Migration, remittances and household welfare in Ethiopia

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Abstract

This paper investigates the effect of international remittances and migration on household welfare in Ethiopia. We employ both subjective (a household's subjective economic well-being) and objective measures (asset holdings and asset accumulation) to define household welfare. A matching approach is applied to address self-selection, and by exploiting information before and after the households began receiving remittances, the study sheds light on the changes in welfare associated with international migration and remittances. The results reveal that remittances have a significant impact on a welfare variable that has previously not received much attention in the migration literature, namely household subjective economic well-being. In addition, we find that remittances have positive effects on consumer asset accumulation, especially in rural areas, but no effect on productive assets.

Keywords: remittances, migration, Ethiopia, propensity score matching

JEL Classification: F22, F24, O15

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1. Introduction

According to official World Bank statistics, approximately 30 million Africans have migrated internationally, while demographic factors are likely to increase African migration rates substantially over the coming decades (World Bank 2011a). Millions of households are affected by migration through remittances sent back to the migrants' countries of origin. Remittance inflows to the continent have observed a fourfold increase in the past 20 years and were estimated at nearly 40 billion USD (2.5 per cent of GDP) in 2010. International remittances constitute the second largest source of net foreign capital inflows after foreign direct investments and exceed foreign aid to the continent (World Bank, 2011a).

Consequently, the economic impact of migration and remittances has received increasing interest from both researchers and policy makers. According to the *new economics of labor migration* (NELM), migration is part of a household strategy to overcome market failures such as imperfect credit and insurance markets, to loosen production and investment constraints, and to reduce poverty in the migration sending country (Taylor, 1999). Migration and remittances can have positive effects on the welfare of household members left behind through an increase in income, which subsequently can lead to an increase in consumption and investments, given that the remittances the household receives compensate for the loss of one or more members in working age leaving the household. Despite the increase in migration and remittance flows to the African continent, the literature on international migration and development in Sub-Saharan Africa is relatively limited, largely due to data constraints (Lucas, 2006).

This paper investigates the impact of international migration and remittances on household welfare in the country of origin by examining household subjective economic well-being and asset holdings and accumulation in Ethiopia. Ethiopia is an interesting country to study because it is one of the top 10 remittance receiving countries in Sub-Saharan Africa. The inflow of remittances to the country has increased dramatically in recent years, from 46 million USD in 2003 to an estimated 387 million USD in 2010 (World Bank 2011a). This study makes use of a new and rich Ethiopian migration and remittance dataset from Ethiopia to estimate the impacts of migration and remittances on household welfare. The main outcome variables used are two measures of household subjective economic well-being, which reflects the household's own rating of its living standard and its relative position in the

community. Subjective well-being is an important, yet understudied, measure in the context of migration and remittances. The household's own rating of its economic situation is important *per se* and represents a highly relevant measure because the household is likely the best at assessing its own welfare. It also captures a broader dimension of household well-being compared to measures such as expenditures or consumption, as the household can include not only the immediate benefits of an income increase but also expectations about future consumption, investments (both short-term and more long-term such as investments in health and education of children) and savings that the migration and remittances might generate[1]. This is particularly true if remittances are considered to be a more stable source of income compared to incomes generated at the local labor market. Moreover, subjective poverty has proven to have a close correlation with consumption-based poverty in urban Ethiopia (Bigsten and Shimeles, 2011). We therefore expect remittances to have a positive effect on subjective economic well-being of the households as long as the remittances are large enough to compensate for the loss of income that the migrant could have generated in the absence of migration. The impact of migration on subjective economic well-being is more ambiguous. The migration of a household member that is not followed by remittances can generate a negative impact on the economic subjective well-being if the household only considers the loss of potential income that the migrant could have earned at home. However, migration may have a positive effect on household economic subjective well-being even without remittances if the household expects remittances in the future and internalizes the expectations into the assessment of its current economic situation.

The subjective well-being measures applied in this paper are complemented by more objective measures of household welfare related to asset holdings and asset accumulation. Two asset indices, one for consumer assets and one for productive assets, are created, and separate analyses are conducted for rural and urban households. An increase in household income through remittances is expected to have a positive effect on household asset holding and asset accumulation. However, whether remittances spur investments in productive assets or whether remittances are mainly used for daily consumption and housing has been a longstanding debate (de Haas, 2007). We therefore investigate the impact of migration and remittances on investments in consumer goods as well as investments in livestock and farm equipment that can be considered productive investments.

[1] Duval and Wolff (2012) find that that receiving remittances has a positive effect on the financial expectations of households' future income in Albania.

Previous empirical research has mainly focused on the impact of remittances on objective measures of welfare such as poverty, consumption, labor force participation and educational attainment. Most studies have found that remittances reduce poverty (see for example Adams and Page, 2005 that examines 71 developing countries and Acosta et al. 2008 on 10 Latin American countries). While the subjective well-being of migrants residing in the migration destination area has recently received attention in the literature (see Knight and Gunatilaka, 2010 and Akay et al., 2012 for recent studies of the relationship between internal migration and the subjective well-being of migrants in China, and de Brauw et al. (2013) for internal migration in Ethiopia), the subjective well-being of households remaining in the country or area of origin has received very little attention. One exception is a study by Semyonov and Gorodzeisky (2008) that use a subjective measure of well-being to investigate the relationship between remittances and household welfare in the country of origin using data from the Philippines. The authors create a measure of subjective well-being by combining two measures: the households' own evaluation of its capacity to meet its daily basic needs and its self-assessed relative position compared to the average Filipino family. The study found a positive effect of remittances on household subjective well-being. Borraz et al. (2008) investigate the impact of migration and remittances on household self-reported *happiness* in Ecuador, and find that households with migrants closely related to the household (parents, children, spouses) abroad are less happy compared to households without a close migrant. Remittances sent by the migrants were not found to compensate for the loss of a family member.

A few studies have specifically investigated the link between remittances and asset accumulation. Adams (1998) investigates the effects of internal and international remittances on asset accumulation in rural Pakistan, and finds a positive and significant relationship between remittances and two types of physical assets: irrigated and rainfed land. Quisumbing and McNiven (2010) assess the impact of internal migration and remittances on assets in the rural Philippines using longitudinal data and an instrumental variable approach. The study finds that remittances have a positive impact on housing, consumer durables and non-land assets. However, having a large number of migrant children in the household reduces the values of non-land assets.

A challenge when estimating the causal impact of migration and remittances on household welfare is self-selection. There might be confounding factors that influence both the probability of receiving remittances and the outcome of interest, and could lead to biased

estimates of the impact of remittances on the outcome. We use a matching approach to address the possible self-selection issue. The advantage of this approach is that it allows us to compare households that receive remittances with otherwise similar households that do not receive remittances. The data used in this study contain retrospective information about household subjective well-being and asset holdings five years prior to the survey as well as information about when the household began receiving remittances, which enables us to analyse the *change* in welfare before and after households begin receiving remittances. The results reveal a strong positive impact of remittances on household subjective economic well-being, and a positive, but weaker, effect on household consumer asset accumulation. No effect on productive asset holdings or accumulation is found. The results also show that migration that is not followed by remittances have no impact, neither positive nor negative, on household subjective economic well-being. The positive impact of migration on subjective economic well-being is hence conditional on the receiving of remittances.

The reminder of the paper is structured as follows: section 2 describes migration and remittance patterns in Ethiopia; section 3 provides an overview of the data and descriptive statistics. Section 4 describes the methodology used. The results and robustness checks are presented in section 5; section 6 provides a discussion of the results and concludes.

2. Migration and remittance patterns in Ethiopia

The character, direction and volume of international migration flows from Ethiopia have gone through a number of changes over the past four decades. Revolution and an unstable political climate in the country shaped migration flows during the 1970s. Most of the individuals who migrated at this time belonged to a well-educated, urban segment of the population and migrated to western countries to seek political asylum. Political migration was followed by more economically oriented migration, initially driven by the aspirations of the urban population. Today, as the Middle East has become an important destination region for Ethiopian migrants, the migrants are to an increasing extent from rural areas migrating to find better (employment) opportunities abroad (Geda and Irving, 2011).

