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Essays on Development and Experimental Economics: Migration, Discrimination and Positional Concerns

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Till Anneka och Elsa

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Lisa Andersson

Paris, November 2013

Abstracts

This thesis consists of four self-contained essays.

Paper 1: A Field Experiment of Discrimination in the Norwegian Housing Market: Gender, Class, and Ethnicity

We test for gender, class, and ethnic discrimination in the Norwegian rental housing market using fake application letters. Females, individuals with high job status, and ethnic Norwegians are more likely to receive positive responses. For example, being an Arabic man and working in a warehouse is associated with a 25 percentage point lower probability of receiving a positive response when showing interest in an apartment as compared to an ethnically Norwegian female economist. We conclude that gender, class, and ethnic discrimination do exist in the Norwegian housing market, and ethnic discrimination seems to be the most prevalent form of discrimination.

Paper 2: Positional Concerns among the Poor: Does Reference Group Matter? Evidence from Survey Experiments

In general, previous research on positional concerns suggests a lower degree of positional concerns among people from poor countries. Yet the evidence is limited and most often builds on the assumption that people's reference groups are given, (often referring to other people in the society) and are the same across all individuals. In this paper, we test if low positional concerns found in the literature may be due to misspecification of the reference groups. We contribute to the limited literature by estimating the positional concerns in a low-income country considering various reference groups. We do so by testing the effect of different reference groups on the positional concerns of a representative sample of individuals in urban Ethiopia. We use a tailored survey experiment that is modified to include multiplicity of reference groups. The results show a low degree of positional concern for income, and that the degree of positional concern is highly stable across different reference groups.

Paper 3: Migration, Remittances and Household Welfare in Ethiopia

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.

Paper 4: Do International Remittances Stimulate Private Transfers? Panel Data Evidence from Urban Ethiopia

International remittances can have important impacts on the households who receive them. However, the effects of remittances might also carry trickle-down effects on other households in the migrant origin country through informal systems of private transfers. Using rich panel data from urban Ethiopia spanning over more than a decade, we investigate how international remittances affect the sending of private transfers. The results show that receiving international remittances increases the likelihood of sending internal transfers among low educated households, while the same effect is not found for highly educated households. The difference in transfer response to remittances between low and high-educated households seems partly driven by differences in transfer behavior during an adverse economic shock.

Paper I

A Field Experiment of Discrimination in the Norwegian Housing Market: Gender, Class, and Ethnicity

Lisa Andersson, Niklas Jakobsson, and Andreas Kotsadam

ABSTRACT. *We test for gender, class, and ethnic discrimination in the Norwegian rental housing market by using fake application letters. Females, individuals with high job status, and ethnic Norwegians are more likely to receive positive responses. For example, being an Arabic man and working in a warehouse is associated with a 25 percentage point lower probability of receiving a positive response when showing interest in an apartment, as compared to an ethnically Norwegian female economist. We conclude that gender, class, and ethnic discrimination do exist in the Norwegian housing market, and ethnic discrimination seems to be the most prevalent form of discrimination.* (JEL R21)

I. INTRODUCTION

Ethnic discrimination in different markets is well documented across many countries (List 2004; Riach and Rich 2002). Its effects are found to be severe and the inequalities are further perpetuated by the change in behavior in the discriminated groups (Parsons et al. 2011). Although it is known that men and ethnic minorities are discriminated against in the housing market (Ahmed and Hammarstedt 2008), to date no study has investigated multiple discrimination in this market. A common argument is, however, that the intersection of social attributes is important for the prevalence and magnitude of discrimination (e.g., Ruwanpura 2008). In the present paper, multiple discrimination (gender, class, and ethnic) in the Norwegian housing market is investigated by means of an Internet-based field experiment.

We use a field experiment in order to estimate parameters that would otherwise be impossible to evaluate (Banjeree and Duflo 2009). Most previous field studies on discrimination in the housing market have used audit studies with personal testers (e.g., Riach and Rich 2002; Ondrich, Stricker, and Yinger 1999). This type of study may suffer a bias, since it is almost impossible to erase all the differences among testers and since such experiments are not double blind, that is, testers are usually aware of the purpose of the study, which may affect how they act (Heckman 1998). Additionally, the variables of main interest (e.g., sex and ethnicity) are not assigned randomly (List 2004).

To overcome these problems, we employ correspondence tests by sending out written applications by e-mail in response to apartment advertisements, as has been previously done by one Spanish, one American, and two Swedish studies (Bosch, Carnero, and Farré 2010; Carpusor and Loges 2006; Ahmed and Hammarstedt 2008; Ahmed, Andersson, and Hammarstedt 2010). A limitation with sending written applications is that ethnicity is signaled via names, thus the results may not generalize to individuals with the same ethnicity but with other names. Another limitation is that discrimination is considered only in the response stage and not in the showing stage. Thus, we do not know if discrimination is important in the actual decision of who gets the apartment. Nonetheless, the strong internal validity implied by the opportunity to randomize key characteristics and by having a double-blind process makes correspondence tests a valuable complement to audit studies.

All previous studies using written applications have found that ethnic discrimination is

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TABLE 1
Definition of Variables and Share of Positive Responses

	Explanation	Share of Positive Responses
Dependent variable: Positive	1 if invited to further contacts or a showing	0.558
Main Independent Variables		
Man	1 if man	0.523
Woman	1 if woman	0.595
Norwegian	1 if Norwegian	0.621
Arab	1 if Arab	0.494
Economist	1 if economist	0.589
Warehouse	1 if warehouse worker	0.524
Indicator Variables		
Hanne economist	1 if woman, Norwegian, and economist	0.685
Hanne warehouse	1 if woman, Norwegian, and warehouse worker	0.628
Håvard economist	1 if man, Norwegian, and economist	0.610
Håvard warehouse	1 if man, Norwegian, and warehouse worker	0.559
Mohammed economist	1 if man, Arab, and economist	0.492
Mohammed warehouse	1 if man, Arab, and warehouse worker	0.435
Fatima economist	1 if woman, Arab, and economist	0.571
Fatima warehouse	1 if woman, Arab, and warehouse worker	0.476

a feature of housing markets (Bosch, Carnero, and Farré 2010; Carpusor and Loges 2006; Ahmed and Hammarstedt 2008; Ahmed, Andersson, and Hammarstedt 2010). Ahmed and Hammarstedt (2008) investigated gender discrimination and found that Swedish males are discriminated against compared to Swedish women. Bosch, Carnero, and Farré (2010) also integrated immigrant females and distinguished between applicants signaling only their name and those signaling a high status job. Our study is the first to integrate class differences to see how they relate to gender and ethnicity in discrimination practices in the housing market.

II. EXPERIMENTAL DESIGN

The experimental design closely follows the design by Ahmed and Hammarstedt (2008), Ahmed, Andersson, and Hammarstedt (2010), and Carpusor and Loges (2006). From December 15, 2009, to March 20, 2010, we applied for 950 advertised apartments on the largest buy-and-sell web site in Norway (www.finn.no), where private landlords advertise apartments. We responded to ads from all over Norway and used fictitious applicants whose names reflected one male and one female ethnic Norwegian, as well as one Arabic male and one Arabic female. An innovation of this study is to integrate socioeconomic class. We therefore let our four names be either economists or warehouse workers. In particular, we explicitly signal that the economist has higher education by writing, "I am an economics graduate." Warehouse worker was chosen as it is clearly a nonskilled occupation. In total, eight different fictitious application letters were created and randomly sent out, allowing us to analyze differences in positive responses (see Table 1).

We created eight fictitious applicants by creating e-mail addresses using the format name.surname74@gmail.com. For these applicants—two Arabic and two Norwegian

Hi,

My name is X and I am 35 years old. I am interested in renting the advertised apartment. I am an economics graduate and have been working as an advisor at a bank for eight years. (I work at a warehouse where I have had a fixed term contract for eight years). I am single, I don't smoke, and I don't have children or payment complaints. Good references are available.

Sincerely,
X

X = Fatima Rashid, Hanne Heimstad, Mohammed Rashid, Håvard Jørgensen

FIGURE 1
Application Letter

economists of different genders and two Arabic and two Norwegian warehouse workers of different genders—we used eight application letters of the format shown in Figure 1.

Hence, the only variables that vary in the application letters are the names (signaling ethnicity and gender) and where the applicant is employed (bank vs. warehouse). The application procedure was completely randomized, and each landlord received one letter from one randomly selected fictitious applicant. The randomization ensures an unbiased estimate of the average treatment effect. That is, even though timing, geographical location, and features of the rented object are not identical for each application, the randomization procedure removes the possible bias from such differences. An alternative could have been to send several matched applications to the same advertisement. The advantage of such a procedure would have been greater precision of the estimates, given the number of advertisements. We choose not to send matched applications since it increases the risk of detection.

We applied for 950 apartments during a period of three months. Application letters were sent out on average three times per week throughout the period, both during weekdays and week-ends, in response to all advertisements posted in the past 24 hours from the application occasion. We did not respond to advertisements asking applicants to call or appear in person, or advertisements that explicitly asked for tenants of a certain sex. If the same landlord posted multiple ads for different apartments, only one letter was sent in response to one of the ads in order to avoid detection. For the same reason, we did not respond to advertisements from real estate agencies. When we received answers from advertisers to each respective e-mail inbox, we recorded whether the response was negative (reject) or positive (invited the applicant to further contact, asked for more information, or invited the applicant to a showing). In order not to infer extra costs on people, we replied and rejected offers within three days. The e-mails were then immediately deleted.

Before we turn to the empirical analysis, we briefly describe some aspects of the market we studied. About 23% of households in Norway rent their apartment or house; this is rather low as compared to many other countries. In 2001, 24% got their apartment through advertisements; the most common way to get a rental apartment was through family or friends (Langsether, Gullbrandsen, and Annaniassen 2003; Belsby et al. 2005). Among youths, advertisements were the main channel for finding apartments in 2001 (Langsether, Gullbrandsen, and Annaniassen 2003). According to TNS-Gallup (2011) finn.no is by far the largest buy-and-sell web site in Norway, and the number of visitors has increased considerably during recent years. Thus, we studied one important channel for advertising apartments in Norway, but it may be the case that the extent of discrimination in other channels is different from the this one.

III. EMPIRICAL ANALYSIS

Distribution of Positive Responses

Previous studies have found that women receive more positive responses than men (e.g., Ahmed and Hammarstedt 2008), and we expect to find the same in Norway. We also expect to find that Norwegians receive more

TABLE 2
Differences in the Shares of Positive Responses

		Difference
Women	Men	
0.595	0.523	0.072**
Norwegians	Arabs	
0.621	0.494	0.127***
Economists	Warehouse workers	
0.589	0.524	0.065**

Note: Significant difference between the two groups in a two-sided test of the equality of proportions.
** $p < 0.05$; *** $p < 0.01$.

positive responses than Arabs, and finally we expect economists to get more positive responses than warehouse workers.

These hypotheses are in line with the differences in positive responses shown in Table 1. In Table 2, we test whether the differences in positive response rates among the groups are statistically significant, and find that the hypotheses outlined above cannot be rejected. The magnitudes of the differences are substantial. The probability of receiving a positive response is lowered by about 7 percentage points if the applicant is a man, by 13 percentage points if the applicant has an Arabic-sounding name, and by 7 percentage points if the applicant is a warehouse worker. The effects of ethnic discrimination are almost twice as large as the effects of gender and class discrimination. Hence, while all three forms of discrimination seem to be prevalent in the Norwegian housing market, ethnic discrimination seems to be the most widespread form.

To further exploit the data, we look into the differences in positive responses more closely in Table 3. The gender effect found in the total sample is also found for ethnic Norwegians; the Norwegian woman gets about 7 percentage points more positive responses than the Norwegian man (statistically significant at 10%). The Arab woman gets about 6 percentage points more answers than the Arab man, but this difference is not statistically significant. Exploring the difference found between Norwegians and Arabs in the total sample further, we see that the effect is large both for women and for men (13 and 12 percentage points, respectively) and statistically significant at 1%. A higher socioeconomic class (signaled by being an economist instead of a warehouse worker) raises the response rate for Arabs by 8 percentage points (significant at 10%). For Norwegians, this effect is 6 percentage points but not statistically significant. Also when looking at these subgroups, the effects of ethnic discrimination are almost twice as large as the effects of gender and class discrimination.

TABLE 3
Differences in the Shares of Positive Responses for Subgroups

		Difference
Norwegian man	Norwegian woman	
0.585	0.658	0.073*
Arab man	Arab woman	
0.464	0.527	0.063
Norwegian woman	Arab woman	
0.658	0.527	0.131***
Norwegian man	Arab man	
0.585	0.464	0.121***
Arab economist	Arab warehouse	
0.531	0.454	0.077*
Norwegian economist	Norwegian warehouse	
0.648	0.593	0.055
Norwegian warehouse	Arab economist	
0.593	0.531	0.062

Note: Significant difference between the two groups in a two-sided test of the equality of proportions.
* $p < 0.10$; *** $p < 0.01$.

By comparing across genders and occupations, we can gain an increased understanding of the differences in opportunities between Norwegians and Arabs in the Norwegian housing market. While having a higher-status job increases a person's chances in the housing market for both Arabs and Norwegians (see Table 3), it is not enough to compensate for the negative effect of having an Arabic-sounding name, since Arab economists receive fewer positive responses (0.531) than their Norwegian peers working in a warehouse (0.593), although this difference is not statistically significant. This is a further indication of ethnic discrimination being more

TABLE 4
Marginal Effects Based on Probit Regressions on Receiving a Positive Response

	(1)	(2)
Arab	− 0.127*** (0.032)	− 0.123* (0.063)
Woman	0.068** (0.032)	0.070 (0.066)
Economist	0.065** (0.032)	0.051 (0.064)
Arab 3 Woman		− 0.030 (0.094)
Arab 3 Economist		0.005 (0.090)
Woman 3 Economist		0.010 (0.092)
Arab 3 Woman 3 Economist		0.028 (0.129)
Predicted probability	0.559	0.559
Observations	950	950

Note: Robust standard errors are in parentheses.
* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

substantial than class-based discrimination.

Turning to the differences among the eight applicants, we see large differences, but few differences are statistically significant, probably because of the small sample size in each subgroup (see Table A1 in the Appendix). For example, being called Mohammed and working in a warehouse is associated with a statistically significant 25 percentage point lower probability of receiving a positive response when showing interest in an apartment, as compared to the most favored applicant, the Norwegian female economist.

Probit Estimates

Tables 2 and 3 indicate that gender, ethnicity, and occupation are important for receiving positive responses on applications for rental apartments. To further assess the effects of these variables generating positive responses we estimate the probability of receiving a positive response using probit estimations. The results of the estimates (the marginal effects) are presented in Table 4. Specification (1) estimates the probability of receiving a positive response, without interaction terms. The results are very similar to the descriptive statistics (in Table 2), which is not surprising considering the only difference is that the results in Table 4 simultaneously control for the other factors. The probability of receiving a positive response is lowered by about 13 percentage points if the applicant has an Arabic-sounding name, increased by 7 percentage points if the applicant is a woman, and increased by 7 percentage points if the respondent is an economist.

In specification (2) we include interaction effects to further assess the dynamics of discrimination in the rental housing market. The first thing we note is that the precision of the estimates falls dramatically. In fact, the only statistically significant finding is a negative marginal effect on having an Arabic-sounding name, implying that an Arabic male warehouse worker has a significantly lower probability of receiving positive responses as compared to a Norwegian male warehouse worker. All other marginal effects point in the expected directions,00 but they fail to reach statistical significance.

Finally, previous studies (Ahmed, Andersson, and Hammarstedt 2010; Bosch, Carnero, and Farré 2010) have tried to separate statistical (Phelps 1972) and taste-based discrimination (Becker 1957) by varying the degree of information signaled. These studies cannot rule out that taste-based discrimination is important, since they find substantial discrimination also when including information about marital status, employment, age, experience, and education in the application letters. Since we also include this information in our application letters, we have tried to control for statistical discrimination in some dimensions.

With our data we cannot rule out any kind of discrimination, but the fact that the Arab bank advisor receives significantly more responses than the Arab warehouse worker is at least an indication that it is not only a matter of taste-based discrimination.

