food consumption (cosmetics, personal care, household supplies, etc.)	18.95	22.18	- 3.22	2.64	- 1.22
Clothing & Footwear	12.12	12.50	- 0.38	2.08	- 0.18
Non-food household articles and services (dishes, tools, linen, bank fees, notary)	1.95	1.68	0.27	0.63	0.43
Large items of non-food consumption (car maintenance, home improvements, etc.)	10.04	4.20	5.84	2.15	2.71
Marriage gifts (traditional)	1.55	2.12	- 0.57	0.37	- 1.55
Costs for ceremonies (weddings)	10.62	17.34	- 6.73	5.36	- 1.26
Pre-school children schooling cost	6.61	9.25	- 2.64	1.83	- 1.44
Total formal education expenditures (fees, uniform, textbooks, supplies, etc.)	0.04	0.02	0.02	0.06	0.24
Private tutoring	0.17	0.19	- 0.03	0.20	- 0.14
Health care spending, hospitalization	2.34	4.80	- 2.46	1.27	- 1.93
Health care spending, ambulatory	8.15	4.31	3.84	2.54	1.51

Sub-sample of households who held wedding celebrations. Ceremonies—500 and more

Table 12 Propensity matching differences in household spending using Mahalanobis-matching, at caliper = 0.1

Variable name (1)	Treated (3)	Control (4)	Difference (5)	SE (6)	T-stat (7)
Total food expenses	35.02	32.55	2.47	3.99	0.62
Basic non-food consumption (cosmetics, personal care, household supplies, etc.)	18.69	21.31	− 2.62	3.07	− 0.86
Clothing & Footwear	12.35	14.45	− 2.10	2.62	− 0.80
Non-food household articles and services (dishes, tools, linen, bank fees, notary)	1.91	2.17	− 0.26	0.68	− 0.39
Large items of non-food consumption (car maintenance, home improvements, etc.)	9.94	3.76	6.18	2.51	2.46***
Marriage gifts (traditional)	1.60	1.86	− 0.26	0.29	− 0.88
Costs for ceremonies (weddings)	10.93	24.52	− 13.59	6.00	− 2.27**
Pre-school children schooling cost	6.41	10.69	− 4.29	2.53	− 1.69
Total formal education expenditures (fees, uniform, textbooks, supplies, etc.)	0.04	0.01	0.03	0.03	1.15
Private tutoring	0.16	0.24	− 0.07	0.22	− 0.34
Health care spending, hospitalization	2.44	4.16	− 1.71	2.35	− 0.73
Health care spending, ambulatory	8.30	2.17	6.13	3.58	1.71

Sub-sample of households who held wedding celebrations. Ceremonies—500 and more

Table 13 Standardized bias before and after matching: Households with remittances and without remittances as a source of income; nearest-neighbor matching (two neighbors)

Variable name	Sample	Mean		% bias	% reduced bias	t-test	
		Treated	Control			t-stats	p-value
Household size (number of household members)	Unmatched	1.76	1.67	24.50		3.54	0.000
	Matched	1.77	1.70	18.10	26.2	2.48	0.013
Share of members under age 7	Unmatched	0.11	0.12	− 7.00		− 1.00	0.317
	Matched	0.12	0.10	9.60	− 37.2	1.31	0.192
Share of members aged 60 and older	Unmatched	6.26	9.32	− 25.20		− 3.51	0.000
	Matched	6.25	6.84	− 4.80	80.8	− 0.67	0.502
Share of members aged 16 to 60	Unmatched	69.73	64.21	25.40		3.64	0.000
	Matched	69.64	72.73	− 14.20	43.9	− 1.77	0.078

Table 13 (continued)