The World Bank ranks Ethiopia as the 8th largest recipient of remittances in Sub-Saharan Africa in 2010, with an inflow of remittances reaching 387 million USD, compared to the net Foreign Direct Investment inflows of 100 million USD and net Overseas Development Assistance (ODI) of 3.3 billion USD (World Bank, 2011b). The figures used by the World

Bank rely on International Monetary Fund (IMF) balance of payment statistics. However, there is a large discrepancy between the figures recorded by the IMF and the officially recorded remittance inflows reported by the National Bank of Ethiopia. In particular, the National Bank reports remittance inflows of approximately 600 million USD. Geda and Irving (2011) estimate that the actual volume of remittances, when taking flows through both formal and informal channels into account, could be in the range of $1 billion to $2 billion annually.

3. Data and descriptive statistics

The data used in this study come from the newly collected *IS Academy: A World in Motion* migration and development household survey, administered by the Maastricht Graduate School of Governance. A sample of 1,282 randomly selected households was interviewed between March and May 2011. The sample includes households with migrants abroad, households with migrants who returned from abroad, and households with no international migration experience by the time of the study.[2] The definition of a household applied in this survey follows the definition previously used in other migration surveys, where the concept of a household is extended to not only include members who are 'living together and have communal arrangements concerning subsistence and other necessities of life' but also those members who presently reside abroad but whose 'principle commitments and obligations are to that household' (see, e.g., Ünalan, 2005). A person living abroad can in this way still be considered a household member.

The survey was administered across five different regions throughout the country: Amhara, Oromia, Southern Nations Nationalities and People's Region (SNNPR), Tigray and the capital Addis Ababa, which together account for 96 per cent of the country's population. In each region, three different *Woredas* (districts) were selected for sampling, totaling 15 data collection sites in both urban and rural areas. The sampling followed a two-stage sampling procedure. A listing was conducted at each site to identify households as a migrant, return, or

[2] It is possible that the households in the sample have members who migrated within the country and consequently receive internal remittances. The data we have at hand do not record internal migration, and there are no official statistics on internal migration and remittances in Ethiopia. However, a study by de Brauw et al. (2011) indicates that internal migration rates are relatively low in Ethiopia. Using the Ethiopian Rural Household Survey (ERHS), together with a matched migrant tracking survey (including 1,595 households), the study finds that only 15% of the households had at least one member who migrated internally for employment reasons in the previous five years, and only 33% of those internal migrants reported remitting anything back to the source household. Compared to other developing countries, these percentages are low (de Brauw et al. 2011).

non-migrant household. Based on this identification, households were randomly selected for enumeration at each site, ensuring that a satisfactory level of households with migration experience was included in the survey. A migrant was in the survey defined as a person who lives in another country and has been away for at least three consecutive months. The questionnaire includes detailed questions about the migration and remittance experiences of the household. In addition, questions related to education, assets, expenditures, borrowing and saving, and the subjective well-being of the households are included.

Out of the 1,282 households included in the sample, 781 reside in rural areas and 501 in urban areas. The data contain information about previous international migration experiences of members who migrated but who had returned to the household by the time of the survey. The sample includes 168 return migrant households (82 in the rural sample and 86 in the urban sample). Households with a return migrant, who possibly received remittances in the past, might differ from other households in the sample. To avoid any bias with respect to return migrants, these households are excluded from the sample. There are also a number of households in the sample with only one member. Because by definition a household with only one member would be excluded from the survey if this single member were to migrate (and leave no one behind to be interviewed), we also exclude single member households from the analysis (in total 29 households). Furthermore, the data contain information regarding the point in time when the household began receiving remittances. In the overall sample, 72 per cent of the remittance-receiving households began receiving remittances in the past five years. However, there is a difference between rural and urban households in this respect. A large majority of the remittance-receiving households in rural areas, 92 per cent, began receiving remittances in the past five years, while the corresponding share for urban households is 65 per cent. This finding is in line with migration and remittances being a more recent phenomenon in the rural areas of Ethiopia compared to urban areas where international migration was more frequent in the past. The sample is restricted to only include those remittance receiving households that began receiving remittances in recent years so that the change in welfare before and after the household began receiving remittances can be investigated.[3] The final sample employed in the analysis consists of 998 households. Of these households, 33 per cent (34 per cent in rural areas and 32 per cent in urban areas) have at least one member abroad, and 20 per cent (22 per cent in urban areas versus 19 per cent in rural

[3] Including the above-mentioned excluded households generates slightly more households *off common support* (see section 4.1), but the results remain very similar in the majority of the specifications.

areas) receive remittances.[4] The large majority of the remittance senders are members of the remittance-receiving households.[5]

The migrants in the sample reside in different parts of the world. The most common migration destination countries are Saudi Arabia (24 per cent), the USA (20 per cent), Sudan and the United Arab Emirates (12 per cent) and South Africa (8 per cent). Other destinations include Israel, Qatar, Kuwait, Canada, the UK and Yemen. Table 1 shows some basic characteristics of the migrants in the sample.

[Table 1 about here]

The migrants are relatively young, with a mean age of 30 years. The majority are children of the household head (77 per cent), female (60 per cent), and approximately 41 per cent completed secondary education or higher.

Among the households with at least one migrant abroad, 52 per cent receive remittances. There is therefore a significant segment of the migrant households that do not receive remittances. Because the analysis in this paper is restricted to examining households that began receiving remittance in the past five years, the fact that only approximately half of the migrants send remittances may partly be explained by the amount of time that the migrants have spent at the country of destination. The share of migrants who migrated within one year prior to the survey is much higher among the non-remittance sending migrants, at 40 per cent, compared to the remittance sending migrants where the share of migrants who left the household within a year prior to the survey is only 20 per cent.

Table 2 presents descriptive statistics for all households in the sample and by remittance status.

[Table 2 about here]

Comparing households that receive remittances (column 2 for remittances from both members and non-members of the household; column 3 for remittances solely from household members) with those that do not receive remittances (column 4 including both non-migrant

[4] By remittances, we refer here to monetary remittances. The data also contain information on remittances in-kind, which in this case mainly consist of clothes and shoes sent home by the migrants. However, as monetary remittances are far more common and in-kind remittances often complement the monetary remittances (only 7 households in the sample receive in-kind remittances without receiving monetary remittances), we restrict the analyses to monetary remittances.

[5] However, there are 29 households who only receive remittances from non-members of the household. The analyses are performed both including and excluding these households (compare specification (1) and (2) in the main analyses), and the results remain very similar.

households and households with migrants who do not send remittances; column 5 including only households that neither have a migrant nor receive remittances) reveals some differences. Households that receive remittances are on average larger and have more members of working age, slightly fewer children and higher education level. Remittance-receiving households also rate their subjective well-being in 2006 slightly higher than households without remittances. The variables and their expected impacts on the probability of receiving remittances will be discussed in more detail in section 5.1.

The survey also records how frequently the households received remittances in the past 12 month prior to the survey, and how the remittances were used. Approximately 7 per cent of the households received remittances every second month or more frequently, 14 per cent received remittances every third month, and 17 per cent received remittances twice throughout the past year prior to the survey. The total values of remittances received by the households also vary substantially, from 500 Birr to 173,300 Birr, with a mean value of 11,603 Birr.[6] Many households (45 per cent) state that they mainly spend the remittances they receive on daily needs such as food, followed by debt repayment (13 per cent), housing/land (10 per cent) and ceremonies (10 per cent). Remittances were to a lesser extent used for investments in education (5 per cent), agriculture (4 per cent), and for savings (3 per cent) as well as to buy durable goods (3 per cent).[7] However, as table 3 reveals, the use of remittances varies depending on whether the household resides in an urban or rural location.