IV. DISCUSSION

This study is the first to investigate how gender, socioeconomic class, and ethnicity are interrelated in discrimination practices in the housing market, and the results are clear-cut. Similar to earlier studies, we find extensive discrimination against people with Arabic names. We can also conclude that gender and class discrimination are present in the Norwegian rental housing market. The probability of receiving a positive response is lowered by about 7 percentage points if the applicant is a man, by 13 percentage points if the applicant has an Arabic-sounding name, and by 7 percentage points if the applicant is a warehouse worker. This indicates that ethnic discrimination is more substantial than discrimination by gender or class.

When integrating the three dimensions, the magnitudes of decreased opportunities in the housing market for already-disadvantaged groups is staggering. Mohammed the warehouse worker has a 25 percentage point lower probability of receiving a positive response when showing interest in an apartment as compared to the most favored applicant, the Norwegian female economist.

A limitation of our study (as well as of other similar studies of discrimination in the housing market) is that we signal ethnicity via names, thus the results may not generalize to individuals with the same ethnicity but with other names. Another limitation is that we only consider discrimination in the response stage and not in the showing stage. Thus, we do not know whether discrimination in the actual decision of who gets the apartment is smaller or larger than what we find. Yet, our findings are important, since it is the first attempt to investigate multiple discrimination in the housing market.

To gain further knowledge about discrimination in the housing market it would be fruitful to integrate information about the landlords and apartments into the analysis (e.g., gender, ethnicity, and type and cost of the apartment). Considering the substantial extent of discrimination we find, this should be done in future research in order to increase the insights on the possible mechanisms behind the discrimination. Additionally, to compare the prevalence of discrimination across regions may indicate to what extent discrimination in the housing market correlates with regional characteristics with respect to, for example, prejudice against immigrants.

APPENDIX

TABLE A1
Differences in the Shares of Positive Responses among the Applicants

	Hanne Economist	Hanne Warehouse	Håvard Economist	Håvard Warehouse	Fatima Economist	Fatima Warehouse	Mohammed Economist	Mohammed Warehouse
Hanne economist	0.685 0.685							
Hanne warehouse	0.685 0.628	0.628 0.628						
Håvard economist	0.685 0.610	0.628 0.610	0.610 0.610					
Håvard warehouse	0.685 0.559**	0.628 0.559	0.610 0.559	0.559 0.559				
Fatima economist	0.685 0.571*	0.628 0.571	0.610 0.571	0.559 0.571	0.571 0.571			
Fatima warehouse	0.685 0.476***	0.628 0.476**	0.610 0.476**	0.559 0.476	0.571 0.476	0.476 0.476		
Mohammed economist	0.685 0.492***	0.628 0.492**	0.610 0.492*	0.559 0.492	0.571 0.492	0.476 0.492	0.492 0.492	
Mohammed warehouse	0.685 0.435***	0.628 0.435***	0.610 0.435***	0.559 0.435*	0.571 0.435**	0.476 0.435	0.492 0.435	0.435 0.435

Note: Significant difference between the two groups in a two-sided test of the equality of proportions.
* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

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Paper II

Positional Concerns among the Poor: Does Reference Group Matter?

-Evidence from Survey Experiments*

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Abstract

In general, previous research on positional concerns suggests a lower degree of positional concerns among people from poor countries. Yet the evidence is limited and most often builds on the assumption that people's reference groups are given, (often referring to other people in the society) and are the same across all individuals. In this paper, we test if low positional concerns found in the literature may be due to misspecification of the reference groups. We contribute to the limited literature by estimating the positional concerns in a low-income country considering various reference groups. We do so by testing the effect of different reference groups on the positional concerns of a representative sample of individuals in urban Ethiopia. We use a tailored survey experiment that is modified to include multiplicity of reference groups. The results show a low degree of positional concern for income, and that the degree of positional concern is highly stable across different reference groups.

Keywords: *Reference groups, income comparison, experiment, subjective well-being*
JEL Classification: D60, C90

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1 Introduction

Concerns about positionality (or status) have been widely discussed by many scholars, including Adam Smith and Karl Marx and later, e.g., Veblen (1899), Duesenberry (1949), and Hirsch (1976). In the last couple of decades, positional concerns for income or consumption have been hot topics in economics (Clark and Oswald, 1996; Frank, 1999; Akay and Martinsson, 2011). Positional concern implies that individuals compare their income or consumption level with "relevant other" individuals or groups of people. In other words, the utility that people derive from income or a good does not only depend on the absolute amount of income or goods consumed, but also on the amount of income or goods consumed relative to the amount of income earned or goods consumed by others. There is a growing empirical literature investigating positionality concerns in the context of optimal taxation (e.g., Boskin and Sheshinski, 1978.; Ljungqvist and Uhlig, 2000; Alpizar et al., 2005; Aronsson and Johansson-Stenman, 2008), labor supply (e.g., Neumark and Postlewaite, 1998; Woittiez and Kapteyn, 1998; Park, 2010), saving and investment (e.g., Abel, 1990; 2005), and migration (Knight and Gunatilaka, 2010; Akay et al., 2012b), to mention a few.

The impact of positional concern on individual utility has been studied using both survey experiments (e.g., Solnick and Hemenway, 1998; 2005; 2007; Johansson-Stenman et al., 2002; Alpizar et al., 2005; Carlsson et al., 2007a; Akay et al., 2012a) and subjective well-being data (e.g., Clark and Oswald, 1996; McBride, 2001; Ferrer-i-Carbonell, 2005; Luttmer, 2005; Clark et al., 2008). The general conclusion from both approaches is that the utility is significantly and negatively affected by the income of others in rich developed Western countries. A limited literature on positional concerns in low-income countries presents more mixed results: a positive positional concern is reported by some studies reflecting tight community ties and altruistic preferences among the poor, while other studies find that the income of others does not significantly affect the utilities of the poor (e.g., Kingdon and Knight, 2007; Carlsson et al., 2007b; Bookwalter and Dalenberg, 2009, Knight and Gunatilaka, 2010; Ravallion and Lokshin, 2010; Akay and Martinsson, 2011; Akay et al., 2012a).

One of the important issues in the studies of positionality is the choice of relevant others, or "reference group," with whom individuals make comparisons. The term "reference group" was first explored in studies in social psychology. Runciman (1966) emphasizes the role and importance of choice of reference group for estimates

of positional concerns. He recognizes that an individual can have multiple reference groups depending on the topic and context. However, the general approach used in the economic literature is to make *a priori* judgment of the composition of reference groups based on characteristics such as geographical proximity, age, education, race, and/or gender, without taking into account that all individuals do not necessarily share the same reference group, and that people could have several simultaneous reference groups that affect their utilities in different ways. Moreover, in the context of low-income countries, the reference groups may also have more complex structures since the members of the community might rely on informal insurance systems in the absence of more formal insurance mechanisms. There is vast evidence showing that people in developing countries often form informal insurance and risk-sharing networks based on close geographic proximity and kinship (e.g., De Weerdt and Dercon, 2006; Fafchamps and Gubert, 2007). Thus, the lower degree of positionality often found in the literature may simply be an artifact of the construction of reference groups similar to those used for rich developed countries. The objectives of this study are twofold. First, we investigate the positional concerns of the poor using survey experiments to bring new evidence to the literature. Second, we address the issue of multiple or simultaneous reference groups among the poor by relaxing the assumption that everyone compares their own income with only one single reference group. We do this by exploring positional concerns relative to an array of possible reference groups defined using different comparison orbits of social proximity.

The experiment was conducted among 260 randomly selected residents of Addis Ababa, the capital city of Ethiopia. The experimental nature of our study allows us to specify different reference groups that are believed to represent key social groupings presumed to exist in every society, and investigate how positional concerns differ across reference groups among the poor. We control for six reference groups – *friends, neighbors, relatives, colleagues, people of the same age, and all other people in the city*. These groups are defined based on different physical and social comparision orbits that we believe the respondents are likely to have interaction and common attributes with, and that have been proposed and used as relevant points of reference in other studies (e.g., Carlsson et al., 2009; Knight et al., 2009; Clark and Senik, 2010a; Carlsson and Qin, 2010).

The results obtained in our analysis can be summarized as follows: We find very

low positional concerns compared to estimates from developed countries, confirming previous results from rural Ethiopia in Akay and Martinsson (2011) and Akay et al. (2012a). There is some heterogeneity in positional concerns across different reference groups, but again, even the highest marginal degree of positionality is much lower than the average from developed countries. In our econometric analysis, which controls for various individual socio-demographic and economic characteristics, we find that the positional concerns *vis-à-vis friends, neighbors, relatives, colleagues* and *all other people in the city* are not statistically significantly different than zero though there is some variation. The positional concerns are somehow higher and statistically significant when people compare their income with *people of the same age*. We also report that the positional concerns are heterogeneous across some socio-demographic and economic characteristics of individuals. Marital status and education seem to be the most important socio-economic determinants of positional concerns.

The remaining part of the paper is organized as follows: The next section discusses previous literature on positional concern and the issue of reference group. Section 3 gives the experimental design. Section 4 presents the results using interval regressions. We also estimate the mean degree of positionality using bootstraping conditional on the socio-dempographic characteristics of the individuals. Section 5 discusses the implications of the results and concludes the paper.

2 Positional Concerns and Reference Groups: What do We Know?

2.1 Methods and literature

Empirical investigation of positionality in the literature draws on two distinct approaches. The first approach is based on survey experiments to directly identify the degree to which individuals care about absolute and relative income or consumption by asking individuals to choose between different societies in which they prefer to live, where the societies differ in the individual's own and others' average level of income. The overall results from these survey experiments show that people do have positional concerns both for income and for consumption of specific goods, but that the degrees vary by goods and location (see Solnick and Hemenway, 1998; 2005; 2007; Johansson-

Stenman et al., 2002; Alpizar et al., 2005; Carlsson et al., 2007a; 2007b; 2009; 2010; Akay et al., 2012a for experimental findings).[1] A second, parallel, approach is based on self-reported subjective well-being data, collected through "happiness" or "life satisfaction" questions in surveys. The impact of positionality on subjective well-being is then investigated using relative income, which is defined as the mean (or median) income level of the reference group. The general welfare implication obtained from studies conducted in rich Western countries is that people care about other people's income, and that subjective well-being is negatively affected by the income of others (Clark and Oswald, 1996; McBride, 2001; Senik, 2005; Ferrer-i-Carbonell, 2005).

However, the literature examining positional concern in transition and developing economies is limited and the results are more mixed (see Clark and Senik, 2010b for a comprehensive review). Akay et al. (2012a) conduct a survey experiment – similar to the one in this paper – among very poor rural Ethiopian farmers. They find very low positionality for income in general and for the income obtained from an aid project. Using a similar survey experiment, Carlsson et al. (2007b) find low degree of positionality among farmers in rural Vietnam, while a higher degree of positionality is found by Carlsson and Qin (2010) among farmers in rural China. Results from studies using the subjective well-being approach in low-income countries are in line with those found using survey experiments. Ravallion and Lokshin (2010) investigate relative income effects in Malawi and find that relative comparison does not seem to matter for most of the sample, but for the relatively well-off (including those living in urban areas) subjective well-being does seem to fall with average neighborhood income. A similar result is found by Akay and Martinsson (2011) for rural farmers in Ethiopia. They use subjective well-being data and various alternative ad hoc reference groups and show that the mean income level of the reference groups does not significantly affect the well-being of poor rural farmers in Ethiopia. In contrast, Fafchamps and Shilpi (2008) use data from Nepal to test whether poor and more isolated households care less about relative consumption, and find that relative consumption negatively affects subjective well-being even at low absolute or relative levels of consumption.

Some evidence obtained from the subjective well-being approach contrasts the finding from developed countries and shows positive effects of income comparisons

[1] Positionality has also been investigated in controlled laboratory experiments (e.g., Clark et al., 2010; McBride, 2010).

in developing and transition economies. Kingdon and Knight (2007) find neighbors to be positive rather than negative comparators, and that subjective well-being rises with average income in the immediate neighborhood in South Africa. This result is confirmed by another study from South Africa by Bookwalter and Dalenberg (2009), who find that at low levels of income and expenditures the benefit of living among wealthier people outweighs the negative effect of being the poorest in a peer group. The positive effects of higher income of others found in some studies are in line with the "tunnel effect" conjectured by Hirschman (1973). An increase in the income of the reference group is interpreted as an encouraging prospect of future income gains. In poorer contexts, risk-insurance mechanisms, altruistic preferences, and fellow feelings in the community have been suggested as the main explanations of the positive relative income effect (Kingdon and Knight, 2007).

2.2 What is really a reference group?

A crucial aspect in the studies of postional concerns is the specification of a reference group. The term "reference group" was first used by Hyman, though the idea behind the concept can be traced much further back in time in the literature and tradition of thoughts in social psychology (Hyman, 1942; 1960). Hyman highlights the difficulties of pre-judging the reference group that people use as their social framework for comparison, and argues in favor of empirically determining the reference group that people are likely to employ (Hyman, 1960, p.390). It is suggested in the literature that people make active choices when it comes to reference groups to serve self-relevant goals such as *self-enhancement* and *self-improvement*. Self-enhancement refers to a strategy of downward comparison where the indiviudal compares himself with people who are less fortunate in order to feel better about their own situation, while self-improvement refers to upward comparison where people compare themselves with indiviudals who perform better or are more fortunate in order to enhance one's own motivation and performance (see Falk and Knell, 2004 for a more detailed discussion). Despite the mounting evidence on the importance of positional concerns in economic decisions, most economic studies, whether they use a survey experiment or a subjective well-being method, suffer from a lack of information about the relevant reference groups and how these reference groups are formed. The reference group is almost always assumed to be exogenously given, and most often assumed to be the same

across all individuals. The common approach in subjective well-being studies is to include one single reference group, refined using various socio-demographic characteristics (e.g., the same age cohort as in McBride, 2001; the same geographical area as in Blanchflower and Oswald, 2004 and Luttmer, 2005; the same region, education level, and age as in Ferrer-i-Carbonell, 2005). Among other things, such an approach could pose a challenge in the interpretation and use of positionality estimates if the specified reference group is not the relevant comparator. People could also have multiple reference groups simultaneously, and hence exhibit different levels of positional concerns vis-à-vis different reference groups. The issue of multiple reference standards therefore poses a serious challenge to the empirical investigation of positional concerns if survey and experimental instruments fail to fully capture an individual's reference group spectrum.

We are only aware of four studies (Carlsson et al., 2009; Knight et al. 2009; Clark and Senik, 2010a; Carlsson and Qin, 2010) that investigate potential reference groups by explicitly asking people with whom they compare themselves. Clark and Senik (2010a) investigate the degree of income comparison using the third wave of the European Social Survey covering 18 European countries. The survey asks people who they are most likely to compare their income with. Of those who identified a reference group[2], 36% stated that they are most likely to compare their income with colleagues, 15% with friends, 6% with family members, and 7% with others. The choice of reference group was shown to be closely related to regular social interactions. Knight et al. (2009) use data from rural China where the respondents were directly asked who they compare themselves with. The most common comparator group was people in the village (40%) followed by neighbors (29%), while 7% compare themselves to relatives. Only 11% had a reference group outside the village (i.e., people in the township, county, city, or elsewhere in the country). When asking respondents in their experiment in rural China about their reference groups for income comparisons, Carlsson and Qin (2010) found small differences across the suggested reference groups, yet found neighbors, people in the village, and off-farm migrants in the city to be the most likely comparison groups, and people in the township or city to be the least likely comparison groups. Carlsson et al. (2009) investigate and quantify the degree of positionality within and between castes in India using a sample of university students.

[2]About one third of the respondents, 36%, stated that they do not compare their income.

Their results show that the negative effect on an individual's utility from an average increase in income in her own caste is larger than the positive effect on utility from an increased income of her own caste compared to the income of other castes.