Variable name	Sample	Mean		% bias	% reduced bias	<i>t</i> -test	
		Treated	Control			t-stats	<i>p</i> -value
Share female members aged 16 to 60	Unmatched	48.25	52.97	− 29.10		− 4.21	0.000
	Matched	48.30	47.48	5.00	82.7	0.69	0.491
Dummy: 1 if a household sent a migrant in the past, 0 otherwise	Unmatched	0.79	0.06	215.00		34.81	0.000
	Matched	0.78	0.78	0.00	100	0.00	1.000
Dummy: 1 if a household is in a rural area; 0 otherwise	Unmatched	0.75	0.63	25.60		3.65	0.000
	Matched	0.75	0.64	24.20	5.5	2.97	0.003
Share of self-employed with hired labor	Unmatched	15.55	27.07	− 44.40		− 6.03	0.000
	Matched	15.66	13.63	7.80	82.4	1.27	0.203
Share of self-employed without hired labor	Unmatched	4.20	9.14	− 30.60		− 4.02	0.000
	Matched	4.22	4.66	− 2.70	91.1	− 0.48	0.633
Share of members employed in an occasional job	Unmatched	4.11	5.06	− 6.90		− 0.96	0.335
	Matched	3.97	2.37	11.50	− 67.8	1.74	0.083
Share of members employed in a temporary job	Unmatched	4.69	6.78	− 12.60		− 1.75	0.080
	Matched	4.72	2.93	10.70	14.6	1.77	0.078
Share of members employed in a permanent job	Unmatched	18.41	32.35	− 49.00		− 6.74	0.000
	Matched	18.42	22.14	− 13.10	73.3	− 1.98	0.048
Share of members employed in an informal job	Unmatched	24.08	32.48	− 26.90		− 3.78	0.000
	Matched	23.96	23.75	0.70	97.5	0.10	0.920

Table 13 (continued)

Variable name	Sample	Mean		% bias	% reduced bias	<i>t</i> -test	
		Treated	Control			t-stats	<i>p</i> -value
Dummy: 1 if a household head has a higher education; 0 otherwise	Unmatched	0.13	0.19	− 18.90		− 2.66	0.008
	Matched	0.13	0.08	11.40	39.9	1.66	0.098
Dummy: 1 if a household head is a female; 0 otherwise	Unmatched	1.20	1.20	− 0.90		− 0.13	0.893
	Matched	1.20	1.18	4.60	− 394.3	0.57	0.566
Dummy: 1 if the household head is married, and 0 otherwise	Unmatched	0.79	0.78	4.00		0.59	0.558
	Matched	0.80	0.81	− 3.60	10.4	− 0.46	0.644
Head's age	Unmatched	3.93	3.94	− 2.70		− 0.38	0.702
	Matched	3.93	3.95	− 4.40	− 63.8	− 0.59	0.557
Head's age squared	Unmatched	15.54	15.61	− 3.60		− 0.51	0.611
	Matched	15.54	15.63	− 4.30	− 20.9	− 0.58	0.564

Table 14 Standardized bias before and after matching: Households with remittances and without remittances as a source of income; bi-weight kernel matching

Variable name	Sample	Mean		% bias	% reduced bias	t-test	p-value
		Treated	Control				
Household size (number of household members)	Unmatched	1.77	1.63	33.30		5.55	0.00
	Matched	1.77	1.74	5.70	82.8	0.91	0.36
Share of members under age 7	Unmatched	0.12	0.12	-1.70		-0.28	0.78
	Matched	0.12	0.12	-4.30	-154.6	-0.62	0.53
Share of members aged 60 and older	Unmatched	6.67	8.99	-19.30		-3.13	0.00
	Matched	6.66	7.47	-6.70	65	-1.06	0.29
Share of members aged 16 to 60	Unmatched	69.17	64.88	19.90		3.34	0.00
	Matched	69.15	68.41	3.40	82.9	0.51	0.61
Share female members aged 16 to 60	Unmatched	48.56	53.43	-28.40		-4.74	0.00
	Matched	48.61	48.91	-1.80	93.8	-0.27	0.79
Dummy: 1 if a household sent a migrant in the past, 0 otherwise	Unmatched	0.78	0.06	211.20		40.42	0.00
	Matched	0.78	0.78	0.00	100	0.00	1.00
Dummy: 1 if a household is in a rural area; 0 otherwise	Unmatched	0.73	0.60	28.20		4.70	0.00
	Matched	0.73	0.66	13.70	51.4	1.98	0.05
Share of self-employed with hired labor	Unmatched	14.88	27.00	-47.40		-7.45	0.00
	Matched	14.95	13.27	6.60	86.1	1.21	0.23
Share of self-employed without hired labor	Unmatched	3.70	9.24	-34.50		-5.23	0.00
	Matched	3.72	3.65	0.40	98.8	0.09	0.93
Share of members employed in an occasional job	Unmatched	3.71	5.07	-10.10		-1.64	0.10

Table 14 (continued)