[Table 3 about here]

Rural households are much more prone to use the remittances for debt repayment (18 per cent) and for investments in housing and land (13 per cent). Not surprisingly, agricultural investments are restricted to rural households: approximately 6 per cent of the rural households state that agricultural investment is the prime use of remittances. Among the urban households, the use of remittances for daily needs is more common among urban households compared to rural households: 57 per cent of the urban households spend the remittances primarily on daily needs. A significant share of the urban households (19 per cent) spends remittances received on ceremonies. Remittance spending on education (8 per cent) and saving (6 per cent) is also more common among urban households. Hence, the

[6] The average monthly income in the sample is 2,324 Birr (corresponding to a yearly income of 27,888 Birr). Note: 1 Birr≈0.057USD in 2011.

[7] Directly examining how the remittances are spent is interesting and can provide useful insights but might not necessarily tell us much about the impact of remittances on household expenditures and investments because, as pointed out by Taylor (1999), money is fungible. Spending remittances on daily needs will free up resources that can be spent on other things or invested in productive activities.

descriptive statistics indicates that only a very small share of the remittances received are spent on investments in agricultural or durable goods.

4. Methodology

In this paper, household welfare is measured through both subjective measures of household economic well-being and by the use of an asset index strategy. To address the problem of self-selection, propensity score matching is applied. The data originate from a cross-sectional dataset that contains retrospective questions related to subjective well-being and household assets five years prior to the survey. By taking advantage of the fact that most households began receiving remittances in the past five years, outcomes can be measured in terms of changes in assets and subjective well-being before and after the households began receiving remittances.

4.1 Propensity score matching

One of the main challenges when estimating the causal impact of remittances on household welfare is self-selection. There might be unobservable characteristics that affect both the probability that the household receives remittances and the outcome of interest. If selection into treatment, i.e., in this case receiving remittances, is not random, an analysis of the effect of remittances on household welfare will produce biased estimates unless the problem of self-selection is addressed.

Previous studies have used a number of approaches to address selectivity into migration and remittance sending, including assuming selection on observables (e.g., Adams, 1998), parametric selection correction models (e.g., Barham and Boucher, 1998), instrumental variables (e.g., Mansuri, 2006; McKenzie and Rapoport, 2010), and propensity score matching (Esquivel and Huerta-Pineda, 2007; Cox-Edwards and Rodríguez-Oreggia, 2009). In this paper, the last method is applied.

Propensity score matching is often used in a program evaluation setting, where the objective is to compare participant outcomes with and without treatment. The method was first proposed as a way to reduce bias in the estimation of treatment effects with observational data in the seminal work by Rosenbaum and Rubin (1983). The idea is to first create an index that summarizes observable characteristics of the households into a propensity score index, based on the probability of receiving remittances. The households are then divided into two groups,

those who receive remittances (treatment group) and those who do not receive remittances (control group), and ranked according to their propensity scores. Finally, households from the treatment group are matched with households from the control group in a way that households with remittances are compared to households with similar propensity scores that do not receive remittances.

In equation form, we begin with a basic treatment model:

$$y_{ij} = \propto + \tau d_j + X_{ij}\beta + \varepsilon_{ij} \quad (1)$$

where we seek to estimate the average impact of treatment *d* (receiving remittances) across households on outcome y (subjective well-being and assets, see sections 4.2 and 4.3), conditional on a set of observable household (indexed *j*) - and individual (indexed *i*) – characteristics X.The impact can then be expressed as the average treatment effect:

$$\tau_{ATE} = \mathrm{E}[\mathrm{y}|\mathrm{X}, \mathrm{d} = 1] - \mathrm{E}[\mathrm{y}|\mathrm{X}, \mathrm{d} = 0] \quad (2)$$

where τ_{ATE} represents the average difference in outcomes between households with remittances and households without remittances. However, such a comparison might not capture the true impact of remittances on household welfare if there are other factors that are correlated with receiving remittances and some omitted variable that is affecting the welfare of the household (captured in the error term ε). A fundamental problem is that we can only observe the subjective well-being and asset holdings of a household either with or without remittances, but we cannot know what the situation of the household would have been in the counterfactual situation.

In this context, a parameter preferred to ATE is the *Average Treatment effect on the Treated* (ATT), defined as:

$$\mathrm{ATT} = \mathrm{E}[\mathrm{y}_1|\ \mathrm{d} = 1] - \mathrm{E}[\mathrm{y}_0|\ \mathrm{d} = 1] \quad (3)$$

where y_1 is the outcome given remittances and y_0 the outcome without remittances such that $\mathrm{E}[\mathrm{y}_0|\ \mathrm{d} = 1]$ represents the unobserved outcome of remittance receiving households had they not received remittances.

Replacing $\mathrm{E}[\mathrm{y}_0|\ \mathrm{d} = 1]$ with the expected value of $\mathrm{E}[\mathrm{y}_0|\ \mathrm{d} = 0]$ (which is observable) would not provide an accurate estimate if we suspect that there is self-selection into remittances and

that y_0 for households with and without remittances systematically differ. Instead, we rely on a matching approach where remittance-receiving households are matched with households without remittances with as similar characteristics as possible to reduce self-selection bias. The matching is made based on an index, the *propensity score*, summarizing the pre-treatment characteristics of each household. The propensity score is the probability of receiving remittances, p(X), conditional on a set of characteristics, X such that:

$$\mathrm{p(X)} = \Pr[\mathrm{d} = 1|\mathrm{X}] = \mathrm{E}[\mathrm{d}|\mathrm{X}] \quad (4)$$

Impact estimates can in general further be improved if there is access to data before and after treatment so that the outcome can be specified in terms of a *change* in outcome before and after treatment (Gilligan et al. 2009).

There are a few restrictions that should be fulfilled when implementing the propensity score procedure. The *conditional independence assumption* (CIA) requires that the outcome variable is independent of treatment conditional on the propensity score. *Conditional mean independence* requires that, given X, the mean outcomes for households in the control group are identical to mean outcomes for treated households had they not been treated. *Common support* implies that the analysis is only carried out when there are sufficient data. Observations outside the range of common support are dropped and there is hence no extrapolation outside the range of the observed data points. Imposing a common support restriction when estimating the propensity score will therefore improve the quality of the matches (Becker and Ichino, 2002).[8] The propensity score can be estimated using any discrete choice model.

4.1.1 Matching estimators

Because the propensity score p(X) is a continuous variable, the probability of finding matches with exactly the same propensity scores is almost impossible. Therefore, several matching techniques have been developed to match households based on the estimated propensity score. In *nearest neighbor matching* (NN), a control household is matched with a treated household based on the closest propensity score. The number of matching partners in NN matching can be varied such that a treated household is matched with the *n* closest neighbors. The

[8] The STATA software program was used in this paper; *psmatch2*, provided by Leuven and Sinanesi (2003), allows the user to impose a common support restriction and provides a balancing test (*pstest*) that tests the equality of the means of the covariates in the model before and after matching, as well as the standardized bias before and after matching.

advantage of NN matching is that all units are matched, but it also has the disadvantage that some of these matches might be poor because two matched households could be the closest match but still have very different propensity scores. Another option is the *kernel matching estimator* that matches the treated households with a weighted average of all controls, using weights that are inversely proportional to the distance between the propensity scores of the two groups. An advantage of kernel matching is that it uses a great deal of the information in the data by including all control households and thereby produces lower variance. However, as all control households are included, the risk of including bad matches also increases. Imposing a common support restriction therefore becomes crucial when applying the Kernel matching method. The *Radius estimator* defines a tolerance level for the maximum propensity score distance (caliper) and uses all of the control households within the caliper as comparison households (Caliendo and Kopeinig, 2008).

In this paper, Kernel matching is used in the main analyses because it has the advantage of making maximum use of the control group data. It also performs best in the balancing test: the t-test for the equality of means after matching is not rejected for any of the variables included in the probit specifications. Analyses using the nearest neighbor and radius estimators are also performed to test the robustness of the results. Common support is imposed in all estimations.