A few studies also look at a set of different reference groups in order to assess the relative impact of different types of comparisons. Senik (2009) investigates the relative importance of internal and external comparison on well-being in all countries in the former socialist bloc, and finds internal comparison to one's own past living standard to outweigh all external comparison groups (parents, former colleagues, and high school friends). External comparison is however found to be more important than individuals' self-ranking in the social ladder. No clear-cut results are found with respect to the relative importance across external comparison groups, but former colleagues and schoolmates seem to play an equally important role, outweighing comparisons with one's parents. Kuegler (2009) investigates the effect of relative income against various reference groups (siblings, friends, own past income, and parents' living standards in the past) using perceived relative income from Venezuela. Siblings turn out to be negative comparators, while no statistically significant results are found for any of the other reference groups. Kingdon and Knight (2007) test two different reference groups based on spatial proximity (neighbors) and social proximity (same race), and find that neighbors are positive comparators while a higher income in a reference group consisting of people of the same race has a negative effect on subjective well-being. Akay et al. (2012b) find that the well-being of Chinese rural-to-urban migrants depends on several reference groups and that well-being is positively affected by the income of urban workers but negatively affected by the income of other migrants and workers from the home region. Taken together, the results from these studies suggest in different ways that the choice of reference group matters for the direction and magnitude of relative comparison, which in turn underlines the importance of better understanding of how reference groups are formed.

3 Experimental Design

3.1 Setup

To test for positional concern across different reference groups, we constructed six versions of the survey experiment where individuals' own income was compared to

the income of friends, neighbors, relatives, colleagues, people of similar age, and all other people in the city. For each reference group, subjects were presented with a scenario describing two states of the world, referred to as societies, which only differ in the monthly income of the subject and the average monthly income of the people in the reference group in question. Subjects were then asked to choose in which of the two societies they would prefer to live. The income was expressed in the local currency Ethiopian birr (ETB) and the official exchange rate was US$ 1 = ETB 16.80 at the time of the survey (see Appendix A for the details of the instructions).

3.2 Preferences: modeling positional concerns

There are various ways to empirically specify the utility function to allow for positional concerns. The most common specifications are (i) the ratio comparison utility function, $U = v(x, x/\bar{x})$, where x is the individual's income and $\bar{x}$ is the average income in the reference group (e.g., Boskin and Sheshinski, 1978; Layard, 1980; Persson, 1995) and (ii) the additive comparison utility function, $U = v(x, x - \bar{x})$ (e.g., Akerlof 1997; Knell 1999; Ljungqvist and Uhlig, 2000). In this paper we apply the following additive comparison utility function:

$$\begin{aligned} v &= (1-\gamma)x + \gamma(x - \bar{x}), \\ 0 &\leq \gamma \leq 1, \end{aligned}$$

where γ measures the *marginal degree of positional concern*, i.e., the proportion of the total change in utility related to an increase in relative income when an individual's own income is marginally increased.

3.3 The marginal degree of positional concern

To elicit the degree of positionality, or more correctly the positionality interval, for each individual, respondents are asked to make pair-wise choices between societies that differ in own and others' income levels for all six reference groups. The income levels in each choice set for each reference group are systematically constructed to measure the degree of positionality. Starting from a choice with the lowest degree of positionality, individuals are presented with up to six successive choices until the

respondent switches to the choice where she cares more about the absolute income than the relative income.

An example scenario used in the experiment is presented in the Table A1 in Appendix A. In the beginning, the individual chooses between a *Society A* where her monthly income is lower than the average monthly income of the reference group, and a *Society* B_1 where her monthly income is higher than the average monthly income of the reference group but lower than her income in *Society A*. If the individual chooses *A*, the experiment for the specific reference group stops since the individual has revealed her actual interval of positionality, i.e., lower than the implied degree of positionality. If the individual chooses B_1, she is asked to choose between *Society A* and *Society B2*, where her income is further lower than in B_1, but still higher than the income level of the reference group, which is the same as in B_1. For instance, for the example choice scenario in Table A1 with just 'others' as a reference group, the individual has an income of 960 Birr per month in *Society A* while the average income of the others in the society is 1080 Birr. On the other hand, her income is 924 Birr in *Society* B_1 and that of others in the society is 720 Birr. Her income decreases by 36 Birr in *Society* B_2 while the average income of others in the society stays at 720 Birr. The 36 birr decreases continue until B_6, where the individual's monthly income drops to 744 Birr. Since the choice is always against *Society A*, the degree of positional concern increases as we go from Society B_i to Society B_{i+1}. The session ends if the individual chooses *Society A* or has reached the last choice set (B_6).

When the subject is indifferent between *Society A* and *Society* B_i, then we know that $x_{i,A} - \gamma \bar{x}_A^r = x_{i,B} - \gamma \bar{x}_B^r$. From this, we can then calculate the marginal degree of positional concern from the above example given in Box 1:

$$\gamma = \frac{x_A - x_B}{\bar{x}_A^r - \bar{x}_B^r} = \frac{960 - 924}{1080 - 720} = 0.1.$$

When the subject chooses *Society A* (for this example), then it implies that the subject has a degree of positionality lower than 0.1 ($\gamma < 0.1$). We present repeated choices between the two societies. Using the stopping choice situation (when the subject chooses *Society A*), we calculate the degree of positional concern of each individual within an upper and lower bound.

The reference groups used are presented in a subsequent order for each respondent. People may learn or get alienated answering similar questions, or may want

to appear consistent. Since the survey experiment contains six reference groups presented after each other, there is a possibility of order effect in their responses, which can be caused by learning, fatigue or wish to be consistent, or a combination of them. In order to limit biases that may arise from these effects, we randomized the order in which the reference groups were presented. It could be argued that the choice sets within a reference group should also be randomized, but we argue that this could create a very high cognitive burden and potentially also confusion for indiviuals, and hence we decided to refrain from this. Another design issue relates to which income levels to use in the choice sets. We thought that using the same income levels across reference gropus may induce individuals to try to be consistent. Thus, we decided to choose slightly different income levels, all just above subsistance level. Table 1 presents the full summary of the experiment. Note that even though the income levels are different in each choice situation, the implicit degree of postitionality is the same across reference groups, changing between 0.1 and 0.6.

(Table 1 about here)

The experiment was conducted among 260 individuals in Addis Ababa, Ethiopa. The mean per-capita daily income of the households in the sample is 3.79 PPP dollars. We employed five local interviewers, who received training prior to the experiment. We conducted a face-to-face interview with each subject in the local language (Amharic). To ensure consistency, the instructions were first translated to the local language and then translated back to English by two different individuals. The experiment was part of larger household survey. After the experiment had been conducted, the respondents participated in a migration and remittances survey that included a wide variety of socio-economic questions.

4 Results

As discussed in the previous section, the key measure in our empirical investigation is the marginal degree of positionality. We start by presenting a descriptive analysis of the unconditional mean marginal degree of positionality. We then estimate the mean marginal degrees of positionality for different reference groups by using econometric models conditional on individual characteristics.

4.1 Descriptive analysis

By using the design features presented in Table 1, we can calculate the unconditional mean marginal degree of positionality. Table 2 summarizes the frequency distributions of marginal degree of positionality intervals across the six reference groups. As can be seen from the table, most people chose *Society A* in the first choice situation. Almost two-thirds of the subjects displayed a very low degree of positionality for each reference group. We can conclude from these results that regardless of which reference group we consider, the unconditional degree of positionality is very low in our sample, which is in line with the existing findings in the literature. There could however be heterogeneity across socio-demographic and economic characteristics of the individuals, which we investigate in more detail below.

(Table 2 about here)

To estimate the mean marginal degree of positionality, we assume that the actual value of the positionality for each individual lies in the middle of each positionality interval. Note that our design cannot identify the maximum or minimum positional concerns. We have to make some assumptions. The mid-value for the highest positional concern is assumed to be 0.8 by considering that the maximum positional concern is 1, and the mid-value of the lowest positional concern is assumed to be 0.05 by considering that the lowest positional concern is 0.[3] The mean marginal degrees of positionality are presented in the Table 3, together with the standard deviations and confidence intervals.

(Table 3 about here)

The mean marginal degrees of positionality estimates are found to be very small, as expected from the descriptive statistics given above. These results are highly in line with Akay and Martinsson (2011) and Akay et al. (2012a), who find very low positionality estimates in rural Ethiopia. We are mainly interested in the relative difference between the positionality parameters across reference groups. The lowest positionality estimate is obtained when subjects compare their income with their relatives, which

[3]We have also experimented with some other lower and upper limits. The result is basically the same.

could be due to strong family relationships and possible altruism between extended family members. The highest positionality is found vis-à-vis neighbors. We compare the experimental data pairwise using t-tests. We find significant differences in the positionality across reference groups. Test results for the mean difference suggest that the difference is statistically significant in the case of positionality experienced toward *neighbors* and *relatives* (*p-value=0.031*); *neighbors* and *same age people* (*p-value=0.099*); and *neighbors* and *all other people in Addis* (*p-value=0.027*).

4.2 Results by socio-demographic characteristics

Although positional concerns are generally low among the respondents in our sample, there may be some variations across different socio-demographic groups. We sort the subjects by their socio-demographic and economic characteristics and estimate the mean degree of positionality for each group. The results are reported in Table 4 by (i) male and female; (ii) employed/self-employed and all other subjects (students, unemployed, housewives, retired people etc.); (iii) married, divorced/widowed and single; (iv) low level of education (no formal education and incomplete primary school education), medium level of education (incomplete secondary education and secondary education), and high level of education (completed secondary education and studied at higher level, or degree at a level above secondary ecucation).

(Table 4 about here)

There are important relationships between the socio-demographic and economic characteristics of subjects and their attitudes toward positionality across reference groups. Females are slightly more positional except vis-à-vis colleagues. Employed are more positional vis-à-vis friends but less positional toward the other reference groups compared to unemployed subjects. There is a clear relationship between positional concerns and marital status – the positionality parameter is larger for married compared to divorced/widowed and single subjects. The largest positionality parameter is obtained among married subjects vis-à-vis neighbors. The level of education is also found to be highy related with positional concerns.

We also investigate which factors explain the degree of positional concern for each reference group using regression analyses. Our dependent variable of interest is the

marginal degree of positionality. The experimental setup gives us a dependent variable with a lower and an upper bound, and thus we use an interval regression specification. The lower and upper bounds of the intervals are specified as in the first column of Table 2. As before, we have to make some assumptions for the extreme choices. We assign 0 for the lower bound of the first interval and 1 for the upper bound of the last interval. In our regressions, we control for various exogenous variations: age, gender, marital status, occupation, household size, education, migrant status, household income, location in Addis Ababa, and ethnic groups (the locations in our sample are the sub cities Kirkos, Arada, Addis Ketama, Yeka, and Gullele; ethnic groups are Amhara, Oromo, Tigray, and Others). Table 5 reports interval regression estimates. The variation in the marginal degree of positionality is explained by several variables. For example, female subjects are more positonal *vis-à-vis neighbors*, and single subjects are less positional toward all reference groups except for *people of the same age*. These result are in line with the descriptive statsitics presented above.

(Table 5 about here)

4.3 Estimating conditional degree of positionality

One of our aims is to use estimated regression parameters presented above to estimate the mean degree of positional concern conditional on socio-demographic and economic characteristics of the subjects. To calculate the mean degree of positional concern as well as confidence intervals, we use the bootstrap technique (see, e.g., Efron and Tibshirani, 1998). We first predict the marginal degree of positionality for each individual using estimated model parameters and then calculate the mean level of predicted marginal degree of positional concerns for each bootstrap sample, which is conditional on the socio-demographic and economic characteristics of the subjects. This procedure is repeated for 1,000 bootstrap samples. Table 6 presents the conditional mean marginal rate of positionality for the overall sample and for the selected socio-demographic groups. Results are presented for each of the reference groups separately. Again, it is clear from Table 6 that the positional concerns are very low. The fact that most estimates are insignificant indicates that, conditional on observed individual characteristics, positional concerns are basically zero. The only statistically significant mean marginal degree of positionality is obtained for the reference group

people of the same age. Significant estimates toward this reference group are also found for four of the socio-demographic groups. However, the level of the positionality is much lower than that is found in developed countries.

(Table 6 about here)

We also control for the order effect with 12 different combinations of the experimental design. However, in order to check the sensitivity of the results we include dummies for the order categories in the interval regressions. We estimate the marginal degree of positionality using 1,000 bootstrap replications. The results are not reported here since they are virtually the same as the results presented in Table 6.[4]

5 Discussions and Conclusion

In this paper we have estimated the marginal degrees of positional concern of poor people in an urban setting using various reference groups explicitly introduced into a survey experiment. We conduct our experiment among 260 individuals living in urban Ethiopia by modifying existing survey experiments used in the literature. A detailed econometric analysis indicates that the poor do have low positional concerns, and that the low positional concerns are not an artifact of a misspecification of reference groups. There are differences across reference groups, yet the low positionality for income persists vis-à-vis all reference group definitions.

Our results suggest that the only significant estimate of the marginal degree of positionality is toward the reference group *people of the same age*. While the marginal degree of positionality is still low, the fact that the "same age" reference group stands out from the other reference groups could have interesting implications when it comes to the role of social proximity, informal mechanisms, and positional concerns. The insignificant estimates found for positional concerns toward the reference groups *relatives*, *friends*, *neighbors*, and *colleagues* may be explained by relationship attributes, e.g., altruism and informal support systems, that imply low positional concerns toward

[4]We also estimated the mean marginal degree of positionality using Spearman-Karber, which is a nonparametric estimator. This estimator is robust to sample size. In this estimator the data is interpreted as a failure or duration time data. The results obtained from this experiment is highy in line with the results reported in Table 6.

reference groups. There is no meaningful way age similarity could be used as a network formation mechanism, while it is reasonable to think that people compare their achievements with those of others of similar age, resulting in significant income comparison estimates. On the other hand, the reference group *all other people in the city* could be too intangible to the individual to make meaningful comparisons.

In this paper, we have systematically investigated multiple reference groups using a survey experiment approach. However, more work remains to be done to identify and explain the underlying relationships between reference groups and degree of positionality and how these relationships are shaped by the socio-economic proximity generated through informal mechanisms between individuals in low-income countries.

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Appendix A

Experiment instructions

Now I want to ask you some questions related to income.

Imagine that you can choose to live in one of two different societies, Society A and Society B. Your monthly income and the average monthly income of different groups of people differ between the two societies. Except for the income differences, other things like living expenses are exactly the same in the two societies.

For each society that we will consider, I will tell you the amount of your monthly income and the average monthly income of the group. Then I will ask you to choose which society you would like to live in.

Let me illustrate this choice by the following example. In this example, we will just name the group of people "other people."

Society	**Your own income** **Birr/Month**	**Average income of Other people** **Birr/Month**
Society A	**800**	**900**
Society B	**770**	**600**
Which society do you choose to live in?		

In this example, your yearly income is 30 birr more in Society A than in Society B. In Society A, you earn 100 birr less than the average income of other people in the society, while in Society B you get 170 birr more. Given these differences, you can either choose to live in Society A or B. *(Repeat question and example)*

Now, I'll ask you to make your choice between the different societies.

(For each table of a reference group, ask the first questions in the following way. Do not change the order the tables from what is given in this questionnaire!)

In Society A, your monthly income is _____ birr, while the average monthly income of _____ in the society is _____ birr. In Society B_1, your monthly income is ____ birr, while the average monthly income of _____ in the society is _____ bbirr. In which Society, A or B_1, do you want to live?

(If the respondent chooses A, stop and proceed to the next table. If respondent chooses B_1, ask her/him to choose between Society A and Society B_2. If respondent chooses B_2, ask her/him to choose between Society A and B_3. Continue in a similar manner for the rest of the choices. Do not change the format of the question except for the numbers. Follow the same procedure for the other tables.

Remember! Do not change the order of the tables as it is given in this printout and always start from the first choice in each table!)[5]

Table presenting the choice scenario for reference group 1

Table presenting the choice scenario for reference group 2

Table presenting the choice scenario for reference group 3

Table presenting the choice scenario for reference group 4

Table presenting the choice scenario for reference group 5

Table presenting the choice scenario for reference group 6

[5]Istead of presenting six tables for each reference group in the experiment, we thought it is better to present a generic example of choice scenario, given in Table A1 below. Note that the numbers in Table A1 do not match to any of choice scenarios in the full instructions (but the implied degress of positionalities do). The full instructions with all the tables can be requested from the authors.