Variable name	Sample	Mean		% bias	% reduced bias	t-test	
		Treated	Control			t-stats	p-value
Share of members employed in a temporary job	Matched	3.61	3.35	1.90	80.9	0.32	0.75
	Unmatched	4.20	6.53	-13.90		-2.19	0.03
Share of members employed in a permanent job	Matched	4.22	2.39	10.90	21.8	2.23	0.03
	Unmatched	17.26	31.57	-52.10		-8.30	0.00
Share of members employed in an informal job	Matched	17.35	18.63	-4.70	91	-0.82	0.42
	Unmatched	21.42	30.02	-28.70		-4.70	0.00
Dummy: 1 if a household head has a higher education; 0 otherwise	Matched	21.40	19.54	6.20	78.3	1.04	0.30
	Unmatched	0.13	0.20	-19.30		-3.16	0.00
Dummy: 1 if a household head is a female; 0 otherwise	Matched	0.13	0.11	4.10	78.6	0.66	0.51
	Unmatched	1.20	1.24	-9.20		-1.54	0.13
Dummy: 1 if the household head is married, and 0 otherwise	Matched	1.20	1.24	-8.50	7.3	-1.20	0.23
	Unmatched	0.79	0.74	10.00		1.68	0.09
Head's age	Matched	0.79	0.75	10.60	-5.8	1.51	0.13
	Unmatched	3.94	3.94	2.60		0.44	0.66
Head's age squared	Matched	3.94	3.97	-10.10	-280	-1.52	0.13
	Unmatched	15.60	15.56	1.80		0.29	0.77
	Matched	15.59	15.79	-10.30	-490.7	-1.55	0.12

Table 15 Standardized bias before and after matching: Households with remittances and without remittances as a source of income; nearest-neighbor matching (two neighbors)

Variable name	Sample	Mean		% bias	% reduced bias	<i>t</i> -test	
		Treated	Control			t-stats	<i>p</i> -value
Household size (number of household members)	Unmatched	1.79	1.75	11.40		0.67	0.503
	Matched	1.79	1.88	− 23.90	− 109.6	− 1.12	0.266
Share of members under age 7	Unmatched	0.11	0.09	18.00		1.10	0.273
	Matched	0.11	0.14	− 24.80	− 37.4	− 1.26	0.212
Share of members aged 60 and older	Unmatched	8.77	10.23	− 10.80		− 0.65	0.516
	Matched	8.96	8.62	2.50	76.7	0.13	0.897
Share of members aged 16 to 60	Unmatched	71.46	70.60	4.10		0.24	0.814
	Matched	71.82	71.24	2.70	32.3	0.17	0.862
Share female members aged 16 to 60	Unmatched	46.12	51.51	− 36.20		− 2.24	0.027
	Matched	46.22	43.59	17.60	51.4	0.81	0.419
Dummy: 1 if a household sent a migrant in the past, 0 otherwise	Unmatched	0.70	0.03	192.30		13.29	0.000
	Matched	0.68	0.66	5.70	97	0.21	0.834
Dummy: 1 if a household is in a rural area; 0 otherwise	Unmatched	0.77	0.82	− 11.70		− 0.70	0.482
	Matched	0.78	0.80	− 4.90	57.6	− 0.24	0.808
Share of self-employed with hired labor	Unmatched	11.30	31.51	− 76.40		− 4.15	0.000
	Matched	11.31	12.61	− 4.90	93.5	− 0.39	0.695
Share of self-employed without hired labor	Unmatched	7.70	12.27	− 22.10		− 1.20	0.230
	Matched	8.17	5.85	11.20	49.2	0.86	0.394
Share of members employed in an occasional job	Unmatched	3.72	3.91	− 1.50		− 0.09	0.930
	Matched	3.94	1.25	20.90	− 1299.7	1.22	0.225

Table 15 (continued)

Variable name	Sample	Mean		% bias	% reduced bias	<i>t</i> -test	
		Treated	Control			t-stats	<i>p</i> -value
Share of members employed in a temporary job	Unmatched	2.85	7.65	− 31.40		− 1.68	0.095
	Matched	3.02	3.60	− 3.80	87.9	− 0.28	0.780
Share of members employed in a permanent job	Unmatched	18.61	37.34	− 61.60		− 3.44	0.001
	Matched	18.39	24.23	− 19.20	68.8	− 1.33	0.186
Share of members employed in an informal job	Unmatched	26.58	29.41	− 9.40		− 0.54	0.587
	Matched	27.01	22.62	14.50	− 54.8	0.79	0.433
Dummy: 1 if a household head has a higher education; 0 otherwise	Unmatched	0.11	0.27	− 41.20		− 2.33	0.021
	Matched	0.12	0.05	18.00	56.4	1.25	0.213
Dummy: 1 if a household head is a female; 0 otherwise	Unmatched	1.23	1.14	21.90		1.34	0.181
	Matched	1.18	1.28	− 25.80	− 17.8	− 1.18	0.239
Dummy: 1 if the household head is married, and 0 otherwise	Unmatched	0.77	0.82	− 11.70		− 0.70	0.482
	Matched	0.80	0.72	19.80	− 69.6	0.93	0.354
Head's age	Unmatched	4.00	4.01	− 4.10		− 0.25	0.800
	Matched	3.99	4.05	− 25.40	− 514.8	− 1.31	0.195
Head's age squared	Unmatched	16.07	16.13	− 3.10		− 0.19	0.847
	Matched	15.99	16.41	− 24.60	− 680.9	− 1.26	0.210