4.2. Subjective well-being measures

The main outcome variables in this study are a set of variables measuring the respondent's perception of household economic well-being. These variables are derived from two questions in the survey: one related to the household's assessment of its economic standard of living (both currently and the current situation compared to five years previous) and one related to how the household assess its economic situation relative to other households in the community (currently and compared to five years previous). What the household believes about its own well-being is important *per se*. It also offers a more multi-dimensional measure of welfare that goes beyond measures such as expenditures and consumption. In addition, subjective well-being measures are likely to capture the direct impact of remittances on household welfare if the household internalizes the possibilities remittances may hold for the household in the future. [9]

[9] However, there are a few methodological considerations and limitations to consider when using measures of subjective well-being. Responses might be sensitive to the current mood and memory of the respondent, recent events in the respondent's life and the immediate context in which the interview is conducted. This has been illustrated, for example, by Schwarz (1987), who in a study found students to report higher life satisfaction if they found a coin prior

4.2.1 Household standard of living

The first set of subjective well-being variables is based on the question, "Which of the following descriptions comes closest to how you see this household's current economic situation?". The five response categories are the following: 1. Finding it very difficult; 2. Finding it difficult; 3. Coping (neutral); 4. Living comfortably; 5. Living very comfortably. In the next question, the respondent is asked the question "Compared to five years ago, would you say the living conditions of this household have improved or become worse?" with the following five response categories: 1. Become much worse; 2. Become worse; 3. Stayed the same; 4. Improved; 5. Very much improved. Using these questions, a number of variables are created. The first is a dummy that takes a value of 1 if the household rates its current situation as either 'living comfortably' or 'living very comfortably', called *living standard good*, and zero otherwise. We also create two variables for the change in household well-being between 2006 and 2011. The variable *Living standard improved* is a dummy that takes a value of 1 if the household states that its living conditions over the past five years are 'improved' or 'very much improved', and *Living standard worse* is a dummy for households stating that their living conditions have 'become worse' or 'become much worse' over the past five years.

4.2.2. Household relative economic position

Additionally, we introduce a second subjective welfare measure based on the questions "Compared to other households in this community, how would you currently describe this household?" and "Compared to other households in this community, how would you describe this household five years ago?". The response categories range on a five-point scale as follows: 1. Among the poorest in the community; 2. Below average; 3. About average; 4. Above average; 5. Among the richest in the community. From these questions, a dummy for the household being above the average or among the richest in the community, called *relative position good*, and a dummy for the household being below average or among the poorest in the community, denoted *relative position bad*, were created. The change in a household's relative position in the community was also calculated by taking the values of the current rating and subtracting the rating of the household's position five years ago. Using these

to completing the survey. Reported life satisfaction and happiness is also often found to be influenced by earlier questions in the survey (Kahneman and Krueger, 2006). However, some of the challenges faced when using subjective measures, such as happiness or general life satisfaction, might be mitigated by the use of the slightly more 'objective' measure of subjective *economic* well-being applied in this study.

calculations, two dummy variables were created. The first takes a value of 1 if the household improved its relative position within the community (denoted *relative position improved)*, and the second takes a value of 1 if the household rates its position in the community as lower in 2011 compared to 2006 (denoted *relative position worse*)[10]. Table 4 presents descriptive statistics for all subjective well-being variables.

[Table 4 about here]

There is a clear difference between households with and without remittances in regard to the well-being variables. Households with remittances have on average higher scores on all of the variables indicating positive subjective well-being (i.e., the current standard of living is rated as good, the standard of living improved in the past five years, the relative household position compared to other households is good, and improvement in relative position compared to other households in the community) and lower scores on the variable indicating that the standard of living and relative position of the households has become worse over the past five years. From the descriptive statistics, it thus appears as though households who receive remittances are more likely to perceive their current situation as good and more likely to think that their situation has improved over the last five years.

4.3 Assets

The use of assets as a complement to more traditional income- and consumption-based measures of wealth and welfare has become increasingly popular in recent years. An advantage of assets measures is that they involve less recall bias and mismeasurements (McKenzie, 2005). Because we divide the assets into productive and consumer assets, it can also shed light on some of the channels through which remittances might affect household welfare.

In a seminal paper, Filmer and Pritchet (2001) introduced *principal component analysis* (PCA) as a way of creating an asset index to construct socio-economic indices in development

[10] A weakness with this measure is that a household who rated its relative position as *good* in the base year (2006) cannot improve its situation from 2006 to 2011 since it already belongs to the highest category (approximately 11 percent of the households rated their relative position as good in 2006). In addition, because the measure *relative position good* (*relative position bad)* is composed by an aggregation of the two upper (lower) categories, a move between the second highest (second lowest) and the highest (lowest) category would not be picked up. This could generate an underestimation of the true change in relative position among the households with the highest (lowest) well-being. However, the descriptive statistics show that share of households in the highest and in the lowest category is relative stable over time.

economics. The index is created by aggregating a large number of household assets, such as durable goods and facilities (source of drinking water, type of toilet, house material, etc.) to obtain a univariate measure of household welfare. More weight is given to assets that vary the most across households, so that an asset owned by all households is given zero weight and an asset owned by only a few household is given the highest weight. The first principal component score can then be calculated for each household. The score can take on negative values and have zero mean.

In this paper, PCA is used to create two separate asset indices for *consumer assets* and *productive assets*. Because there are assets only owned by households in the urban areas, separate analyses are conducted for urban and rural households[11]. The consumer asset index for the rural sample is created using binary variables for whether the household owns the following assets: furniture, TVs, telephones/mobile phones, radios, refrigerators and bicycles. The urban asset index consists of the same assets plus a set of urban specific assets including computers, stoves, dishwashers, washing machines and cars.[12] The productive asset index includes binary variables for poultry, goats, sheep, donkeys, cows, oxen, ploughs/hoes, wagons/carts, and land.[13] Given that the assets included in the productive asset index are specifically related to livestock, this index is created only for households involved in activities related to livestock. To estimate the scoring factors to be used as weights, the asset data were first aggregated across the two years. Table 5 separately reports the scoring factors for the first principal component for the rural and urban samples.

[Table 5 about here]

The weights were then applied to household asset holdings in 2006 and 2011. In the analysis, both the consumer and productive asset holdings in 2011 and the difference in the asset index between 2006 and 2011, denoted *asset accumulation*, will be used. Table 6 presents the descriptive statistics for the asset outcome variables for all households and by remittance status.

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11 The fact that the patterns for remittance spending differ between rural and urban households (as shown and discussed in section 3 and Table 3)also indicate that there might be differences in the impact of remittances across the two groups.

12 Filmer and Pritcher (2001) use a wide variety of assets, such as the source of drinking water and housing characteristics, to construct their index. Here, only the assets for which we have retrospective information about the asset five years ago are included in the index.

13 One could argue that bicycle should be considered as a productive asset as well, since bicycles could be used for small businesses in rural areas. Furthermore, land might be a problematic asset since it is not owned but leased in Ethiopia. However, the results are not sensitive to the inclusion or exclusion of land and bicycle among the productive assets.

[Table 6 about here]

We find that urban and rural households that receive remittances have higher consumer asset holdings both in 2006 and in 2011 compared to households without remittances. Consumer asset accumulation is positive for households both with and without remittances, although higher for households with remittances. When examining productive assets, we again find higher asset holdings for households with remittances across both years but that productive asset accumulation is actually higher among households without remittances.

5. Results

5.1 Probability of receiving remittances

The first step in the analysis is to estimate the probability of receiving remittances as a function of individual and household level characteristics. The household level variables include the number of members of working age (18-55 years) in the household, the female to male ratio, number of children (younger than 18 years), number of young children (younger than 6 years), number of household members above 65 years, household size (including migrants), and the highest education level attained in the household (by household members 18 years and above). Individual level variables include dummy variables for household head being in the following occupation categories: self-employed (business); in paid work, working in agriculture; retired or doing housework. Being in education or unemployed are the excluded categories. The household's own perception of its economic well-being in 2006 (SWB 2006) is included as a control for pre-remittance household wealth.[14] Finally, dummy variables for the community where the household resides are included.[15]

Table 7 presents the results for the probit regressions. The first specification includes all households and compares households with remittances from both members and non-members of the family to households that do not receive remittances (though households in the control group could have migrants who do not send remittances). To better understand the combined effect of sending one or several member(s) of the household abroad and receiving remittances, the second specification excludes remittance-receiving households that only

[14] In the asset analysis, indices for initial (in 2006) productive and consumer asset holdings are included. These specifications are not presented in the paper but are available upon request.