Table A1: An example of the choice scenario

Others in the society		
Society	**Your own income Birr/Month**	**Average income of others Birr/Month**
A	**960**	**1080**
B1	**924**	**720**
Which society do you choose to live in? *(Circle choice. If the choice is A, stop and go to next next page, if the choice is B_1, proceed below)*		
A	**960**	**1080**
B2	**888**	**720**
Which society do you choose to live in? *(Circle choice. If the choice is A, stop and go to next next page, if the choice is B_2, proceed below)*		
A	**960**	**1080**
B3	**852**	**720**
Which society do you choose to live in? *(Circle choice. If the choice is A, stop and go to next next page, if the choice is B_3, proceed below)*		
A	**960**	**1080**
B4	**816**	**720**
Which society do you choose to live in? *(Circle choice. If the choice is A, stop and go to next next page, if the choice is B_4, proceed below)*		
A	**960**	**1080**
B5	**780**	**720**
Which society do you choose to live in? *(Circle choice. If the choice is A, stop and go to next next page, if the choice is B_5, proceed below)*		
A	**960**	**1080**
B6	**744**	**720**
Which society do you choose to live in? *(Circle choice.)*		

Tables

Table 1. Summary of the experiment (in ETB).

		Reference groups											
		Friends		*Neighbors*		*Relatives*		*Colleagues*		*Same age people*		*All other people*	
Implied degree of positionality if indifferent		Own income	Friends' income	Own income	Neighbors' income	Own income	Relatives income	Own income	Colleagues' income	Own income	Income of same age people	Own income	Income of all other people
Alternative A		640	720	800	900	760	855	880	990	680	765	824	927
Alternative B1	0.1	616	480	770	600	732	570	847	660	655	510	793	618
Alternative B2	0.2	592	480	740	600	703	570	814	660	629	510	762	618
Alternative B3	0.3	568	480	710	600	675	570	781	660	603	510	731	618
Alternative B4	0.4	544	480	680	600	646	570	748	660	578	510	700	618
Alternative B5	0.5	520	480	650	600	618	570	715	660	553	510	670	618
Alternative B6	0.6	496	480	620	600	589	570	682	660	527	510	640	618
#Subjects		260		260		259		260		260		259	

Table 2. Frequency distribution of marginal degree of positionality with alternative reference groups.

	Reference groups											
	Friends		*Neighbors*		*Relatives*		*Colleagues*		*People of same age*		*All other people*	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
$\gamma < 0.1$	194	74.33	181	69.35	201	77.01	202	77.39	199	76.25	205	78.54
$0.1 < \gamma < 0.2$	11	4.21	23	8.81	15	5.75	15	5.75	8	3.07	10	3.83
$0.2 < \gamma < 0.3$	18	6.9	14	5.36	12	4.6	12	4.6	19	7.28	12	4.6
$0.3 < \gamma < 0.4$	9	3.45	13	4.98	12	4.6	8	3.07	8	3.07	10	3.83
$0.4 < \gamma < 0.5$	9	3.45	5	1.92	5	1.92	2	0.77	9	3.45	5	1.92
$0.5 < \gamma < 0.6$	0	0	0	0	1	0.38	2	0.77	2	0.77	2	0.77
$\gamma > 0.6$	19	7.28	24	9.2	13	4.98	19	7.28	15	5.75	15	5.75
#Subjects	260		260		259		260		260		259	

Table 3. Unconditional mean marginal degree of positionality by reference groups.

	mean	standard deviation	95% confidence interval	
			lower	*upper*
Friends	0.151	0.221	0.124	0.178
Neighbors	0.166	0.238	0.137	0.195
Relatives	0.129	0.192	0.105	0.152
Colleagues	0.140	0.217	0.113	0.166
People of the same age	0.141	0.206	0.116	0.166
All other people in Addis	0.133	0.203	0.108	0.157
Overall	0.141	0.134	0.125	0.158

Table 4. Unconditional mean marginal degree of positionality by reference groups and socio-demographic characteristics of subjects.

reference groups	Male	Female	Employed/Self-employed	Unemployed /others	Married	Divorced /Widowed	Single	Low-Education	Medium-Education	High-Education
Friends	0.134	0.163	0.166	0.138	0.164	0.163	0.126	0.147	0.158	0.150
	(0.207)	(0.230)	(0.232)	(0.210)	(0.242)	(0.234)	(0.182)	(0.217)	(0.212)	(0.240)
Neighbors	0.160	0.170	0.160	0.172	0.203	0.174	0.120	0.151	0.169	0.191
	(0.235)	(0.240)	(0.235)	(0.240)	(0.282)	(0.231)	(0.177)	(0.224)	(0.233)	(0.268)
Relatives	0.111	0.141	0.110	0.145	0.156	0.146	0.085	0.147	0.122	0.103
	(0.156)	(0.213)	(0.163)	(0.213)	(0.223)	(0.198)	(0.137)	(0.205)	(0.193)	(0.160)
Colleagues	0.141	0.139	0.121	0.156	0.161	0.149	0.108	0.131	0.156	0.134
	(0.222)	(0.215)	(0.197)	(0.234)	(0.252)	(0.226)	(0.162)	(0.204)	(0.237)	(0.219)
People of the same age	0.104	0.167	0.123	0.157	0.132	0.155	0.138	0.137	0.168	0.113
	(0.158)	(0.231)	(0.179)	(0.226)	(0.207)	(0.217)	(0.196)	(0.192)	(0.238)	(0.184)
All other people in Addis	0.128	0.136	0.136	0.130	0.161	0.143	0.094	0.150	0.122	0.113
	(0.199)	(0.206)	(0.205)	(0.201)	(0.228)	(0.213)	(0.157)	(0.216)	(0.208)	(0.168)
Overall	0.130	0.150	0.132	0.150	0.159	0.155	0.112	0.144	0.149	0.126
	(0.124)	(0.141)	(0.117)	(0.148)	(0.140)	(0.150)	(0.108)	(0.141)	(0.135)	(0.120)
#Subjects	108	152	122	138	96	75	89	118	79	63

Table 5. Interval regression estimation results by alternative reference groups.

Dependent variable=intervals of marginal degree of positionality

	Reference groups					
	Friends	*Neighbors*	*Relatives*	*Colleagues*	*People of same age*	*All other people*
Age	-0.005	-0.002	0.001	-0.002	-0.006	-0.004
	(0.004)	(0.004)	(0.003)	(0.004)	(0.004)	(0.003)
Age-squared	0.00003	0.00001	-0.00003	0.00001	0.00001	0.00001
	(0.00004)	(0.00004)	(0.00003)	(0.00005)	(0.00004)	(0.00003)
Female(=1)	0.025	0.015	-0.009	-0.007	0.047 *	-0.011
	(0.030)	(0.029)	(0.024)	(0.027)	(0.028)	(0.025)
Married(=1)	-0.022	-0.0001	0.006	-0.007	-0.020	-0.005
	(0.032)	(0.030)	(0.032)	(0.032)	(0.027)	(0.025)
Single(=1)	-0.106 **	-0.102 ***	-0.089 **	-0.070 *	-0.062	-0.094 ***
	(0.047)	(0.038)	(0.035)	(0.043)	(0.041)	(0.031)
Paid worker(=1)	0.022	-0.041	-0.049 *	-0.023	-0.023	-0.002
	(0.030)	(0.028)	(0.026)	(0.027)	(0.028)	(0.028)
Self-employed(=1)	0.010	0.00001	-0.040	-0.038	-0.022	-0.021
	(0.031)	(0.042)	(0.029)	(0.032)	(0.028)	(0.027)
Secondary education	0.034	0.074 **	-0.008	0.062 *	0.053 *	-0.019
	(0.031)	(0.033)	(0.027)	(0.032)	(0.030)	(0.030)
High education	0.014	0.094 **	-0.012	0.038	0.000	-0.026
	(0.035)	(0.041)	(0.029)	(0.035)	(0.024)	(0.033)
Migrant to Addis	0.012	-0.029	-0.013	0.011	0.031	-0.027
	(0.023)	(0.024)	(0.022)	(0.025)	(0.023)	(0.024)
Log (household size)	-0.044 *	0.007	0.008	0.032	0.016	-0.005

	(0.023)		(0.020)		(0.016)		(0.022)		(0.020)		(0.018)	
Log (household income)	-0.015	*	-0.026	**	-0.007		-0.012		-0.013		0.001	
	(0.008)		(0.011)		(0.007)		(0.009)		(0.008)		(0.007)	
Other income (=1)	-0.015		-0.026		-0.002		0.012		-0.005		0.020	
	(0.022)		(0.027)		(0.022)		(0.026)		(0.023)		(0.021)	
Constant	0.415	***	0.412	***	0.274	*	0.284	**	0.319	**	0.283	**
	(0.155)		(0.155)		(0.143)		(0.138)		(0.142)		(0.134)	
Regions in Addis (a)	yes		yes		yes		yes		yes		yes	
Ethnic group in Addis (b)	yes		yes		yes		yes		yes		yes	
Prob>chi-squared	0.003		0.017		0.003		0.390		0.017		0.059	
Sigma	0.161	***	0.175	***	0.145	***	0.164	***	0.154	***	0.152	***
	(0.011)		(0.013)		(0.012)		(0.014)		(0.012)		(0.013)	
Pseudo-loglikelihood	-483.072		-499.356		-460.424		-488.155		-475.957		-471.689	
#obs	258		258		257		258		258		257	

Notes: The upper limit is assumed to be 1 and lower limit is assumed to be 0 in the interval regressions;
(a) there are 5 regions in our sample: Kirkos, Arada, Addis Ketama, Yeka, Gullele (Kirkos is excluded);
(b) there are 4 ethnic classifications: Amhara, Oromo, Tigray and Others (Amhara is excluded);
[*],[**], and [***] indicate significance at 10%, 5%, and 1% level.

Table 6. Marginal degree of positional concerns: 1,000 bootstrap estimates and confidence intervals with percentile method.

	Reference groups					
	Friends	*Neighbors*	*Relatives*	*Colleagues*	*People of same age*	*All other people*
All						
MDPC	0.073	0.003	0.056	0.070	**0.147** *	0.018
std.err.	(0.088)	(0.091)	(0.071)	(0.073)	**(0.081)**	(0.074)
PCI	(-0.026,0.322)	(-0.012,0.363)	(-0.011,0.263)	(-0.012,0.277)	**(-0.012,0.298)**	(-0.018,0.275)
Males						
MDPC	0.071	-0.005	0.122	0.141	0.107	0.031
std.err.	(0.111)	(0.124)	(0.088)	(0.116)	(0.088)	(0.108)
PCI	(-0.039,0.364)	(-0.068,0.446)	(-0.054,0.299)	(-0.056,0.412)	(-0.040,0.297)	(-0.069,0.350)
Females						
MDPC	0.144	0.052	0.054	0.023	**0.271** **	0.048
std.err.	(0.113)	(0.115)	(0.091)	(0.095)	**(0.109)**	(0.090)
PCI	(-0.039,0.408)	(-0.031,0.439)	(-0.035,0.336)	(-0.039,0.316)	**(-0.045,0.397)**	(-0.042,0.307)
Employed/Self-employed						
MDPC	0.018	-0.039	0.070	0.078	0.127	0.002
std.err.	(0.120)	(0.115)	(0.086)	(0.091)	(0.084)	(0.103)
PCI	(-0.055,0.420)	(-0.052,0.403)	(-0.028,0.327)	(-0.042,0.340)	(-0.034,0.299)	(-0.044,0.344)
Unemployed						
MDPC	0.110	0.045	0.022	0.054	0.159	0.036
std.err.	(0.098)	(0.109)	(0.090)	(0.107)	(0.118)	(0.090)
PCI	(-0.039,0.355)	(-0.023,0.412)	(-0.026,0.324)	(-0.036,0.404)	(-0.039,0.442)	(-0.055,0.320)
Married						
MDPC	0.171	0.116	**0.335** ***	0.135	**0.395** ***	**0.218** *
std.err.	(0.123)	(0.150)	**(0.119)**	(0.136)	**(0.107)**	**(0.122)**
PCI	(-0.064,0.435)	(-0.082,0.524)	(-0.0412,0.401)	(-0.083,0.464)	**(-0.053,0.381)**	**(-0.052,0.413)**
Single						

MDPC	0.035	0.014	0.033	0.131	0.102	-0.010
std.err.	(0.093)	(0.092)	(0.077)	(0.090)	(0.114)	(0.084)
PCI	(-0.041,0.322)	(-0.042,0.348)	(-0.041,0.288)	(-0.028,0.328)	(-0.049,0.391)	(-0.050,0.289)
Widowed/Divorced						
MDPC	0.172	-0.165	0.079	0.111	0.159	0.101
std.err.	(0.150)	(0.129)	(0.105)	(0.137)	(0.130)	(0.120)
PCI	(-0.080,0.539)	(-0.041,0.459)	(-0.059,0.365)	(-0.083,0.476)	(-0.073,0.448)	(-0.077,0.389)
No education						
MDPC	0.148	0.125	0.084	0.081	**0.253** **	0.153
std.err.	(0.103)	(0.101)	(0.085)	(0.094)	**(0.100)**	(0.102)
PCI	(-0.041,0.377)	(-0.042,0.364)	(-0.025,0.318)	(-0.041,0.339)	**(-0.046,0.364)**	(-0.047,0.356)
Middle education						
MDPC	0.110	-0.038	0.072	0.213	**0.232** *	0.048
std.err.	(0.132)	(0.146)	(0.110)	(0.135)	**(0.128)**	(0.116)
PCI	(-0.041,0.435)	(-0.082,0.522)	(-0.064,0.392)	(-0.063,0.533)	**(-0.048,0.347)**	(-0.069,0.403)
High education						
MDPC	0.047	0.008	0.041	0.004	0.052	-0.043
std.err.	(0.155)	(0.184)	(0.107)	(0.145)	(0.137)	(0.116)
PCI	(-0.090,0.548)	(-0.067,0.666)	(-0.070,0.410)	(-0.075,0.510)	(-0.054,0.526)	(-0.043,0.412)

Notes: Each result is obtained using 1,000 bootstrap replications to interval regressions;
MDPC is the marginal degree of positional concern;
Std.err. is the bootstrap standard error and PCI is the percentile method confidence intervals;
[*],[**],and [***] indicate significance at 10%, 5%, and 1% level.

Paper III

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
EL 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% 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

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

considered productive investments.

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 analyze 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 8^{th} 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

[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).

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% 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 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% 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%, began receiving remittances in the past five years, while the corresponding share for urban households is 65%. 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% (34% in rural areas and 32% in urban areas) have at least one member abroad, and 20% (22% in urban areas versus 19% in rural 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%), the USA (20%), Sudan and the United Arab Emirates (12%) and South Africa (8%). 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%), female (60%), and approximately 41% completed secondary education or higher.

Among the households with at least one migrant abroad, 52% 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

[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.

[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.

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%, 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%.

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 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% of the households received remittances every second month or more frequently, 14% received remittances every third month, and 17% 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%) state that they mainly spend the remittances they receive on daily needs such as food, followed by debt repayment (13%), housing/land (10%) and ceremonies (10%). Remittances were to a lesser extent

[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.

used for investments in education (5%), agriculture (4%), and for savings (3%) as well as to buy durable goods (3%).[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%) and for investments in housing and land (13%). Not surprisingly, agricultural investments are restricted to rural households: approximately 6% 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% of the urban households spend the remittances primarily on daily needs. A significant share of the urban households (19%) spends remittances received on ceremonies. Remittance spending on education (8%) and saving (6%) is also more common among urban households. Hence, the 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.

[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.

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:

$$y_{ij} = \alpha + \tau d_j + X_{ij}\beta + \varepsilon_{ij} \tag{1}$$

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:

$$\tau_{ATE} = E[y|X, d = 1] - E[y|X, d = 0] \tag{2}$$

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:

$$ATT = E[y_1|d = 1] - E[y_0|d = 1] \tag{3}$$

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

Replacing $E[y_0|d = 1]$ with the expected value of $E[y_0|d = 0]$ (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:

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

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 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

[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.

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]

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

[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 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.

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 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

[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

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 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

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.