Sub-sample of households who held wedding celebrations

Table 16 Pseudo- R^2 balance statistics before and after matching

	Before match	After the nearest neighbor match	After kernel-matching
Pseudo- R^2	0.464	0.052	0.019
LR Chi-square	569.47	43.39	21.11
P -value	0.00	0.001	0.274

Table 17 Pseudo- R^2 balance statistics before and after matching (restricted sample)

	Before match	After the nearest neighbor match
Pseudo- R^2	0.528	0.152
LR Chi-square	106.89	21.06
P -value	0.000	0.276

The results of matching on alternative specification

See Tables 18, 19, 20, 21, 22, 23 and 24.

Table 18 Determinants that a household receives remittances, logit model

Household characteristics		
Household size	– 0.14	(0.44)
Multi-generation household	– 0.21	(0.49)
The proportion of children under 7	1.76	(1.29)
Proportion of elderly	– 0.08	(0.66)
Migrant sending household	3.94***	(0.32)
Rural area	0.20	(0.32)
Household head characteristics		
Head is female	– 0.34	(0.43)
Log of head's age	25.58	(16.88)
Log of head's age, squared	– 3.07	

Table 18 (continued)

	(2.15)
Head married	– 0.09
	(0.46)
Head his higher education	– 0.34
	(0.34)
Head retired	– 0.49
	(0.41)
Head is an agricultural worker	0.22
	(0.43)
Observations	583
Pseudo- R^2	0.44
Log-likelihood	– 189.40
chi2	191.26
<i>p</i> -value	0.00

Standard errors in parentheses

*** $p < 0.01$ **Table 19** Propensity matching differences in household spending on wedding ceremonies as a share of total household expenditure

Matching method (1)	Treated (2)	Control (3)	Difference (4)	SE (5)	T-stat (6)
Epanechnikov kernel	9.11	17.89	– 8.78	3.89	– 2.26
Biweight kernel	9.11	18.13	– 9.02	3.88	– 2.32
Nearest 2 neighbors	8.95	18.29	– 9.34	5.52	– 1.69
Radius matching	8.95	15.94	– 6.99	3.68	– 1.90
Mahalanobis-matching	10.93	20.93	– 10.00	4.93	– 2.03

Sub-sample of households who held wedding celebrations. Cost of ceremonies—UZS 500,000 and more

Table 20 Standardized bias before and after matching: Households with remittances and without remittances as a source of income (Epanechnikov kernel matching)

Variable name	Sample	Mean		% bias	% reduced bias	<i>t</i> -test	
		treated	control			t-stats	<i>p</i> -value
Household size	Unmatched	1.79	1.74	13.90		0.81	0.42
	Matched	1.73	1.77	− 11.60	16.60	− 0.42	0.68
Multi-generational household	Unmatched	0.58	0.64	− 10.30		− 0.62	0.54
	Matched	0.56	0.72	− 33.70	− 226.50	− 1.26	0.21
Proportion of children under 7	Unmatched	0.11	0.09	18.70		1.14	0.26
	Matched	0.09	0.13	− 27.10	− 45.30	− 1.04	0.30
Proportion of elderly	Unmatched	0.09	0.11	− 15.50		− 0.91	0.37
	Matched	0.11	0.07	26.70	− 72.20	0.99	0.33
Migrant sending household	Unmatched	0.70	0.03	192.50		13.36	0.00
	Matched	0.44	0.44	0.00	100.00	0.00	1.00
Rural area	Unmatched	0.77	0.82	− 12.10		− 0.73	0.47
	Matched	0.78	0.83	− 11.70	3.10	− 0.43	0.67
Head is female	Unmatched	1.23	1.14	22.30		1.37	0.17
	Matched	1.15	1.24	− 22.40	− 0.70	− 0.80	0.43
Log of head's age	Unmatched	4.00	4.01	− 4.60		− 0.28	0.78
	Matched	4.00	4.00	0.00	99.70	0.00	1.00
Log of head's age, squared	Unmatched	16.07	16.14	− 3.60		− 0.22	0.83
	Matched	16.02	16.01	0.40	88.40	0.02	0.99
Head married	Unmatched	0.77	0.82	− 12.10		− 0.73	0.47
	Matched	0.81	0.76	14.40	− 19.20	0.51	0.61
Head his higher education	Unmatched	0.11	0.27	− 40.60		− 2.30	0.02
	Matched	0.15	0.10	12.50	69.20	0.53	0.60
Head retired	Unmatched	0.42	0.42	− 1.10		− 0.07	0.95
	Matched	0.37	0.33	7.60	− 589.50	0.28	0.78
Head is agricultural worker	Unmatched	0.15	0.21	− 14.20		− 0.83	0.41
	Matched	0.15	0.12	7.60	46.50	0.31	0.76