[15] Ideally, we would have liked to only include control variables measured five years ago, to reflect the situation and characteristics of the household pre-remittances. Unfortunately, we do not have retrospective information about the individual and household level characteristics in 2006 and instead need to rely on the control variables using information for 2011.

receive remittances from someone who is not a member of the household and compares households that receive remittances from household members with households without remittances in the control group. In the third specification, migrant households without remittances are excluded from the control group so that the remittance-receiving households (remittances only from household members as in specification (2)) are compared to households that have no experience of either international remittances or migration.[16]

[Table 7 about here]

The main determinants of receiving remittances are household education level, household head being self-employed (business), and subjective well-being in 2006. Household education level can be considered as a proxy for household wealth and is therefore expected to have a positive correlation with remittances because international migration is costly and might prevent poorer households from sending migrants abroad. We find that receiving remittances is positively correlated with all education levels above 'no formal education', which is the excluded education category. Looking at the magnitudes, there appears to be an inverted U-shape relationship between education and receiving remittances. This is probably explained by the large migration flows to the Middle-East characterized by migrants who are not highly-educated but still have basic education. We expect remittances to be negatively correlated with the household head being involved in income generating activities such as being self-employed (business), having a paid job, or being involved in agriculture because this might decrease the incentives for migration and reduce the need for an extra income through remittances. We find this negative relationship for all mentioned occupation categories, but the only variable that is statistically significant in all three specifications is the household head being self-employed. Households with higher subjective well-being in 2006 are more likely to receive remittances. As both education level and pre-remittance subjective well-being can be seen as proxies for household wealth, these results indicate that remittance receiving households are positively selected.

The probability of receiving remittances is expected to be positively correlated with the number of members of working age, as it increases the number of members available for migration. Given that more females than males migrated, receiving remittances is also

[16] However, the survey only includes information about remittances from non-members of the household in the past 12 months. We hence cannot exclude the possibility that a household that currently does not receive remittances did receive remittances from non-members of the household between 2006 up to 12 months before the survey was conducted. Considering that very few households receive remittances from non-members, we do not believe this is a major concern.

expected to be positively correlated with the household's female to male ratio. The effect of children is somewhat ambiguous because having more children in the household increases the number of economically dependent members in the household and might therefore increase the need for additional income from remittances. However, having children in the household might discourage parents from migrating and thereby reduce the chances of receiving remittances. We find that larger household size and female to male ratio both increase the probability of receiving remittances and that the effects are statistically significant in the third and the second and third specifications, respectively. The variable for the number of members of working age is also positive, but not statistically significant. Having more children in a household appears to have a negative effect on the probability of receiving remittances (both variables for children have negative signs in all specifications except the first for children 18 years old or younger). A possible explanation is that parents are more hesitant to migrate when their children are younger. The effect is only statistically significant for younger children (below 6 years) in the last two specifications.

5.2 Probability of having a migrant

Table 8 presents the determinants of having at least one migrant in the household, both for the overall sample and according to whether the migrant sends remittances or not.

[Table 8 about here]

The main determinants of sending a migrant are, not surprisingly, similar to the determinants of receiving remittances. The most significant determinants are the female to male ratio, household size, education level and subjective well-being in 2006. All mentioned variable estimates have positive signs and are statistically significant, with the exception of subjective-well-being in 2006 for migration without remittances. Having more children in the household reduces the probability of having a migrant, especially for the number of children 6 years old or younger. With respect to the occupation of the household head, being in paid work, self-employed, retired or working in agriculture generate different effects depending on whether the migrant sends remittances or not. The head being involved in any of the included occupation categories decreases the probability of having a migrant who sends remittances but increases the probability of having a migrant who does not send remittances.

5.3. Results from propensity score matching: subjective well-being

The next step in the analysis is to rank the households according to their probability of receiving remittances, matching the households in the treatment group with similar households from the control group, and finally, calculating the average differences in outcome variables across the two groups. We begin by examining the results for the subjective well-being measures using the main estimator (Kernel). The results are presented in Table 9.

[Table 9 about here]

Specification (1) includes all households in the sample, specification (2) excludes those remittance-receiving households that only receive remittances from non-members of the household, and specification (3) excludes households that receive remittances from non-household members according to specification (2) and in addition also excludes non-remittance households with a migrant (that do not send remittances). The results show that households that receive remittances are more prone to report higher levels of subjective well-being and improvements in their economic situation, while they are less prone to report a decrease in subjective well-being over the past five years compared to households who do not receive remittances. All variables are statistically significant, except the variable for household being richer than the average in the community (*relative position good*) that is statistically significant in the last specification, and most at the highest level (1 per cent). Hence, a clear difference seems to exist in both the level of and the change in subjective well-being over the past five years between remittance- and non-remittance-receiving households.

In Table 7 we found that a higher subjective well-being in 2006 increases the likelihood of receiving remittances. We are therefore interested in determining whether there is a difference in the effect of remittances on subjective well-being depending on a household's level of subjective well-being in 2006, which could have implications for inequality. We perform additional analysis restricting the sample to only include those households that rated their subjective well-being compared to other households in the community as 'below average' and 'among the poorest in the community' in 2006 (which includes 368 households, or nearly 37 per cent of the total sample). The results are presented in Table 10.

[Table 10 about here]

The results are very similar to those reported in Table 9, i.e., households with remittances are more likely to feel that their subjective well-being has improved over the past five years and less likely to feel that it has become worse. The most notable difference compared to the

results for the overall sample is that current level of well-being is not significantly higher among remittance receiving households than remittance households. This finding is explained by the very low share of households (7 per cent) in the sample of households with low subjective well-being in 2006 that rate their wellbeing as good in 2011. However, the statistically significant difference in the *change* in subjective well-being between households that receive remittance and those that do not implies that remittances also have a positive impact on subjective well-being for the poorer households in the sample.

To better understand the relationship between migration, remittances and household subjective well-being, we also perform an analysis using migration as the treatment variable.

[Table 11 about here]

If we compare these results to the results obtained with remittances as the treatment variable, we again find that remittance receiving households are more likely to rate their level of subjective well-being and improvement in subjective well-being higher than non-remittance households, but only for migration with remittances. While the effect of having migrants that send remittances is statistically significant at the highest level for all outcome variables except the variable for household being poorer than the community average (*relative position bad*, which is significant at the 10 per cent level), having a migrant who does not send remittances only has a positive and statistically significant effect on one of the outcome variables, namely household having a favorable relative economic position in the community[17]. We can hence conclude that the positive effect of migration on subjective well-being to a large extent depends on whether the migrant sends remittances or not. This may suggest that expectations of future remittance income do not play an important role here. Given that there are many households in the sample that have migrants but do not receive remittances, these findings are important.

5.3 Results from propensity score matching: assets

Next, we perform a similar propensity score analysis but with asset indices as outcome variables. Separate analyses are performed depending on whether the households are located in an urban or a rural area. Table 12 presents the results using the Kernel estimator.

[17] It is difficult to know why this variable is statistically significant while none of the other variables are. This may potentially be explained by the fact that having a migrant abroad is associated with social status, especially in rural areas of Ethiopia, which may contribute to a feeling of higher well-being compared to households without migrants.

[Table 12 about here]

Beginning with the urban sample, we find that households with remittances on average own more consumer assets and also accumulated more consumer assets over the past five years compared to households without remittances. However, this effect is only statistically significant for the accumulation of assets in the last specification in the table. When instead examining the rural sample, we again find a positive impact of remittances on consumer asset accumulation, and the effect is statistically significant in all three specifications (at the 5 per cent level in the two first specifications and at the 10 per cent level in the third specification). The effect on consumer asset holdings in 2011 is also positive, but not statistically significant in any of the specifications. Therefore, it seems as if remittance-receiving households do not have higher levels of consumer asset holdings than households that do not receive remittances, but that accumulated consumer asset holdings over the past five years, when they started receiving remittances, increased to a greater extent than households that did not receive remittances.