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

[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.

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.

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used. Table 6 presents the descriptive statistics for the asset outcome variables for all households and by remittance status.

[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]

[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.

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 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

[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.

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 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%). 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% 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%) in the sample of households with low subjective well-being in 2006 that rate their well-being 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% 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.

5.4 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.

[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% level in the two first specifications and at the 10% 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

[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.

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.

5.5 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 r*elative 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% 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% 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% 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.

[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.

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.

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% compared to 38% 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
	(0.853)	(0.788)	(0.790)	(0.866)	(0.862)
Observations	998	200	171	798	646

Notes: Standard errors in parenthesis. 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) 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 (4) 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

Notes: 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

Notes: 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)

Notes: 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***
	(0.060)	(0.065)	(0.069)
Community controls	yes	Yes	Yes
Observations	998	969	817

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. 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
	(0.070)	(0.067)
Community controls	yes	yes
Observations	813	798

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. 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	

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

Notes: ***p<0.01, **p<0.05, *p<0.1. 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 embers 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	

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

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

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

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

Paper IV

Do International Remittances Stimulate Private Transfers?

Panel Data Evidence from Urban Ethiopia*

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Abstract

International remittances can have important impacts on the households who receive them. However, the effects of remittances might also carry trickle-down effects on other households in the migrant origin country through informal systems of private transfers. Using rich panel data from urban Ethiopia spanning more than a decade, we investigate how international remittances affect the sending of private transfers. The results show that receiving international remittances increases the likelihood of sending internal transfers among low educated households, while the same effect is not found for highly educated households. The difference in transfer response to remittances between low-educated and highly-educated households seems to be partly driven by differences in transfer behaviour during an adverse economic shock.

Keywords: International Remittances; Private inter-household transfers; Ethiopia; Panel Data; Fixed Effects.
JEL Classification: O12, O15, F24

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1 Introduction

Transfer flows in the form of remittances and other private inter-household transfers play an important role in developing countries, where formal credit- and insurance markets are often weak and households are vulnerable to adverse shocks. International remittances have increased globally over the past decades, and the level of remittances to the developing world amounted to 307 billion USD in 2009 (World Bank, 2011). Remittances can help smooth consumption, loosen liquidity constraints and finance long-term human and physical capital investment (Taylor, 1999). There is currently a vast number of studies investigating the impact of international migration and remittances on poverty and inequality in the migrant origin country.[1] Most of these studies find that remittances reduce poverty in developing countries (see for example Adams et al., 2008 for Ghana; Lokshin et al., 2010 for Nepal; Taylor et. al, 2005 for Mexico; Yang & Martinez, 2006 for the Philippines), while the impact on inequality is more ambiguous. Due to the often-high costs involved in international migration, migrants tend to be found at the higher ends of the income distribution and international remittances can thus lead to an increase in inequality (see for example Barham & Bucher, 1998, for Nicaragua; Rodriguez 1998 for the Philippines; and Adams & Cuecuecha 2010 for Indonesia). However, it was also found that as the number of migrants increase, income inequality may be reduced due to network effects that lowers the migration costs and make migration affordable to low-income households (see for example McKenzie and Rapoport, 2007; Taylor et al. 2005). A related strand of literature has studied private inter-household transfer flows within countries (see for example Cox 1987; Cox et al. 1998b; 2004). Studies from different developing countries indicate that a large share of the households are involved in private financial transfers and gift-giving with other households (see for example Kazianga, 2006) and that households use these transfers as risk-sharing mechanisms (Fafchamps & Lund, 2003; Foster & Rosenzweig, 2001).

Although remittances and household private transfer flows have been studied quite extensively in the literature, much less is known about the dynamics and inter-linkages between receiving remittances and the sending of private inter-household transfers. Receiving remittances might enable the household to share more of its resources with

[1] For a review of recent empirical findings on the economic impacts of international remittances on the developing world see Adams (2011) and Rapoport and Docquier (2006).

other households, which could lead to trickle-down effects to non-migrant households that do not directly receive remittances. This paper investigates whether international and internal remittances stimulate the sending of private inter-household transfers in Ethiopia. The country has seen a rapid increase in the amounts of international remittances in the last decade, and remittances have proved to play an important role for household's poverty status in urban Ethiopia (Alem, 2011), and for household subjective wellbeing among both urban and rural households (Andersson, 2012). Understanding the potential link between remittances and private transfer flows is important to understand all channels through which remittances can affect poverty and inequality in the migrant source country.

The literature on the impact of remittances on private inter-household transfers is very scarce. We are only aware of one other study that explores this topic. Beyene (2012) finds a positive link between international remittances and private transfers sent out in urban Ethiopia using the 2004 wave of the Ethiopian Urban Socio-economic Survey (EUSS). We take this study as a starting point, and extend the analysis in several ways. First, we investigate the effect of remittances on private transfers over a time period of fifteen years (1994 to 2009). Having access to panel data enables us to take into account unobserved household heterogeneity (e.g., risk and time preferences) that could affect both the likelihood of receiving remittances and the likelihood of sending private transfers. The time period covered by the data is interesting because it captures the substantial increase in remittances that has taken place in Ethiopia over the last decade. The last part of the data also covers a time of extreme food price inflation in Ethiopia: food prices increased by over 90 percent in the summer of 2008 (Central Statistics Agency, 2008; 2009). This allows us to explore how the link between remittances and private inter-household transfers is affected by a severe adverse economic shock in the form of accelerating food inflation that particularly affected urban households.

Second, we attempt to understand if different types of households differ in their transfer response to remittances by looking separately at low- and high-educated households.[2] The education level of the household head is often used to proxy the underlying ability of the household to generate income, and previous empirical evidence

[2]Low education is here defined as having primary education or lower, high education refers to having finished secondary education or higher.

gives support to this link in the context of Ethiopia. Alem (2011) and Bigsten et al. (2003) show that education significantly reduces the probability of being poor in urban Ethiopia. Similarly, Alem & Söderbom (2012) find that higher (tertiary) education of the household head is an important determinant of household consumption levels. However, the authors do not find education to play a role for the ability to cope with the 2008 food price shock. Finally, internal remittances are also added to the analysis to investigate if remittances sent within the country stimulate the sending of private transfers.

We find fixed effect regression results consistent with previous findings by Beyene (2012), showing that receiving international remittances stimulate the sending of private inter-household transfers. However, our results suggest that there is heterogeneity in the effect across households depending on education level. We find a strong impact of international remittances on both the probability to send transfers and the amount of transfers sent for low educated households, while the effect is not significant for households with higher education level. This difference between low- and high-educated households seems partly driven by an adverse shock in the form of severe food price inflation. While the transfer pattern of low educated households does not seem to be affected by a food price shock, highly educated households change their transfer behaviour. One possible explanation may be differences in the underlying transfer motives. Low educated households being more prone to engage in informal risk-sharing networks could explain why they still keep transferring parts of the remittances they receive to other households also during an adverse shock, while high-educated households do not. More careful investigation of the descriptive statistics reveals that low-educated households who receive transfers also to a larger extent send transfers themselves compared to non-receiving households. This type of reciprocity in transfers is not found among high-educated households, which may suggest that mutual insurance is an important motive behind transfer patterns specifically for low-educated households. Finally, as opposed to international remittances, internal remittances do not seem to stimulate the sending of private transfers.

The remainder of the paper is organised as follows. Section 2 gives a background to international remittances and private transfer flows in developing countries. Section 3 describes these types of transfer flows in the context of Ethiopia. Section 4 describes the data and methodology. The results are presented in section 5. Section 6 provides a

discussion of the results and concludes.

2 Private Inter-household Transfer Flows

Private inter-household transfer sources are likely to be the main providers of loans and transfers in developing countries, with limited public welfare programs and imperfect formal markets. Households form economic ties with each other and engage in income transfers, exchange of gifts or other transactions to smooth consumption. In a seminal paper, Townsend (1994) shows how households within a village create informal arrangements to mitigate risk. It has also been shown that inter-household transfers, remittances and gifts are used for consumption smoothing purposes in rural areas (Lucas & Stark, 1985; Rosenzweig, 1988). Fafchamps & Lund (2003) find that households in rural Philippines rely on gift giving and zero-interest informal credits as a risk sharing mechanism within a network of friends and relatives. Although the literature on private inter-household transfers mainly has focused on rural households, there is also evidence that such transfers play an important role for risk sharing in urban areas in developing countries (see Cox & Jimenez, 1998a; Kanzianga, 2006; Alvi & Dendir, 2009).

Apart from acting as an important risk sharing mechanism, private inter-household transfers can potentially affect household welfare by redistributing the income gains from remittances sent from abroad. Most studies that investigate the impact of remittances on households in the origin country assume that the benefits of the remittances are exclusively destined at those households who directly receive the remittances. One exception is a study by Yang and Martinez (2006) investigating the impact of international remittances on poverty and inequality in the Philippines. The authors acknowledge that remittances might have broader effects on households who do not receive remittances through household direct transfers. Their results show that an increase in remittances due to an exchange rate shock led to a decrease in poverty not only for migrant households but also for non-migrant households. An increase in the amount of remittances received from abroad also raised the gift receipts by non-migrant households, suggesting that transfers between migrant and non-migrant households could at least partly explain the poverty reductions among non-migrant households.

How the sending of inter-household transfers respond to remittances received will

ultimately depend on the motives for sending transfers. Although determining the underlying transfer motives go beyond the scope of this paper, theories of why households send transfers can give some guidance in predicting how the receiving of remittances affect the sending of private transfers. There are three main motives for sending private inter-household transfers discussed and tested in the literature: the *altruistic model* where the donor is driven by care of the well-being of the recipient and transfers depend on the financial situation of the donor and the recipient (Becker, 1974); the *exchange motive model* where transfers are driven by reciprocity (Cox, 1987; Foster & Rosenzweig, 2001); and finally the *mutual insurance model* where the donor enter into mutual agreements and use transfers to smooth consumption (Townsend, 1994).[3] Previous empirical tests of the motives for private transfers have typically been carried out by investigating how private transfers vary with the income of the *recipient* of the transfer.[4] The studies are often motivated by concerns of "crowding out", i.e., if public transfers are followed by compensatory reductions in private transfers so that the effect of the public transfer programs might ultimately be neutralised. This study will take the income (or more precisely the remittance income[5]) of the *donor* into account to discuss how different motives could imply different predictions regarding the relationship between remittances and private transfers. If altruism is the dominant motive, and the donor is concerned with the wellbeing of the recipient, an increase in remittances will lead to an increase in the sending of transfers. The same prediction holds for the exchange motive: an increase in remittances received enables the donor to send more transfers to benefit from more services from transfer recipients. However, the predictions are more ambiguous if the decision to send private transfers is based on insurance motives. Dercon (2005, p.17) argues that households may have incentives to leave a risk-sharing arrangement if they feel that staying in the arrangement is no longer in their interest. For example, this could occur when the household experience a positive income shock and prefers to make private investments rather than use the money to support others, or when the household has access to a new source of risk reduction or protection. Consistent with this reasoning, households who re-

[3]In addition to these three motives, Mitrut & Nordblom (2010) also find social norms to be an important determinant for gift giving in Romania.

[4]One exception is a study by Clément (2008) that also develops predictions for how private transfers vary with the income of the donor.

[5]In this study we do not include household income due reasons that are further discussed in the empirical strategy section.

ceive remittances, and particularly remittances from abroad, might be less willing to engage in informal insurance systems if they feel that the exogenous income source in the form of remittances is protection enough against adverse shocks. Hence, the effect of remittances on private transfers is not clear a priori.

Transfer motives may also affect how transfer patterns respond to an adverse shock. If the motives are altruistic, an adverse shock that affects the income of the household may lead to a decrease in the transfers sent. However, if other motives are at play, such as mutual insurance, the shock may not automatically translate into a decrease in private transfers sent out.

3 The Ethiopian context

Ethiopia makes an interesting case study when investigating the link between remittances and private inter-household transfers. International remittance flows to the country have increased rapidly over the past decade. Alvi & Dendir (2009) show that households in urban areas in Ethiopia use transfers (including remittances, inter-household transfers and gifts) as insurance against risks. The authors find that about one third of the households are involved in transfer activities and that gifts and transfers respond positively to measures of vulnerability such as unemployment and sickness of the household head.

The historic migration patterns in Ethiopia have been characterised by a mix of economic, political and environmental factors. A noticeable international out-migration took place after the 1974 revolution and the political upheavals and instability that followed. The migrants were predominantly young and educated people from the urban elite. Later, the wish to migrate spreads to other parts of the urban population, and in the 1980's the Middle East attracted migrants from both rural and urban areas (Aredo, 2005). The migration flows to the Middle East has since then expanded, especially among women, and is today one of the largest migration flows in Ethiopia (Fransen & Kuschminder, 2009; Kebede, 2002). International remittances to Ethiopia substantially increased in recent years. According to World Bank estimates, the amount has increased almost three times in only a few years: from a value of 46 million USD in 2003 to a value of 387 million USD in 2010. The National Bank of Ethiopia reports even higher numbers: 661 million USD in 2009-2010, as cited in Geda & Irving (2011). The

discrepancy is probably due to the difficulty in estimating remittances sent through informal channels.

Internal migration flows are larger than the international migration flows in Ethiopia (Fransen & Kuchminder, 2009). However, information about internal migration and remittances is relatively scarce. The 2008 Ethiopian Urban Migration Survey (World Bank, 2010), conducted among a representative sample of 1,115 households in Addis Ababa, showed that although a large share of the internal migrants (more than 75 percent) stay in touch with their family and relatives in the origin area, only 13 percent of the migrants send remittances back to their family. Slightly higher remittance rates were found by de Brauw et al. (2011) among migrants in a matched sample of rural households and internal migrants. About one third of the migrants in their sample sent remittances, which is a relatively low share in comparison with some of the large migration countries such as the Philippines and China, but quite similar to other African contexts such as South Africa and the Kayes area of West Africa.[6] Migrants without skilled employment were less likely to send remittances, which suggest that internal remittances are low for cost reasons.

One purpose of this paper is to study how the link between remittances and private transfers may be affected by an adverse shock. During 2007 and 2008, Ethiopia experienced serious food price inflation. The peak of the inflation occurred in July 2008, when food price inflation surpassed 90 percent.

There are reasons to believe that urban households are particularly vulnerable to food price shocks given that formal insurance markets are scarce in Ethiopia and the urban households spend a large share of their budget on food, while little food production takes place in urban Ethiopia (Alem & Söderbom, 2012). According to Headey et al. (2012), the impact of the food price shock implied a large decline in the welfare of poor urban wage earners as the real daily labourer wages (deflated by the urban poor's food consumer price index) fell by 26 percent from mid-2007 to mid-2008.

[6]See de Brauw et al. (2011) for further details.

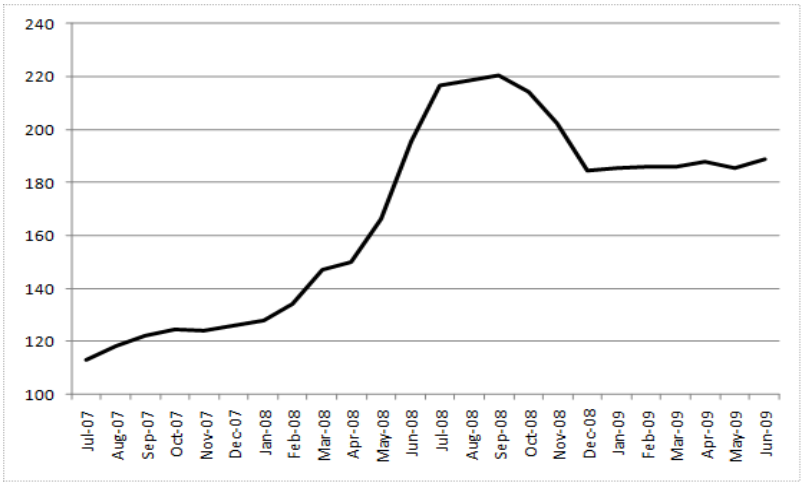

Figure 1: Food price index, Ethiopia, July 2007- June 2009. (December 2006=100)
Source: *Central Statistical Agency (2008; 2009)*

4 Data and Empirical Strategy

This study uses five rounds of the Ethiopian Urban Socio-economic Survey (EUSS), a panel dataset covering four major urban areas of Ethiopia (Addis Ababa, Hawassa, Mekelle, and Dessie[7]) collected in the years 1994, 1997, 2000, 2004, and 2009.[8] A stratified sampling technique was used to form a total of 1500 households, which represent the urban population.[9] The last wave of the data was collected in late 2008 and early 2009 from a sub-sample of the original households in the four cities following a similar sampling strategy. Out of the 709 households surveyed in the 2009 round, 128 were new households chosen randomly and incorporated in the sample. These new households were surveyed to investigate how well the panel households who were

[7]In addition, three other cities were covered the survey (Bahir Dar, Jimma, and Dire Dawa) in the 1994-2004 waves. Households in these cities were not surveyed in the 2009 round due to resource constraints and are therefore not included in the study.