Regional dummies included

Table 21 Standardized bias before and after matching: Households with remittances and without remittances as a source of income (Bi-weight kernel matching)

Variable name	Sample	Mean		% bias	% reduced bias	<i>t</i> -test	
		Treated	Control			t-stats	<i>p</i> -value
Household size	Unmatched	1.79	1.74	13.90		0.81	0.42
	Matched	1.73	1.76	− 10.60	23.80	− 0.38	0.71
Multi-generational household	Unmatched	0.58	0.64	− 10.30		− 0.62	0.54
	Matched	0.56	0.72	− 34.30	− 233.00	− 1.29	0.20
Proportion of children under 7	Unmatched	0.11	0.09	18.70		1.14	0.26
	Matched	0.09	0.12	− 24.20	− 29.70	− 0.93	0.35
Proportion of elderly	Unmatched	0.09	0.11	− 15.50		− 0.91	0.37
	Matched	0.11	0.07	25.70	− 65.50	0.95	0.35
Migrant sending household	Unmatched	0.70	0.03	192.50		13.36	0.00
	Matched	0.44	0.44	0.00	100.00	0.00	1.00
Rural area	Unmatched	0.77	0.82	− 12.10		− 0.73	0.47
	Matched	0.78	0.83	− 12.70	− 4.70	− 0.46	0.64
Head is female	Unmatched	1.23	1.14	22.30		1.37	0.17
	Matched	1.15	1.25	− 26.00	− 17.00	− 0.92	0.36
Log of head's age	Unmatched	4.00	4.01	− 4.60		− 0.28	0.78
	Matched	4.00	4.00	− 2.10	54.60	− 0.08	0.94
Log of head's age, squared	Unmatched	16.07	16.14	− 3.60		− 0.22	0.83
	Matched	16.02	16.05	− 1.70	52.50	− 0.06	0.95
Head married	Unmatched	0.77	0.82	− 12.10		− 0.73	0.47
	Matched	0.81	0.74	17.80	− 47.20	0.63	0.53
Head his higher education	Unmatched	0.11	0.27	− 40.60		− 2.30	0.02
	Matched	0.15	0.09	14.10	65.30	0.61	0.55
Head retired	Unmatched	0.42	0.42	− 1.10		− 0.07	0.95
	Matched	0.37	0.35	5.00	− 355.20	0.19	0.85
Head is agricultural worker	Unmatched	0.15	0.21	− 14.20		− 0.83	0.41
	Matched	0.15	0.12	6.40	54.90	0.26	0.80

Regional dummies included

Table 22 Standardized bias before and after matching: Households with remittances and without remittances as a source of income (Nearest two neighbors)