If we instead examine asset holdings and accumulation using the productive asset index, we find no statistically significant effects in any of the specifications. In fact, there even seems to be a negative effect on household productive asset holdings in the last specification, although this result is not statistically significant. Selling livestock or other household assets could be one way for the household to finance the migration of one of its members. A negative value for asset accumulation could hence arise if the remittances sent by a migrant household member abroad are insufficient to compensate for the costs associated with sending a household member abroad. The high share of households who use the remittances they receive for debt repayment (displayed in Table 3) could also indicate that households take loans to finance the emigration of a household member.

5.4 Robustness checks

To check the robustness of the results, we also perform the analyses using *nearest neighbor* (NN) as an alternative matching estimator. Table 13 presents the results for subjective well-being variables.

[Table 13 about here]

The results are similar to those found for the Kernel estimator, namely that remittances have a strong impact on household subjective well-being. For most of the subjective well-being

measures, there is a statistically significant difference between households that receive remittances and those that do not. The variables *relative position bad* and *relative position worse* is not statistically significant in the first and third specifications, and the variable *relative position good* is only statistically significant in the last specification (in line with the results in Table 9). All of the other variables show a statistically significant difference between remittance and non-remittance receiving households, and most at the highest significance level.

We also perform the same estimations using the *radius estimator*. The results remain similar to those obtained with the kernel and NN estimators and are even stronger in terms of statistical significance (all variables included are statistically significant at 1 per cent level). However, the balancing test for the equality of the covariate means after matching show much weaker results and several of the variables do not pass the test. The results for the radius matching estimator are therefore not presented here.

When re-estimating the asset analysis using the NN estimator, we find results similar to those obtained in the previous analysis.

[Table 14 about here]

For the urban sample, we find a weak but positive impact of remittances on consumer asset accumulation (only significant at the 10 per cent level in the second specification) and no statistically significant difference between remittance and non-remittance households with respect to consumer asset holdings. For the rural sample, we again find a positive and significant effect of remittances on consumer asset accumulation (significant at the 10 per cent level in the first two specifications). Again, no statistically significant results are found for productive assets.

The standard errors in the second stages of the estimations above are computed under the assumption that the propensity score is measured without sampling error. Given that the propensity score is estimated using a probit estimation, it should however be taken into account that the propensity score is calculated with some degree of uncertainty. We perform

an additional robustness check through bootstrapping with 100 repetitions of the standard errors[18]. The results remain very similar.

6. Discussion and conclusion

The aim of this study is to investigate the impact of remittances on household welfare in Ethiopia. We employ a welfare measure that takes the households' own perceptions of their subjective economic well-being into account, which has previously not received much attention in the migration and remittances literature. In addition, the impact of remittances on asset holdings and asset accumulation over the past five years is investigated using indices for consumer and productive assets.

The results reveal a strong positive effect of remittances on household subjective well-being. Households that receive remittances are more likely to have positive perceptions of their current economic subjective well-being and their current position compared to other households in the community. Remittance-receiving households are also more likely to report an improvement in their subjective well-being over the past five years compared to households that do not receive remittances. These results also hold if we restrict the analysis to households at the bottom of the subjective well-being ranking in 2006, which indicates that poorer households also benefit from international remittances. The results are robust to alternative estimators.

We also find a positive, but weaker, effect of remittances on consumer asset accumulation, particularly for the rural sample. The results suggest that rural households that receive remittances have accumulated more consumer assets over the past five years compared to households that do not receive remittances. The results for the urban sample do not show the same positive relationship between the receiving of remittances and accumulation of consumer assets. This might partly be explained by the low number of observations for the urban sample, which drops below 300 in the last specification. Neither rural nor urban remittance-receiving households appear to experience (statistically significantly) higher levels of asset holdings compared to non-remittance receiving households.

[18] As shown by Abadie and Imbens (2008), bootstrapping may not always be valid for inference when matching estimators are applied. We therefore limit the use of bootstrapping to be used as a robustness test, and present the estimation results based on standard errors without without bootstrapping in the tables.

We find no effect of remittances on productive assets. One explanation could be that the time period under study is relatively short, and while the effect of remittances on subjective well-being is more direct, the potential effects of remittances on productive asset investments take more time due to high costs of asset accumulation and are not yet realized. This explanation is supported by the descriptive statistics that showed a low average change in productive assets between 2006 and 2011. The results are also in line with the descriptive statistics on how remittances are spent, which indicated that remittances are mainly used for daily consumption and debt repayment rather than for investments in productive assets. It is also possible that these results are linked to the reasons behind and the interpretation of a change in the productive asset index. As previously mentioned, the productive asset index is only calculated for the sub-sample of the households engaged in any type of activity that involves livestock. If a households moves away from agricultural to another income generating activity (or diversifies its income sources to complement incomes from agriculture activities) where the income potentials are higher, it would have a negative effect on household productive asset accumulation. However, we do not find any clear patterns of a negative effect on productive asset holdings or accumulation either. Furthermore, an examination of household income-generating activities show that those households who have negative productive asset accumulation to a larger extent involve in crop production for home consumption as their main income generating activity (at 48 per cent compared to 38 per cent for the overall sample of households that own productive assets). Hence, it does not seem to be the case that these households have switched to income activities with higher earnings potential. However, it is difficult to conclude anything about this finding without any baseline data on household income activities pre-remittances (i.e., in 2006).

Finally, we also conclude that the positive effect of migration on subjective well-being is conditional on the receiving of remittances. Having a migrant member who does not send remittances do not have a positive effect on household subjective well-being.

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Table 1: Migrant characteristics

Variable	
Gender (%)	
Female	60
Age	
Mean age	30.21
Relation to household head (%)	
Household head	4.96
Spouse	5.13
Child	76.99
Brother/sister	6.9
Nephew/Niece	1.42
Grand child	1.77
Other family	2.83
Civil status (%)	
Single	59.29
Married	34.51
Divorced	5.31
Widowed	0.88
Education (%)	
Incomplete primary	36.11
Incomplete secondary	22.65
Secondary or higher	41.24
Observations	565

Table 2: Descriptive statistics

	(1) All households	(2) Remittance-receiving households	(3) Remittances-receiving household (only members)	(4) Non-remittance receiving households	(5) Non-remittance, non-migrant households
Number of members in working age (18-55)	2.898	3.635	3.807	2.713	2.519
	(1.546)	(1.714)	(1.699)	(1.445)	(1.353)
Female to male ratio	0.358	0.384	0.399	0.352	0.343
	(0.191)	(0.173)	(0.173)	(0.195)	(0.194)
Children <18 years old	1.974	1.875	1.836	1.999	2.063
	(1.716)	(1.623)	(1.589)	(1.739)	(1.741)
Young children <6 years old	0.447	0.310	0.240	0.481	0.545
	(1.181)	(0.979)	(0.801)	(1.225)	(1.294)
Number of elderly >65 years	0.190	0.220	0.228	0.183	0.170
	(0.448)	(0.461)	(0.461)	(0.444)	(0.434)
Household size	5.414	6.120	6.292	5.237	5.063
	(2.107)	(2.049)	(2.051)	(2.086)	(2.017)
Highest education Incomplete primary	0.247	0.190	0.181	0.262	0.271
	(0.432)	(0.393)	(0.386)	(0.440)	(0.445)
Highest education primary	0.0421	0.0750	0.0819	0.0338	0.0341
	(0.201)	(0.264)	(0.275)	(0.181)	(0.182)
Highest education incomplete secondary	0.160	0.205	0.199	0.149	0.142
	(0.367)	(0.405)	(0.400)	(0.356)	(0.350)
Highest education secondary or higher	0.422	0.495	0.515	0.404	0.379
	(0.494)	(0.501)	(0.501)	(0.491)	(0.486)
Head's occupation own business	0.151	0.0900	0.0760	0.167	0.183
	(0.359)	(0.287)	(0.266)	(0.373)	(0.387)
Head's occupation in paid work	0.170	0.150	0.129	0.175	0.178
	(0.376)	(0.358)	(0.336)	(0.381)	(0.383)
Head retired	0.102	0.105	0.117	0.102	0.0991
	(0.303)	(0.307)	(0.322)	(0.302)	(0.299)
Head's occupation agricultural	0.370	0.390	0.409	0.365	0.358
	(0.483)	(0.489)	(0.493)	(0.482)	(0.480)
Head doing housework	0.140	0.185	0.193	0.129	0.115
	(0.347)	(0.389)	(0.396)	(0.335)	(0.319)
Household SWB 2006	2.661	2.820	2.830	2.622	2.593
Observations	998	200	171	798	646