[8]Data was also collected in 1995. However, to maintain a fairly even gap between rounds, this wave is dropped from the analysis, except when it comes to the transfer variables which were not collected in 1994. We therefore use the 1995 values for the year 1994. Since 1994 and 1995 overlap with approximately five months in the Ethiopian calendar and the survey questions concern transfers in the 12 months prior to the survey, this should not significantly affect the data.

[9]For more details of the survey and sampling strategy see Bigsten et al. (2005).

originally sampled in 1994 represent the urban population of Ethiopia. Alem & Söderbom (2012) find no significant difference in economic status, measured by household consumption levels, between the original panel households and the newly incorporated households conditional on observable household characteristics, which imply that the data reasonably represents urban Ethiopia. Along with the 128 newly incorporated households in 2009, there are an additional 453 households that only have observations for one of the survey years in the data. The final sample used in this study includes 1285 households, with observations for at least two of the five years in the data, and in total 4426 observations. A majority of the households in the sample, 75 percent, reside in the capital city Addis Ababa, 7 percent reside in Hawassa and 9 percent reside in Dessie and Mekelle, respectively.

The dataset contains rich information on individual- and household level characteristics such as household demographics, education, health, occupation status and household consumption. In addition, information about internal and international remittances received and transfers sent by the household in the past 12 months prior to the survey is included. Private transfers recorded in the survey can be divided into three main categories: remittances from abroad, remittances from domestic sources, and gifts received.[10] In this study we focus on the first two transfer flows. The survey recorded both cash and values of in-kind transfers. In the case of in-kind remittances, the household was asked to estimate the monetary value in the local currency Birr. The variable for transfers sent by the household is derived from a summary question in the survey asking for the amount of transfer given out by the household in the 12 months prior to the survey. The question about private transfers given out is hence not as detailed as the questions about transfers received.[11] There is no information about whether the transfer was sent in cash or in-kind or who the receiver of the transfer was.

[10]The survey also includes questions on public transfers, such as food aid and food-for-work. These transfers represent very small proportions of the transfers received by the households, and are excluded from the analysis.

[11]As discussed by for example Cox et al. (2004) and Beyene (2012), asking much more detailed questions about transfers received compared to transfers sent out could potentially lead to an underestimation of the transfers sent out.

4.1 Model specifications

Our main specification is the following linear model:

$$r_{it} = x'_{it}\beta + \alpha_i + u_{it} \quad (1)$$

$$\epsilon_{it} = \alpha_i + u_{it} \quad (2)$$

where the dependent variable r_{it} is a dummy taking the value one if the household has been sending private transfers in the past 12 months (prior to the survey), and zero otherwise, (in some alternative specifications r_{it} is the log value of transfers sent out). x_{it} represents a vector of explanatory variables, α_i is a term capturing unobserved household heterogeneity, and u_{it} is a random error term. The main variables of interest are international and internal remittances, measured as a dummy that takes the value one if household has received remittances (or the amount of remittances received depending on the specification). The other explanatory variables include individual characteristics of the household head (age, gender, occupation, education), household characteristics (monthly consumption expenditures per adult equivalent[12], number of members in the various occupation categories, number of members of the household below the age of 15, number of elderly members above 65 years old, and the location of the household), and a set of year dummies.

Previous research has also suggested that there might be different underlying motives for private transfers depending on the standard of living of the household (Cox et al. 2004; Kazianga, 2006; Clément, 2008). It is therefore possible that the transfer response to remittances might depend on how well off the household is. We use education level of the household head (to reflect underlying ability to generate income) to investigate heterogeneous effects across households. The sample is divided according

[12]The use of income versus consumption when studying household welfare in devleoping countries has been subject to some discussions. Due to challeges in accuratly measuring income due to underreporting, volatility and recall bias, consumption are often prefered over income measures (See for example Deaton, 1997; Deaton & Grosh, 2000). We therefore include consumption among the control variables. Consumption expenditures are reported on a monthly and weekly basis by the household and include both food (value of food purchased from the market and food obtained in the form of gifts or aid) and non-food (clothing, footwear, energy, personal care, utilities, health and education) items. The aggregate monthly consumption measure was then converted into adult equivalences to adjust for household size and composition using World Health Organization (WHO) conversion codes.

to education level of the household head, and separate regressions are run for households with low and high education level. Low education is defined as having no education or primary education, and high education is defined as secondary education or higher.[13]

To control for unobserved household characteristics, Fixed Effects models are used to run the main specifications in the analysis, while OLS regressions are included as a baseline. Where the dependent variable is binary, we also run regressions using a probit model for robustness. Because a significant share of the households in the sample are not involved in any transfer activities, the dependent variable will take value zero for a substantial part of the households which might give rise to biased results. We address the concern of censored data by running regressions using Tobit models (pooled and random effects). Furthermore, the regressions including the total amount of remittances (i.e., remittances both in-kind and in cash) are complemented with estimations that include remittances only in cash.[14]

4.2 Household transfer activities

Table 1 provides summary statistics of household transfer flows for all households and separately by household education level and year. All amounts are expressed in 1994 Ethiopian Birr[15].

[Table 1 about here]

Among all households, the share of households that receive international and internal remittances has increased over time, with the largest increase occurring between the two last waves of the data. In 2009, 27.2 percent of the households receive international remittances and 25.9 percent receive internal remittances, compared to 2004 when the shares were 13.9 percent and 11.1 percent, respectively. The share of households sending private transfers also increased substantially between 2004 and 2009,

[13] A t-test shows that the consumption level of households with a highly educated head is significantly higher than the consumption level of households with a low-educated head.

[14] No separate regressions for remittance in-kind are performed, because the value of remittances received in-kind is relatively low and few households receive only remittances in-kind without receiving remittances in cash.

[15] One USD was approximately five Ethiopian Birr in 1994.

from approximately 9 percent to almost 20 percent. When looking at the amounts of transfer flows, the picture looks a bit different. Remittances received from abroad and from domestic sources both increased in the early years of the panel and decreased in later years. The mean amounts of international remittances received were highest in the years of 1997 and 2000, and lowest in 2009. Internal remittances saw an increase in the years 1994 to 2004, but decreased in 2009 back to levels equivalent to the 1994 value. It thus seems as if although more household receive remittances in later years, they receive smaller amounts, especially in regard to international remittances. One potential explanation could be a change of migration flows over the years. More households sent migrants to the Middle East in recent years, where wages are lower compared to other popular countries of destinations, which may affect the amounts of remittances the migrants are able to send home. Another possible explanation could be that during the food price shock in 2008 the need for remittances increased and migrants consequently sent remittances to more households compared to previous years, while each household received a lower amount.[16]

The mean of transfers given out by the households was stable approximately 600 Birr in 1994 and 1997, decreased a little bit in 2000, increased substantially in 2004 and decreased substantially in the last wave where the mean value of transfers sent out was lower compared to other years. The decrease in the last period of the data might reflect the more difficult times faced by urban households during the food price inflation in 2008. As expected, remittances received from abroad are higher than internal remittances.

When looking at the difference between low and high education households, a larger fraction of the latter receives remittances from abroad in the time period 1994 to 2000, but low-educated households 'catch-up' and the difference is very small in later rounds of the data. Low-educated households are more likely to receive internal remittances in all years except in 2000. Households with high education are more likely to send transfers to others: 27.1 percent for households with high education compared to 14.5 percent for the low-educated in 2009. The highly educated receive higher average amounts of international remittances in the first three years of the data, but less on average compared to low-educated household in 2004 and 2009. The high-educated

[16]The effect could also be due to migrants abroad being affected by the economic crises and consequently sending lower amounts, or due to exchange rate effects.

households also receive higher amounts of internal remittances on average, except in 1994. In regard to the average amounts of transfers sent out, highly educated households send out more transfers to others in 1994 and in 2000, while the low-educated actually transfer higher amounts in all other years. Hence, even though a larger share of high-educated households tends to both receive and send transfers, the average amounts of transfers received and sent are higher for the low-educated households in the later years of the panel.

In Table 2 some descriptive statistics of the variables included in the regression analysis are presented.

[Table 2 about here]

The descriptive statistics reveal that a little more than 50 percent of the household heads in the sample are males, and the head mean age is just above 50 years old. Approximately 41 percent of the heads have higher education (which include secondary education or higher). The average real consumption per adult equivalent per month is 145.7 Birr. The mean age of low-educated household heads are slightly higher (53 years) than the sample average. Only 46 percent of the households with a low-educated head are headed by a male compared to 71.5 percent of the high-educated households. From the descriptive statistics we also find that consumption is higher for high-educated households compared to low-educated households. The average monthly consumption is 118.6 Birr per month for the low-educated and 184.3 Birr for the highly educated.[17] This is consistent with previous findings of the importance of education of the household head as a determinant for household consumption (Bigsten et al., 2003; Alem 2011; Alem & Söderbom 2012), and gives us some confidence that education is a fairly good proxy for household welfare.

5 Results

The first step in the analysis is to explore the impact of international and internal remittances on private transfers among all households in the sample. We first investigate

[17] A t-test shows that the difference in consumption is significant at the 1% level.

the impact of receiving remittances, expressed as a dummy, on the probability of sending transfers, expressed as dummy. In the next specifications, the impact of receiving remittances, expressed in amounts of remittances received, on the sending of private transfers, expressed in amounts sent out, is investigated. The results are presented in Table 3.

[Table 3 about here]

International remittances are shown to have a strong impact on both the probability of sending transfers (column (1) to (4)) and the amounts sent out (column (5) to (8)). The results for the OLS specification in column (1) and (2) and the Fixed-Effects (FE) specifications in column (3) and (4) show that receiving remittances increase the probability of sending transfers, with the coefficient estimate significant at the 1% level in all specifications but column (2) where the significance level is 5%. The results provide point estimates between 0.048 and 0.072 depending on the model and whether controlling for household consumption or not. In the OLS model (columns (1) and (2)), receiving international remittances increases the likelihood of sending out transfers by 7 percent without controlling for consumption, and by 4.8 percent when controlling for consumption. The magnitude in the FE estimation is similar: receiving international remittances increases the probability of sending out transfers by 7.2 percent (without consumption) and 6.7 percent (with consumption control), respectively. Hence, including a control for household consumption causes a larger drop in the point estimate in the OLS model compared to FE. The point estimate of the consumption coefficient is also approximately 50 percent larger in the OLS specification (column 2) compared to FE (column 4). Thus, once household unobserved heterogeneity is controlled for, the consumption level of the household plays a less important role for the sending of private transfers.[18]

The amount of international remittances received also has a significant effect on the amounts of private transfers sent out by the household. The results for the OLS specification (column (5) and (6)) and the FE specifications (column (7) and (8)) show that a one percent increase in the amount of international remittances received generate a 0.070 percent increase in the amount of private transfers sent out in the OLS specification in column (5) and a 0.072 percent increase in the FE specification in column (7).

[18] Analyses using probit and tobit models were also performed, and results remain very similar.

Again, controlling for consumption makes a bigger difference for the point estimates in the OLS estimation: the coefficient drops to 0.05 in the OLS specification compared to 0.067 in the FE specification.

Receiving internal remittances only has a weak effect on the sending of private transfers. The coefficient is significant at a 10% level in the OLS specification for the probability of sending transfers in column (1), and for the amounts of transfers sent in the OLS specification in column (5) and FE specification in column (7). However, the result is not robust for the inclusion of a control for household consumption in neither of the specifications (column (2), (6) and (8)). International remittances thus seem more important than internal remittances for the sending of private transfers.

Among the controls, the numbers of household members who are self-employed or hired in the private sector are important positive determinants of the sending of private transfers in all specifications. The number of members employed in the public sector is positive and significant in all specifications except in the analysis of the impact of amounts sent out using FE in the last two columns. Having a male household head is a strong determinant in the OLS specifications, but not in the FE specifications.[19] The year dummies for the years of 1997 and 2009 are positive and significant in all specifications.[20] Finally, the education level of the household head plays a role for sending private transfers, although the effect is much more pronounced in the OLS specifications. The coefficient for tertiary education is statistically significant in all OLS specifications, but only significant in the FE specification in column (7), which indicates the effect of the amount of remittances on the amounts of private transfers sent out (without controlling for consumption). The magnitudes in the OLS specifications are also larger compared to the FE specifications.

5.1 Heterogeneous effects by education level

To analyse heterogeneous effects across low- and high-educated households, separate regressions for the two household types are carried out. Table 4 shows the impact of receiving remittances on the sending of remittances when the dependent variable

[19]Since the data spans over 15 years, there are a number of households who change household head over this time, which makes it possible for a variable like sex of the household head to vary over time and therefore be included in the FE regression.

[20]The reference year is 1994.

is a dummy variable, and Table 5 shows the results when the dependent variable is expressed in log values.

[Table 4 about here]

The results in Table 4 show that the receiving of international remittances is a strong determinant of sending private transfers for low-educated households. The coefficient is statistically significant at 1% in both the both the OLS (column (1)) and the FE (column (2)) regressions, and robust to the inclusion of a consumption control (column (3)). The point estimates imply that receiving remittances increase the likelihood of sending transfers by 9.1 percent (using OLS), and by 10 percent (not controlling for consumption) and 9.2 percent (when controlling for consumption) in the FE specifications. However, the results look different for the high-educated households. The coefficient estimates are not statistically significant and the magnitude only approximately one third compared to the coefficient for the low-educated households. When looking at the year effects, we find that year 2009, together with 1997, has a positive and statistically significant effect on the sending of private transfers. For highly educated households, we instead find a negative and statistically significant effect of the year 2000 and 2004 (1994 being the reference year). It is also interesting to note that consumption level only matters for the sending of private transfers among the low-educated households, while the coefficient for consumption is not statistically significant for the highly educated. A possible explanation could be that households that are better off are less constrained by their available resources. Among the year controls, year 2009 is a strong determinant for sending private transfers for the low-educated households, while it is only statistically significant (at the 10% level) in the OLS specification for the highly educated households. There is no effect of internal remittances on the sending of private transfers for either low- or high-educated households.

We are also interested in knowing how the amounts of international remittances received affect the amounts of private transfers sent out for low- and high-educated households.

[Table 5 about here]

The results show a strong relationship between the amount of international remittances received and private transfers sent out for the low-educated. The coefficient estimate is significant at a 1% level in both the OLS specification in column (1) and to the FE specifications in column (2) and (3). The magnitudes for the FE estimation including consumption in column (3) imply that a one percent increase in the amount of international remittances received increases the amounts of transfers sent out by 0.093 percent. Again, there is a divergence between the results for the low- and high-educated households. Although the coefficient for international remittances for the high-educated households using OLS (column (4)) is statistically significant at 5%, the results do not hold when the analysis is performed using FE (column (5) and (6)).[21] The year effects are similar to those found in Table 4, and although the consumption coefficient now is significant also for highly educated households it still has a stronger impact in terms of statistically significance for low-educated households (significant at the 1% for low-educated households and at 10% for high-educated households). The coefficient for internal remittances is statistically insignificant in all specifications.

In the previous estimations, the measure for remittances include remittances received both in cash and in-kind. Remittances received in the form of cash might be easier to pass on to other households through private transfers, and households might find it difficult to approximate the value in monetary terms of remittances sent in-kind, especially for remittances received from abroad. We therefore also run regressions only including remittances received in cash. The results are found in Table 6.