Variable name	Sample	Mean		% bias	% reduced bias	<i>t</i> -test	
		Treated	Control			t-stats	<i>p</i> -value
Household size	Unmatched	1.79	1.74	13.90		0.81	0.42
	Matched	1.73	1.75	− 4.50	67.60	− 0.16	0.87
Multi-generational household	Unmatched	0.58	0.64	− 10.30		− 0.62	0.54
	Matched	0.57	0.66	− 18.20	− 76.40	− 0.68	0.50
Proportion of children under 7	Unmatched	0.11	0.09	18.70		1.14	0.26
	Matched	0.10	0.11	− 11.80	36.60	− 0.47	0.64
Proportion of elderly	Unmatched	0.09	0.11	− 15.50		− 0.91	0.37
	Matched	0.11	0.05	39.70	− 155.80	1.59	0.12
Migrant sending household	Unmatched	0.70	0.03	192.50		13.36	0.00
	Matched	0.43	0.43	0.00	100.00	0.00	1.00
Rural area	Unmatched	0.77	0.82	− 12.10		− 0.73	0.47
	Matched	0.75	0.77	− 4.40	63.40	− 0.15	0.88
Head is female	Unmatched	1.23	1.14	22.30		1.37	0.17
	Matched	1.14	1.16	− 4.60	79.30	− 0.18	0.86
Log of head's age	Unmatched	4.00	4.01	− 4.60		− 0.28	0.78
	Matched	4.00	3.96	16.80	− 267.40	0.70	0.48
Log of head's age, squared	Unmatched	16.07	16.14	− 3.60		− 0.22	0.83
	Matched	16.02	15.72	17.50	− 390.40	0.73	0.47
Head married	Unmatched	0.77	0.82	− 12.10		− 0.73	0.47
	Matched	0.82	0.84	− 4.40	63.40	− 0.17	0.86
Head his higher education	Unmatched	0.11	0.27	− 40.60		− 2.30	0.02
	Matched	0.14	0.05	23.00	43.40	1.11	0.27
Head retired	Unmatched	0.42	0.42	− 1.10		− 0.07	0.95
	Matched	0.39	0.27	25.20	− 2186.70	0.99	0.33
Head is agricultural worker	Unmatched	0.15	0.21	− 14.20		− 0.83	0.41
	Matched	0.14	0.14	0.00	100.00	0.00	1.00

Regional dummies included

Table 23 Standardized bias before and after matching: Households with remittances and without remittances as a source of income (Radius matching)

Variable name	Sample	Mean		% bias	% reduced bias	<i>t</i> -test	
		Treated	Control			t-stats	<i>p</i> -value
Household size	Unmatched	1.79	1.74	13.90		0.81	0.42
	Matched	1.73	1.73	0.20	98.60	0.01	0.99
Multi-generational household	Unmatched	0.58	0.64	− 10.30		− 0.62	0.54
	Matched	0.57	0.68	− 21.40	− 107.80	− 0.80	0.43
Proportion of children under 7	Unmatched	0.11	0.09	18.70		1.14	0.26
	Matched	0.10	0.11	− 10.60	43.50	− 0.41	0.69
Proportion of elderly	Unmatched	0.09	0.11	− 15.50		− 0.91	0.37
	Matched	0.11	0.08	19.50	− 25.60	0.72	0.47
Migrant sending household	Unmatched	0.70	0.03	192.50		13.36	0.00
	Matched	0.43	0.42	3.40	98.20	0.09	0.93
Rural area	Unmatched	0.77	0.82	− 12.10		− 0.73	0.47
	Matched	0.75	0.77	− 5.50	54.30	− 0.19	0.85
Head is female	Unmatched	1.23	1.14	22.30		1.37	0.17
	Matched	1.14	1.22	− 20.00	10.10	− 0.74	0.46
Log of head's age	Unmatched	4.00	4.01	− 4.60		− 0.28	0.78
	Matched	4.00	4.01	− 6.80	− 49.60	− 0.26	0.79
Log of head's age, squared	Unmatched	16.07	16.14	− 3.60		− 0.22	0.83
	Matched	16.02	16.14	− 6.70	− 87.10	− 0.26	0.80
Head married	Unmatched	0.77	0.82	− 12.10		− 0.73	0.47
	Matched	0.82	0.77	13.40	− 10.90	0.49	0.62
Head his higher education	Unmatched	0.11	0.27	− 40.60		− 2.30	0.02
	Matched	0.14	0.11	9.30	77.10	0.40	0.69
Head retired	Unmatched	0.42	0.42	− 1.10		− 0.07	0.95
	Matched	0.39	0.35	8.00	− 623.90	0.30	0.77
Head is agricultural worker	Unmatched	0.15	0.21	− 14.20		− 0.83	0.41
	Matched	0.14	0.12	6.80	52.10	0.29	0.78

Regional dummies included

Table 24 Pseudo- R^2 balance statistics before and after matching

	After matching using				
	Before match	Epanechnikov kernel	Bi-weight kernel	Nearest two neighbors	Radius matching
Pseudo- R^2	0.502	0.156	0.157	0.154	0.121
LR Chi-square	102.09	11.64	11.75	11.71	9.41
<i>P</i> -value	0.000	0.821	0.815	0.764	0.927

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