Standard errors in parenthesis. Note: Column (1) includes all households in the final sample. Column (2) includes all households who receive remittances (regardless if the remittances comes from members or non-members of the household). Column (3) displays household who receive remittances from migrant members of the household. Column (4) includes households who do not receive remittances and either do not have a migrant abroad or have a migrant who do not send remittances. Column (5) includes only households with neither remittance nor migration experience.

Table 3: The use of remittances

Most important thing household Spend remittances on	All households (%)	Rural households (%)	Urban households (%)
Daily needs (food/drinks)	44.87	38.83	56.60
Education	5.13	3.88	7.55
Business/investments	1.92	1.94	1.89
Saving	3.21	1.94	5.66
Agriculture	3.85	5.83	0
Leisure	0.64	0.97	0
Debt Repayment	12.82	18.45	1.89
Healthcare	1.92	1.94	1.89
Housing/land (including rent, construction)	9.62	12.62	3.77
To buy durable goods	3.21	3.88	1.89
Donations to community projects	0.64	0.97	0
Ceremonies (e.g. marriage/funeral, etc.	9.62	4.85	18.87
Other (specify)	2.56	3.88	0
Observations	156	103	53

Note: not all households who receive remittances answered this question.

Table 4: Descriptive statistics for subjective well-being outcome variables, all sample and by remittance status

	(1) All sample	(2) Households with remittances	(3) Households without remittances
Living standard good	0.190	0.320	0.158
	(0.392)	(0.468)	(0.365)
Living standard improved	0.417	0.614	0.368
	(0.493)	(0.488)	(0.483)
Living standard worse	0.358	0.198	0.397
	(0.480)	(0.399)	(0.490)
Relative position good	0.116	0.186	0.100
	(0.321)	(0.390)	(0.300)
Relative position bad	0.336	0.161	0.378
	(0.472)	(0.368)	(0.485)
Relative position improved	0.169	0.259	0.147
	(0.375)	(0.439)	(0.354)
Relative position worse	0.146	0.0914	0.159
	(0.353)	(0.289)	(0.366)
Observations	995	197	798

Standard errors in parenthesis. Column (2) include households with remittances (from members and non-members of the household). Column (3) include households without remittances (who either have no migrant abroad or have a migrant who do not send remittances).

Table 5: Scoring factor for first principal component

	Rural Sample	Urban sample
Livestock		
Poltry	0.3139	
Goat	0.1811	
Sheep	0.2715	
Donkey	0.338	
Cow	0.3885	
Oxen	0.4357	
Land	0.3893	
Plough/hoe	0.4301	
Wagon/cart	0.0591	
Furniture	0.2959	0.1854
Fridge	0.4497	0.4510
Radio	0.3249	0.2998
TV	0.5153	0.4123
Telephone	0.4751	0.3882
Bicycle	0.3367	0.1172
Computer		0.2967
Stove		0.3393
Washing machine		0.1803
Dishwasher		0.1618
Car		0.2759

Table 6: Descriptive statistics for asset variables, all sample and by remittance status

	(1) All sample	(2) Households with remittances	(3) Households without remittances
Urban sample			
Consumer asset index 2006	0,971	1,149	0,915
	(0.611)	(0.578)	(0.611)
Consumer asset index 2011	1,311	1,499	1,255
	(0.576)	(0.551)	(0.573)
Accumulation consumer assets	0,329	0,348	0,324
	(0.373)	(0.382)	(0.371)
Rural sample			
Consumer asset index 2006	0,469	0,541	0,452
	(0.526)	(0.555)	(0.518)
Consumer asset index 2011	0,696	0,837	0,663
	(0.582)	(0.557)	(0.583)
Accumulation consumer assets	0,229	0,296	0,214
	(0.356)	(0.400)	(0.343)
Productive assets 2006	1,644	1,868	1,583
	(0.751)	(0.576)	(0.782)
Productive assets 2011	1,717	1,930	1,663
	(0.634)	(0.514)	(0.651)
Accumulation productive assets	0,083	0,058	0,090
	(0.504)	(0.377)	(0.533)

Standard errors in parenthesis. Column (2) include households with remittances (from members and non-members of the household). Column (3) include households without remittances (who either have no migrant abroad or have a migrant who do not send remittances).

Table 7: Determinants of receiving remittances (probit specification)

	(1)	(2)	(3)
Number of members in working age (18-55)	0.144	0.118	0.0806
	(0.0964)	(0.101)	(0.109)
Female to male ratio	0.376	0.792**	0.926**
	(0.335)	(0.356)	(0.391)
No. of children <18 years	0.0165	-0.0201	-0.129
	(0.0966)	(0.101)	(0.111)
No. of young children <6 years	-0.0537	-0.101*	-0.120**
	(0.0483)	(0.0576)	(0.0607)
Number of elderly >65 years	0.0780	0.0383	-0.0121
	(0.134)	(0.140)	(0.155)
Household size	0.0391	0.0996	0.211**
	(0.0932)	(0.0978)	(0.106)
Highest education Incomplete primary	0.375*	0.542**	0.615**
	(0.210)	(0.249)	(0.267)
Highest education primary	1.028***	1.312***	1.336***
	(0.285)	(0.319)	(0.342)
Highest education incomplete secondary	0.719***	0.864***	0.928***
	(0.232)	(0.272)	(0.294)
Highest education secondary or higher	0.601***	0.854***	0.903***
	(0.229)	(0.270)	(0.292)
Head's occupation own business	-0.513**	-0.547**	-0.602**
	(0.240)	(0.266)	(0.281)
Head's occupation in paid work	-0.321	-0.287	-0.277
	(0.226)	(0.247)	(0.263)
Head retired	-0.315	-0.220	-0.286
	(0.248)	(0.263)	(0.282)
Head's occupation agricultural	-0.416*	-0.308	-0.206
	(0.222)	(0.238)	(0.257)
Head doing housework	-0.0408	0.0122	0.110
	(0.223)	(0.241)	(0.262)
Household SWB 2006	0.155**	0.142**	0.192***
Community controls	yes	yes	yes
Observations	998	969	817

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1 Note: specification (1) includes all households in the sample, specification (2) only consider remittances from household members and exclude households who receive remittances from non-members, specification (3) excludes households with a migrant who do not send remittances and compare households who receive remittances from household members to households who do not have a migrant and who do not receive remittances. The dependent variable is a dummy taking on value one if the household receives remittances.