[Table 6 about here]

In general, the results are similar when only including remittances in cash compared to remittances both in-kind and in cash. The magnitudes are more or less identical for specifications including low-educated households (column (1), (2) and (3)) but drop in the FE specifications for high-educated households (column (5) and (6)). The difference between low- and high-educated households remain, with a slightly larger difference in magnitude between the coefficient estimates of the two groups due to the drop in magnitude for the high-educated households.

[21] The coefficient for international remittances also becomes insignificant when adding a control for consumption to the OLS specification in column (4), and causes a notable drop in the magnitude of the coefficient. Results are available upon request.

5.2 Heterogeneous effects of the 2009 price shock across low- and high-educated households

There is reason to believe that the impact of remittances on private transfers might be different in times of an adverse shock. Furthermore, due to differences in motives for sending transfers, the transfer responses may also systematically vary depending on the household type. We are therefore interested in investigating if private transfer patterns differed when the households were faced by a food price shock. We do so by first excluding the observations in the year 2009 from the sample. The results are displayed in Table 7.

[Table 7 about here]

When year 2009 is excluded, the coefficient estimate for international remittances is significant for both low- and high-educated households. The significance level is 1% for the low-educated and 10% for the high-educated, with similar magnitudes for the two groups. Hence, the previous clear difference between the two groups does not seem to hold when the last year is excluded from the data. Excluding the last round also significantly increases the international remittances coefficient estimates in the regressions for the high-educated households. This indicates that the difference between low- and high-educated households found in the previous regressions is driven by the latest time period in the data, which coincide with the food price shock. It thus seems as if transfer behaviours of low-educated households were comparatively unaffected despite the price shock in 2008, while high-educated households adjusted their transfer patterns.

We apply the same test of removing the last round of the data to the specification using amounts of remittances and private transfers. The results show that when 2009 is excluded, there is no longer any difference between low- and high-educated households in regard to international remittances variable, neither in terms of statistical significance nor in terms of magnitudes.

[Table 8 about here]

Thus, it seems as if different mechanisms are at play in 2009, which affects the transfer response to remittances among highly educated households but less so among low-educated households.

6 Discussion and Conclusion

This paper uses an extensive panel data set from urban Ethiopia to investigate if receiving remittances affects private inter-household transfers sent out. A better understanding of the linkages between international remittances and other types of transfers offers insights into the possible spill-over effects international remittances may have on poverty and inequality in the migrant origin community.

Taken together, the results first of all suggest that international remittances matter for the sending of private transfers, whereas internal remittances do not. A possible explanation for the difference is that the amounts of remittances received from abroad are larger in magnitude. International remittances could also be seen as a source of income that is exogenous to local conditions and the local economy and therefore perceived as a more stable source of income over time.[22] We also note that the controlling for unobserved household characteristics by the use of a fixed effects estimator does not dramatically change the overall results in regard to sign and significance levels of the coefficient for international remittances compared to the pooled OLS-estimator, but it effects the magnitudes and also generates differences in regard to the inclusion of a consumption variable.

There are heterogeneous effects in the transfer response to receiving international remittances across low- and high-educated households. The impact of international remittances on private transfers sent out is only significant for households with a low educated household head, and not for households with high-educated household heads. This effect seems partly driven by differences between the two groups in the last time period. We do not find any difference between low- and high-educated households when the last round of the data is removed from the sample for the low-educated sample. The transfer patterns of the low-educated households remain stable to the inclusion and exclusion of the last round of the data, while the results change for the highly educated households.

There are two distinct features that make the last round of the data different from the other time periods included in the data. The first relates to the severe food price inflation that occurred in the country in 2008, just before the last round of the data

[22]International remittances have shown to be less volatile than other private capital flows, and may even rise in response to economic cycles in the recipient country (Ratha, 2003).

was collected. The second is the large increase in the share of households receiving remittances and sending transfers in between the two last rounds of the data. These two features are possibly interlinked if private transfers are used as insurance in times of an adverse shock in a context without access to formal insurance systems. The increase in remittances received could also be linked to increasing international migration flows in recent years, especially to the Middle-East, which may have translated into an increase in the number of households that receive remittances (but not necessarily higher mean amounts of remittances because the wages in the Middle-East are lower compared to wage levels in many other migration destination countries).

Previous research has shown that households with a higher level of education are less prone to be poor (Bigsten et al. 2003; Alem, 2011). At the same time, a higher level of education did not seem to have a significant impact on the ability to cope with the 2008 food price shock (Alem & Söderbom 2012). This indicates that there are somewhat different mechanisms at play during an adverse shock, which also seem to affect transfer patterns. This could be explained by a difference in transfer motives between low- and high-educated households. If low-educated households engage in private transfers through informal insurance systems, while households with higher education level, and therefore better prospect to generate income, are less dependent on such systems, high-educated households may be more vulnerable during a severe adverse shock when the importance of informal insurance systems is most pronounced. Without any information on the receiver of the private transfers sent out it is very difficult to directly test the reason behind the difference in transfer response to international remittances across low- and high-educated households. However, some further investigation of the descriptive statistics may shed more light on the possible mechanism at play, especially during a time of shock.

The 2009 wave of the data includes a question on household coping strategies during adverse shocks. We are particularly interested in the data on coping mechanisms adopted during a food price shock.[23] A look at the descriptive statistics in Table 9 first of all shows that assistance from other households (family and friends) is an important mechanism in regard to coping with a food price shock. For the overall sample, it is the second most important strategy after cutting back on quantities per served meal:

[23] As shown by Alem & Söderbom (2012), the most widespread and severe shock that the households faced was by far food price shock: 94 percent of the households stated that they had experienced such a shock, and 87 percent identified the increase in food price as the most influential shock to the household.

approximately 22 percent of the household state assistance from relatives or friends as their main coping mechanism.

[Table 9 about here]

Not surprisingly, among the households who receive remittances the share that states assistance from family and friends as the main strategy is considerably higher (40 percent, compared to 15 percent for non-remittance receiving households). While high-educated households who do not receive remittances use different strategies to cope with a shock, non-remittance receiving households with low education are much more prone to cut back on the quantities per served meal (approximately 43 percent use this strategy, compared to 26 percent among high-educated households). In Table 10 we divide the sample according to transfer sending and non-sending households.

[Table 10 about here]

When comparing the coping mechanisms between households who send transfers to those who do not send transfers in the overall sample we find that the former are slightly more likely to rely on assistance from family and friends (approximately 26 percent) compared to those who do not send transfers (approximately 21 percent). Comparing coping mechanisms across low- and high-educated households reveals an interesting difference. We find that in regard to high-educated households, receiving assistance from family and friends is more common among households who do not send private transfers, while the opposite pattern is found for low-educated households. The share of highly educated households who receive help from family and friends is about the same in the group of households who send private transfers and the group of households who do not (22 percent compared to 18 percent). The difference is however considerably larger for low-educated households: 21 percent among the non-sending households compared to 35 percent among the household who do send transfers out. A t-test also reveals that this difference among the low-educated households is statistically significant, while it is not for the highly educated. Although the descriptive statistics do not identify a causal relationship, it does indicate that some

sort of reciprocity in transfers among low-educated households who engage in sending private transfers. This might suggest that informal transfer systems are more important for low-educated households, especially during an adverse food price shock.[24]

Another pattern to explore is the aforementioned sharp increase in the share of households who receive and send transfers in the last round of the data. About half of the households who receive remittances in the last round did not receive remittances in any of the other rounds. It is possible that these households have different characteristics and transfer patterns compared to households who were involved in private transfers in previous rounds. We explore such potential difference, with specific focus on differences between the low- and high-educated samples, by comparing the characteristics of those households that only receive remittances in the last year with households who receive remittances in one or several of the previous rounds of the data. The descriptive statistics first of all shows that those households who receive remittances only in 2009 have lower mean household consumption compared to the other households in the last round of the data. The difference is even more pronounced when comparison is made to the sample of households who received remittances in the 2009 round and in at least one of the other years included the data. Another feature of the households who only received remittances in the last round is that they do not seem to send out transfers to the same extent as households who receive remittances also in other rounds. This difference is larger for the highly educated. We can therefore not exclude the possibility that this difference in the sample of highly educated households who received remittances in 2009 and the rest of the years may have contributed to some of the difference between low- and high-educated households observed in the data.[25]

Hence, the results found in the paper indicate that international remittance can lead to spill-over effects by sending private transfers but that transfer patterns may differ across different types of households. Specifically, we find evidence of differences in the change of transfer patterns between low- and high-educated households when the households are facing an adverse shock. While the transfer pattern remains stable for

[24]The 2009 wave of the panel is the only year that includes a module on shock coping mechanisms, so it is not possible to compare these results to coping mechanisms in response to other shocks in different years.

[25]This may however also be linked to the food price shock if certain households, who are more vulnerable to such a shock, start receiving remittances during the shock period.

the low-educated households, high-educated households seem more prone to change their transfer behaviour in response to such a shock. The findings in this paper calls for more research to better understand what motivates inter-household transfers, especially during periods of economic shock.

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Table 1: Descriptive statistics for transfer variables, overall and by education of household head

Variable	1994	1997	2000	2004	2009
All households					
International remittances received (dummy)	0.060	0.073	0.107	0.139	0.272
Internal remittances received (dummy)	0.093	0.109	0.086	0.111	0.259
Private transfers sent out (dummy)	0.094	0.120	0.081	0.092	0.195
International remittances (amount, real value)	3 009.298	4058.931	4028.195	3717.313	2280.827
Internal remittances (amount, real value)	867.294	1015.180	1241.799	1445.942	886.525
Private transfers sent out (amount, real value)	596.775	590.507	488.904	891.649	491.949
Low education					
International remittances received (dummy)	0.046	0.055	0.097	0.139	0.265
Internal remittances received (dummy)	0.102	0.119	0.080	0.130	0.276
Private transfers sent out (dummy)	0,052	0,087	0.075	0.071	0.145
International remittances (amount, real value)	2 748.857	3999.127	4022.389	4124.617	2336.157
Internal remittances (amount, real value)	903.837	1005.795	1091.791	1204.257	839.330
Private transfers sent out (amount, real value)	520.016	592.346	433.196	1020.858	526.081
High education					
International remittances received (dummy)	0.086	0.103	0.117	0.139	0.284
Internal remittances received (dummy)	0.078	0.091	0.091	0.084	0.231
Private transfers sent out (dummy)	0.170	0.204	0.087	0.122	0.271
International remittances (amount, real value)	3 260.759	4115.318	4032.623	3135.450	2201.662
Internal remittances (amount, real value)	782.030	1036.676	1362.458	1979.071	972.901
Private transfers sent out (amount, real value)	638.407	589.122	533.218	783.536	463.873

Note: The mean amounts of remittances received/transfers sent are restricted to those households who receive remittances/send transfers.

Transfers are reported for the period 12 months prior to the survey. Remittances include both values in cash and in-kind. All amounts expressed in 1994 Ethiopian Birr.

Table 2: Descriptive statistics

	All sample		Low education		High education	
Variable	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**
Household head						
Age of head	50.168	13.693	53.541	13.426	45.356	12.590
Age of head squared	2704.276	1433.344	3046.851	1477.601	2215.582	1210.507
Head Male	0.567	0.496	0.463	0.499	0.715	0.451
Head-Employer or own-account worker	0.266	0.442	0.332	0.471	0.171	0.377
Head-civil/public servant	0.198	0.399	0.096	0.295	0.344	0.475
Head Private sector employee	0.079	0.270	0.057	0.232	0.111	0.314
Head-casual worker	0.111	0.314	0.118	0.323	0.100	0.300
Head out of labor force	0.346	0.476	0.396	0.490	0.274	0.446
Household variables						
No. of own-account worker members	0.160	0.481	0.189	0.540	0.118	0.379
No. of civil/public servant members	0.255	0.580	0.214	0.558	0.313	0.603
No. of private sector employee members	0.322	0.694	0.281	0.645	0.383	0.756
No. of casual worker members	0.144	0.473	0.184	0.545	0.086	0.337
No. of unemployed members	0.614	1.005	0.666	1.035	0.538	0.955
No. of out of labor force members	1.488	1.375	1.468	1.375	1.514	1.369
No. of children	1.819	1.669	1.874	1,716	1.742	1.598
No. of elderly	0.077	0.282	0.070	0.261	0.087	0.310
Resides in Addis	0.750	0.433	0.737	0.440	0.770	0.421
Resides in Dessie	0.088	0.283	0.085	0.279	0.090	0.287
Resides in Hawassa	0.071	0.257	0.065	0.246	0.081	0.273
Resides in Mekelle	0.090	0.286	0.113	0.317	0.059	0.235
Real consumption expenditures/adult eq.	145.663	171.116	118.552	124.032	184.347	217.3936
Year 1994	0.215	0.411	0.236	0.425	0.191	0.393
Year 1997	0.224	0.417	0.229	0.420	0.186	0.389
Year 2000	0.215	0.411	0.179	0.383	0.277	0.448
Year 2004	0.217	0.412	0.221	0.415	0.221	0.415
Year 2009	0.129	0.335	0.135	0.342	0.126	0.331
Head has higher education	0.412	0.492				
Number of observations	4426		2602		1824	

Note: All amounts expressed in 1994 Ethiopian Birr. The consumption variable is here expressed in real values (local currency Birr) and in logarithmic form in the regression analysis.

Table 3: The impact of remittances on private transfers sent out

VARIABLES	(1) OLS	(2) OLS incl. consumption	(3) FE	(4) FE incl. consumption	(5) OLS	(6) OLS incl. consumption	(7) FE	(8) FE incl. consumption
Dummy for international remittances	0.070***	0.048**	0.072***	0.067***				
	(0.019)	(0.019)	(0.019)	(0.019)				
Dummy for internal remittances	0.028*	0.025	0.026	0.025				
	(0.016)	(0.016)	(0.018)	(0.018)				
Log of international remittances					0.070***	0.050***	0.072***	0.067***
					(0.015)	(0.015)	(0.014)	(0.014)
Log of internal remittances					0.027*	0.022	0.025*	0.023
					(0.014)	(0.014)	(0.015)	(0.015)
Age of head	-0.001	-0.000	0.001	0.002	-0.005	-0.002	-0.000	0.004
	(0.002)	(0.002)	(0.003)	(0.003)	(0.011)	(0.011)	(0.017)	(0.017)
Age of head squared	-0.000	-0.000	-0.000	-0.000	0.000	0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Head Male	0.037***	0.032***	0.009	0.005	0.216***	0.190***	0.066	0.042
	(0.011)	(0.011)	(0.021)	(0.021)	(0.061)	(0.060)	(0.114)	(0.114)
Head-Employer or own-account worker	0.030**	0.024*	0.026	0.026	0.202***	0.163**	0.145	0.146
	(0.013)	(0.013)	(0.020)	(0.020)	(0.076)	(0.073)	(0.110)	(0.109)
Head-civil/public servant	0.029*	0.025	-0.012	-0.012	0.145	0.114	-0.141	-0.140
	(0.017)	(0.017)	(0.025)	(0.025)	(0.093)	(0.090)	(0.135)	(0.134)
Head Private sector employee	0.019	0.016	-0.005	-0.006	0.114	0.097	-0.020	-0.032
	(0.020)	(0.020)	(0.027)	(0.027)	(0.116)	(0.112)	(0.149)	(0.149)
Head-casual worker	-0.023	-0.010	0.003	0.007	-0.119	-0.042	-0.029	-0.010
	(0.014)	(0.014)	(0.025)	(0.025)	(0.078)	(0.077)	(0.137)	(0.137)
No. Of own-account worker members	0.022*	0.026**	0.034***	0.033**	0.168**	0.192***	0.256***	0.253***
	(0.012)	(0.011)	(0.013)	(0.013)	(0.067)	(0.063)	(0.071)	(0.070)
No. Of civil/public servant members	0.027***	0.023**	0.024**	0.023**	0.134**	0.109**	0.101	0.098
	(0.010)	(0.010)	(0.012)	(0.011)	(0.053)	(0.052)	(0.063)	(0.062)