Table 8: Determinants of Migration (probit specifications)

VARIABLES	(1) With remittances	(2) Without remittances
Number of members in working age (18-55)	0.0571	-0.0198
	(0.110)	(0.110)
Female to male ratio	0.874**	0.755**
	(0.393)	(0.375)
Children <18 years	-0.146	-0.265**
	(0.111)	(0.108)
Young children <6 years	-0.118*	-0.139**
	(0.0608)	(0.0630)
Number of elderly >65 years	-0.0214	-0.0623
	(0.155)	(0.153)
Household size	0.227**	0.301***
	(0.106)	(0.106)
Highest education Incomplete primary	0.635**	0.372*
	(0.268)	(0.220)
Highest education primary	1.356***	0.556
	(0.342)	(0.365)
Highest education incomplete secondary	0.953***	0.542**
	(0.294)	(0.255)
Highest education secondary or higher	0.880***	0.478**
	(0.292)	(0.241)
Head's occupation own business	-0.674**	0.194
	(0.290)	(0.321)
Head's occupation in paid work	-0.254	0.604*
	(0.266)	(0.309)
Head retired	-0.273	0.359
	(0.284)	(0.328)
Head's occupation agricultural	-0.221	0.416
	(0.260)	(0.311)
Head doing housework	0.114	0.746**
	(0.264)	(0.314)
Household SWB 2006	0.194***	0.0439
	(0.0698)	(0.0666)
Community controls	yes	yes
Observations	813	798

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1 Note: specification (1) only includes migrants who send remittances; specification (2) only considers migrants who do not receive remittances. The dependent variable is a dummy taking on value one if the household has at least one migrant abroad.

Table 9: Results from propensity score matching: Impact of Remittances on household subjective well-being (Kernel matching estimator)

	ATT (1)	T-stat	ATT (2)	T-stat	ATT (3)	T-stat
Well-being						
Living standard good	0,123	3.18***	0,103	2.41**	0,140	2.85***
Living standard improved	0,208	4.72***	0,221	4.56***	0,318	5.45***
Living standard worse	-0,130	-3.28***	-0,113	-2.61***	-0,191	-3.45***
Relative position good	0,034	1.04	0,050	1.37	0,125	3.04***
Relative position bad	-0.116	-3.06***	-0,122	-2.92***	-0,121	-2.27**
Relative position improved	0,149	4.02***	0,178	4.27***	0,193	4.01***
Relative position worse	-0,074	-2.55**	-0,098	-3.12***	-0,140	-3.45***
Number of observations	996		967		815	

*** p<0.01, ** p<0.05, * p<0.1 Note: specification (1) includes all households in the sample, specification (2) only consider remittances from household members and exclude households who receive remittances from non-members, specification (3) excludes households with a migrant who do not send remittances and compare households who receive remittances from household members to households who do not have a migrant and who do not receive remittances. The treatment variable is a dummy taking on value one if the household receives remittances.

Table 10: Results from propensity score matching: Impact of Remittances on household subjective well-being, restricted to households rating themselves as poor in 2006 (Kernel matching estimator)

	ATT(1)	T-stat	ATT(2)	T-stat	ATT(3)	T-stat
Living standard good	0,071	1.36	0,048	0.93	0,048	0.86
Living standard improved	0,257	2.86***	0,213	2.15**	0,251	2.41**
Living standard worse	-0,258	-2.98***	-0,160	-1.65*	-0,159	-1.53
Relative position improved	0,334	3.77***	0,344	3.55***	0,358	3.48***
Number of observations	368		360		311	

***p<0.01, **p<0.05, *p<0.1. Note: Poor refers to those households who rated their SWB in 2006 as 'below average' or 'among the poorest in the community'. Specification (1) includes all households in the sample, 10 observations are off common support. Specification (2) only considers remittances from household members and exclude households who receive remittances from non-members, 9 observations are off common support. Specification (3) excludes households with a migrant that do not send remittances and compare households that receive remittances from household members to households who do not have a migrant and who do not receive remittances. The treatment variable is a dummy taking on value one if the household receives remittances.

Table 11: Results from propensity score matching: Impact of Migration on household subjective well-being (Kernel matching estimator)

	With remittances		Without remittances	
	ATT	**T-stat**	**ATT**	**T-stat**
Living standard good	0,143	2.83***	0,015	0.39
Living standard improved	0,312	5.23***	0,056	1.12
Living standard worse	-0,181	-3.21***	-0,029	-0.59
Relative position good	0,125	2.99***	0,071	2.08**
Relative position bad	-0,122	-2.23**	-0,019	-0.40
Relative situation improved	0,187	3.82***	0,014	0.40
Relative situation worse	-0,134	-3.25***	-0,023	-0.65
Number of observations	810		797	

***p<0.01, **p<0.05, *p<0.1.

Note: Households *with remittances* only refers to households with remittances from household members, and households with a migrant that do not send remittances are excluded from the control group.

One household from treatment group off common support in specification without remittances. The treatment variable is a dummy assigned value one if the household has at least one migrant abroad.

Table 12: Results from propensity score matching: Impact of Remittances on asset holdings and asset accumulation (Kernel matching estimator)

	ATT (1)	T-stat	ATT(2)	T-stat	ATT(3)	T-stat
Urban sample						
Consumer asset index 2011	0,010	0.12	0,063	0.69	0,090	0.84
Accumulation consumer assets	0,062	1.11	0,080	1.31	0,137	1.88*
Number of obs.	*333*		*320*		*272*	
Rural sample						
Consumer asset index 2011	0,075	1.13	0,077	1.07	0,042	0.48
Accumulation consumer assets	0,102	2.30**	0,108	2.16**	0,100	1.71*
Number of obs.	*649*		*631*		*542*	
Productive assets 2011	0,059	0.76	0,016	0.18	-0,004	-0.03
Accumulation productive assets	0,079	1.32	0,077	1.03	0,074	0.79
Number of obs.	*449*		*418*		*353*	

*** p<0.01, ** p<0.05, * p<0.1 Note: specification (1) includes all households in the sample, specification (2) only consider remittances from household members and exclude households who receive remittances from non-members, specification (3) excludes households with a migrant who do not send remittances and compare households who receive remittances from household members to households who do not have a migrant and who do not receive remittances. The treatment variable is a dummy taking on value one if the household receives remittances.

Table 13: Results from propensity score matching: Impact of Remittances on household subjective well-being (NN matching estimator)

	ATT (1)	T-stat	ATT (2)	T-stat	ATT (3)	T-stat
Well-being						
Living standard good	0,106	2.09**	0,106	1.91*	0,165	2.60***
Living standard improved	0,251	4.32***	0,259	3.96***	0,335	4.46***
Living standard worse	-0,161	-2.89***	-0,118	-1.99**	-0,224	-3.16***
Relative position good	0,040	1.04	0,030	0.58	0,112	2.18**
Relative position bad	-0,076	-1.53	-0,160	-2.72***	-0,053	-0.78
Relative position improved	0,157	3.59***	0,189	3.98***	0,178	3.29***
Relative position worse	-0,040	-1.01	-0,154	-3.30***	-0,071	-1.37
Number of observations	996		967		815	

*** p<0.01, ** p<0.05, * p<0.1 Note: specification (1) includes all households in the sample, specification (2) only consider remittances from household members and exclude households who receive remittances from non-members, specification (3) excludes households with a migrant who do not send remittances and compare households who receive remittances from household members to households who do not have a migrant and who do not receive remittances. The treatment variable is a dummy taking on value one if the household receives remittances.

Table 14: Results from propensity score matching: Impact of Remittances on asset holdings and asset accumulation (NN matching estimator)

	ATT(1)	T-stat	ATT(2)	T-stat	ATT(3)	T-stat
Urban sample						
Consumer asset index 2011	-0,021	-0.21	0,046	0.37	0,039	0.33
Accumulation consumer assets	0,083	1.16	0,130	1.67*	0,052	0.57
Number of obs.	333		320		272	
Rural sample						
Consumer asset index 2011	-0,032	-0.34	0,045	0.48	0,028	0.26
Accumulation consumer assets	0,102	1.86*	0,118	1.89*	0,086	1.19
Number of obs.	649		631		542	
Productive assets 2011	0,106	1.04	-0,046	-0.46	-0,028	-0.20
Accumulation productive assets	0,113	1.54	0,070	0.98	0,034	0.28
Number of obs.	449		418		353	

*** p<0.01, ** p<0.05, * p<0.1 Note: specification (1) includes all households in the sample, specification (2) only consider remittances from household members and exclude households who receive remittances from non-members, specification (3) excludes households with a migrant who do not send remittances and compare households who receive remittances from household members to households who do not have a migrant and who do not receive remittances. The treatment variable is a dummy taking on value one if the household receives remittances.

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