No. Of private sector employee members	0.045***	0.038***	0.020**	0.019**	0.279***	0.233***	0.109**	0.102**
	(0.009)	(0.009)	(0.009)	(0.009)	(0.059)	(0.058)	(0.050)	(0.050)
No. Of casual worker members	-0.011	0.002	-0.001	0.002	-0.046	0.031	0.017	0.033
	(0.007)	(0.007)	(0.013)	(0.013)	(0.038)	(0.038)	(0.070)	(0.070)
No. Of children	0.001	0.009***	0.005	0.008	0.009	0.059***	0.035	0.052*
	(0.003)	(0.003)	(0.005)	(0.005)	(0.019)	(0.019)	(0.028)	(0.028)
No. Of elderly	-0.014	-0.009	-0.003	0.000	-0.120	-0.091	-0.070	-0.050
	(0.018)	(0.017)	(0.024)	(0.024)	(0.096)	(0.093)	(0.128)	(0.128)
Year 1997	0.036**	0.028**	0.037***	0.032**	0.178**	0.134*	0.181**	0.152**
	(0.014)	(0.014)	(0.014)	(0.014)	(0.075)	(0.075)	(0.077)	(0.077)
Year 2000	-0.013	-0.019	-0.008	-0.015	-0.095	-0.132*	-0.073	-0.116
	(0.014)	(0.014)	(0.015)	(0.016)	(0.075)	(0.075)	(0.084)	(0.085)
Year 2004	-0.009	-0.018	-0.003	-0.013	-0.053	-0.105	-0.007	-0.063
	(0.013)	(0.013)	(0.016)	(0.016)	(0.075)	(0.075)	(0.086)	(0.087)
Year 2009	0.068***	0.066***	0.077***	0.068***	0.222**	0.211**	0.303***	0.245**
	(0.020)	(0.020)	(0.020)	(0.021)	(0.106)	(0.104)	(0.111)	(0.111)
Head primary schooling completed	0.025**	0.019*	-0.002	-0.000	0.106*	0.068	-0.054	-0.046
	(0.011)	(0.011)	(0.018)	(0.018)	(0.062)	(0.061)	(0.096)	(0.096)
Head secondary schooling completed	0.050***	0.029**	0.029	0.028	0.256***	0.126*	0.117	0.107
	(0.013)	(0.013)	(0.020)	(0.020)	(0.072)	(0.073)	(0.111)	(0.111)
Head tertiary schooling completed	0.144***	0.099***	0.044	0.040	1.008***	0.726***	0.306*	0.281
	(0.026)	(0.026)	(0.032)	(0.032)	(0.166)	(0.163)	(0.172)	(0.172)
Log real cons. exp/adult eq.		0.064***		0.038***		0.400***		0.232***
		(0.007)		(0.009)		(0.042)		(0.051)
Constant	0.052	-0.263***	0.006	-0.193**	0.341	-1.618***	0.232	-0.960*
	(0.053)	(0.062)	(0.083)	(0.096)	(0.307)	(0.362)	(0.454)	(0.523)
City fixed effects	Yes	Yes	No	No	Yes	Yes	No	No
Observations	4,426	4,425	4,426	4,425	4,425	4,424	4,425	4,424
R-squared	0.066	0.086			0.078	0.103		
Number of households			1,285	1,285			1,285	1,285
Number of observations			4426	4426			4426	

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Dependent variable in column (1) to (4) is a dummy for transfers (in Birr) sent out in the 12 months prior to the survey private. Dependent variable in column (5) to (8) is the logarithmic amount of private transfers sent (in Birr) in the 12 months prior to the survey. OLS clustered at household level. All amounts expressed in 1994 Ethiopian Birr. Dummy variables for city of residence included in OLS, not in FE estimations due to no variation across years. Household head being out of labour force is the reference category for household head occupation status, and Mekelle is reference city among city controls.

Table 4: The impact of remittances on private transfers sent out, by education level

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	FE	FE Low edu.	OLS High	FE	FE High edu.
VARIABLES	**Low education**	**Low edu.**	**incl. consumption**	**edu.**	**High edu.**	**incl. consumption**
Dummy for international remittances	0.091***	0.100***	0.092***	0.043	0.033	0.033
	(0.024)	(0.025)	(0.025)	(0.028)	(0.039)	(0.038)
Dummy for internal remittances	0.018	0.017	0.015	0.044	0.062	0.060
	(0.018)	(0.020)	(0.020)	(0.030)	(0.042)	(0.042)
Year 1997	0.036**	0.042***	0.039**	0.036	0.037	0.033
	(0.014)	(0.016)	(0.016)	(0.029)	(0.029)	(0.029)
Year 2000	0.020	0.035*	0.028	-0.058**	-0.079**	-0.086**
	(0.016)	(0.020)	(0.020)	(0.026)	(0.037)	(0.037)
Year 2004	0.015	0.033	0.023	-0.053**	-0.086**	-0.092***
	(0.014)	(0.020)	(0.020)	(0.025)	(0.035)	(0.035)
Year 2009	0.070***	0.081***	0.071**	0.069*	0.035	0.027
	(0.023)	(0.028)	(0.028)	(0.036)	(0.045)	(0.045)
Log real cons. exp./adult eq.			0.035***			0.032
			(0.011)			(0.021)
Constant	0.038	-0.077	-0.240*	0.055	-0.082	-0.262
	(0.067)	(0.113)	(0.124)	(0.096)	(0.193)	(0.226)
Controls for household characteristics	Yes	Yes	Yes	Yes	Yes	Yes
City fixed effects	Yes	No	No	Yes	No	No
Observations	2,602	2,602	2,601	1,824	1,824	1,824
R-squared	0.047			0.063		
Number of observations		2,602	2,601		1,824	1,824

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Dependent variable is a dummy for transfers (in Birr) sent out in the 12 months prior to the survey. High education refers to household head having secondary education or higher. OLS clustered at household level. All amounts expressed in 1994 Ethiopian Birr. Household characteristics included in the specifications. Dummy variables for city of residence included in OLS, not in FE estimations due to no variation across years.

Table 5: The impact of remittances on private transfers sent out, by education level

VARIABLES	(1) OLS Low education	(2) FE Low education	(3) FE Low education incl. consumption	(4) OLS High education	(5) FE High education	(6) FE High education incl. consumption
Log of international remittances	0.090***	0.101***	0.093***	0.046**	0.044	0.044
	(0.020)	(0.017)	(0.017)	(0.023)	(0.029)	(0.029)
Log of internal remittances	0.019	0.020	0.018	0.041	0.057	0.054
	(0.016)	(0.017)	(0.017)	(0.027)	(0.037)	(0.037)
Year 1997	0.172**	0.191**	0.169**	0.198	0.204	0.172
	(0.073)	(0.081)	(0.081)	(0.164)	(0.164)	(0.164)
Year 2000	0.084	0.140	0.094	-0.364**	-0.456**	-0.502**
	(0.084)	(0.105)	(0.105)	(0.147)	(0.206)	(0.207)
Year 2004	0.086	0.179*	0.118	-0.298**	-0.456**	-0.498**
	(0.077)	(0.105)	(0.106)	(0.148)	(0.196)	(0.197)
Year 2009	0.205*	0.246*	0.184	0.283	0.134	0.077
	(0.111)	(0.143)	(0.143)	(0.208)	(0.252)	(0.254)
Log real cons. exp/adult eq.			0.226***			0.215*
			(0.059)			(0.118)
Constant	0.438	-0.126	-1.173*	0.091	-0.659	-1.882
	(0.399)	(0.584)	(0.642)	(0.525)	(1.085)	(1.273)
Controls for household characteristics	Yes	Yes	Yes	Yes	Yes	Yes
City fixed effects	Yes	No	No	Yes	No	No
-squared	0.056			0.069		
Number of observations	2602	2,602	2,601	1823	1,823	1,823

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Dependent variable is logarithmic amount of private transfers (in Birr) sent out in the 12 months prior to the survey. High education refers to households head having secondary education or higher. OLS clustered at household level. All amounts expressed in 1994 Ethiopian Birr. Household characteristics included in all specifications. Dummy variables for city of residence included in OLS, not in FE estimations due to no variation across years.

Table 6: The impact of remittances on private transfers sent out, remittances only in cash

VARIABLES	(1) OLS Low education	(2) FE Low education	(3) FE low education incl. consumption	(4) OLS High education	(5) FE High education	(6) FE High education incl. consumption
of international remittances(cash)	0.090***	0.092***	0.083***	0.031	0.016	0.016
	(0.021)	(0.018)	(0.018)	(0.024)	(0.030)	(0.030)
of internal remittances (cash)	0.023	0.026	0.024	0.044	0.064	0.061
	(0.017)	(0.018)	(0.018)	(0.030)	(0.041)	(0.041)
Year 1997	0.176**	0.196**	0.174**	0.208	0.216	0.184
	(0.073)	(0.081)	(0.081)	(0.165)	(0.164)	(0.164)
Year 2000	0.084	0.140	0.094	-0.365**	-0.447**	-0.494**
	(0.085)	(0.105)	(0.106)	(0.147)	(0.206)	(0.207)
Year 2004	0.084	0.186*	0.123	-0.295**	-0.441**	-0.484**
	(0.077)	(0.105)	(0.106)	(0.149)	(0.196)	(0.198)
Year 2009	0.204*	0.260*	0.195	0.306	0.181	0.122
	(0.112)	(0.143)	(0.144)	(0.207)	(0.253)	(0.254)
Log real cons. exp/adult eq.			0.233***			0.218*
			(0.059)			(0.118)
Constant	0.416	-0.115	-1.195*	0.094	-0.600	-1.837
	(0.397)	(0.585)	(0.644)	(0.525)	(1.087)	(1.276)
Controls for household characteristics	Yes	Yes	Yes	Yes	Yes	Yes
City fixed effects	Yes	No	No	Yes	No	No
squared	0.054			0.068		
Number of observations	2,601	2,601	2,600	1,823	1,823	1,823

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Dependent variable is logarithmic amount of private transfers (in Birr) sent out in the 12 months prior to the survey. Remittances include only cash transfers (not in-kind). High education refers to households head having secondary education or higher. OLS clustered at household level. All amounts expressed in 1994 Ethiopian Birr. Household characteristics included in all specifications. Dummy variables for city of residence included in OLS, not in FE estimations due to no variation across years.

Table 7: The impact of remittances on private transfers sent out, excluding year 2009

VARIABLES	(1) FE Low edu excl. 2009	(2) FE Low edu excl. 2009 incl. consumption	(3) FE High edu excl. 2009	(4) FE High edu excl. 2009 incl. consumption
Dummy for international remittances	0.099***	0.093***	0.098**	0.098**
	(0.030)	(0.030)	(0.045)	(0.045)
Dummy for internal remittances	0.032	0.031	0.077	0.077
	(0.023)	(0.023)	(0.051)	(0.051)
Year 1997	0.040***	0.038**	0.031	0.032
	(0.015)	(0.015)	(0.028)	(0.028)
Year 2000	0.038**	0.034*	-0.095**	-0.094**
	(0.019)	(0.019)	(0.037)	(0.037)
Year 2004	0.030	0.024	-0.083**	-0.083**
	(0.020)	(0.020)	(0.035)	(0.036)
Log real cons. exp/adult eq.		0.023*		-0.002
		(0.012)		(0.022)
Year 2009				
Constant	0.022	-0.087	0.072	0.083
	(0.120)	(0.132)	(0.223)	(0.258)
Controls for household characteristics	Yes	Yes	Yes	Yes
R-squared	0.035	0.038	0.040	0.040
Number of observations	2,251	2,250	1,595	1,595

Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Dependent variable is a dummy for transfers (in Birr) sent out in the 12 months prior to the survey. High education refers to households head having secondary education or higher. In column (1) to (4) year 2009 is excluded, in column (5) to (8) year 2004 is excluded. All amounts expressed in 1994 Ethiopian Birr. Household characteristics included in all specifications. Dummy variables for city of residence included in OLS, not in FE estimations due to no variation across years.

Table 8: The impact of remittances on private transfers sent out, excluding year 2009

VARIABLES	(1) FE Low edu. excl. 2009	(2) FE Low edu. excl. 2009 incl. consumption	(3) FE High edu. excl. 2009	(4) FE High edu. excl. 2009 incl. consumption
Log of international remittances	0.085***	0.078***	0.091***	0.091***
	(0.021)	(0.021)	(0.033)	(0.033)
Log of internal remittances	0.032	0.029	0.042	0.042
	(0.019)	(0.019)	(0.044)	(0.044)
Year 1997	0.183**	0.166**	0.173	0.170
	(0.078)	(0.078)	(0.159)	(0.160)
Year 2000	0.165	0.131	-0.552***	-0.556***
	(0.104)	(0.104)	(0.207)	(0.209)
Year 2004	0.169	0.126	-0.435**	-0.439**
	(0.108)	(0.108)	(0.199)	(0.201)
Log real cons. exp/adult eq.		0.175***		0.020
		(0.063)		(0.126)
Year 2009				
Constant	0.058	-0.775	0.150	0.032
	(0.641)	(0.706)	(1.259)	(1.456)
Controls for household characteristics	Yes	Yes	Yes	Yes
R-squared	0.040	0.046	0.041	0.041
Number of observations	2,251	2,250	1,594	1,594

Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Dependent variable is logarithmic amount of transfers (in Birr) sent out in the 12 months prior to the survey. High education refers to households head having secondary education or higher. In column (1) to (4) year 2009 is excluded, in column (5) to (8) year 2004 is excluded. All amounts expressed in 1994 Ethiopian Birr. Household characteristics included in all specifications. Dummy variables for city of residence included in OLS, not in FE estimations due to no variation across years.

Table 9: Household (top 5) shock coping mechanisms, all households and by remittance status

	Overall (1)	Do not receive remittances (2)	Receive remittances (3)
Cut back quantities served per meal	32.84	34.68	28.00
Received assistance from relatives, friends etc.	22.20	15.44	40.00
Nothing done	10.28	11.14	8.00
Engage in extra income generating activities	7.71	9.87	2.00
Shift resource from clothing and other	8.26	8.86	6.67
High education			
Cut back quantities served per meal	22.60	21.48	25.42
Received assistance from relatives, friends etc.	21.15	12.75	42.37
Nothing done	8.17	9.40	5.08
Engage in extra income generating activities	9.13	12.75	1.69
Shift resource from clothing and other	11.54	12.75	8.47
Low education			
Cut back quantities served per meal	39.17	42.68	29.67
Received assistance from relatives, friends etc.	22.85	17.07	38.46
Nothing done	11.57	12.20	9.89
Engage in extra income generating activities	6.82	8.13	3.30
Shift resource from clothing and other	6.23	6.50	5.49

Note: Descriptive statistics based on question on how households have coped with increase in food price in past five years (since 2004). Only the five most common coping mechanism categories displayed in the table. Column (2) shows households who received remittances in the 12 months prior to the survey, column (3) displays household who did not receive remittances.

Table 10: Household (top 5) shock coping mechanisms, all households and by inter-household transfers sent out

	Do not send transfers out (1)	Send transfers out (2)
Cut back quantities served per meal	37.16	13.86
Received assistance from relatives, friends etc.	21.40	25.74
Nothing done	10.81	7.92
Engage in extra income generating activities	7.88	6.93
Shift resource from clothing and other	6.98	13.86
High education		
Cut back quantities served per meal	26.14	12.73
Received assistance from relatives, friends etc.	22.22	18.18
Nothing done	8.50	7.27
Engage in extra income generating activities	10.46	5.45
Shift resource from clothing and other	9.80	16.36
Low education		
Cut back quantities served per meal	42.96	15.22
Received assistance from relatives, friends etc.	20.96[1]	34.78[1]
Nothing done	12.03	8.70
Engage in extra income generating activities	6.53	8.70
Shift resource from clothing and other	5.50	10.87

Note: Descriptive statistics based on question on how households have coped with increase in food price in past five years (since 2004). Only the five most common coping mechanism categories displayed in the table. Column (1) shows households who sent inter-household private transfers in the 12 months prior to the survey, column (2) displays household who did not send private inter-household transfers. [1]A t-test shows that the difference in receiving assistance from others between households who send remittances and those who do not is statistically significant for low-educated households (but not for high-educated households).

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