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Exploring the Links

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International Remittances and Private Inter-household Transfers: Exploring the Links*

Yonas Alem† Lisa Andersson ‡

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Abstract

We investigate the effect of remittances from migrated family members on informal inter-household transfers, an issue that has received limited attention in the literature. Using rich panel data from urban Ethiopia, we show that receiving international remittances increases the value of private domestic inter-household transfers, whereas receiving domestic remittances does not have any effect. We also show that the transfers sent respond to shocks to a great extent. Our results provide new evidence on the trickle-down effects of international remittances, effects important to consider when analyzing the impact of international remittances on household outcomes in recipient countries.

JEL Classification: D12, O12, O17, O55

Keywords: International Remittances, Inter-household Transfers, Urban Ethiopia

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1 Introduction

In this paper, we use rich panel data spanning 15 years to investigate whether international remittances stimulate inter-household transfers in urban Ethiopia. Households in developing countries are vulnerable to risk and shocks and generally lack access to formal financial markets to insure themselves accordingly. Instead, households engage in a variety of informal strategies to mitigate risk and cope with shocks. For example, they may adjust their production choices and asset portfolios and engage in precautionary savings, gift-giving, and informal transfers (Paxson, 1992; Rosenzweig & Wolpin, 1993; Udry, 1995; Jacoby & Skoufias, 1997). International remittances are a type of informal transfer that has attracted increasing attention in the literature on transfers in developing countries in recent years. According to the World Bank (2011), the value of international remittances to the developing world reached US $350 billion in 2011, which is 50 percent more than the total official development assistance that these countries received from the developed world in the same year. The rapid increase in international remittances has sparked a large number of studies attempting to measure their impact on various household outcomes, including poverty, education, health, labor supply, and investment in recipient countries.[1]

Several previous studies (e.g., Adams et al., 2008 in Ghana; Lokshin et al., 2010 in Nepal; Taylor et. al, 2005 in Mexico; Yang & Martinez, 2006 in the Philippines; and Alem, 2015 in Ethiopia) have documented that remittances improve consumption by recipient households and hence reduce poverty, but 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 & Boucher, 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 reduce the migration costs and make migration affordable to low-income households (see, for example, McKenzie & Rapoport, 2007; Taylor et al. 2005).

Remittances also have been shown to help households reduce consumption volatility (Combes & Ebeke, 2010), loosen liquidity constraints, and finance long-term human and physical capital investment (Taylor, 1999). A related strand of literature has also studied private inter-household transfer flows within countries (see, e.g., Cox, 1987; Cox, et al. 1998b, 2004). Studies from various developing countries indicate that a large share of households are involved in private financial transfers and gift-giving with other households (e.g., Kazianga, 2006) and that households use

[1] See Adams (2011) for an extensive survey of the recent literature on the household-level impact of international remittances in developing countries. Three earlier literature reviews have been undertaken by Lopez-Cordova & Olmedo (2005), Ruizz and Vargas-Silva (2009), and the Social Science Research Council (2009).

these transfers as risk-sharing mechanisms (Fafchamps & Lund, 2003; Foster & Rosenzweig, 2001).

Although the impact of remittances on household outcomes and private transfer flows has been investigated separately in numerous previous studies, much less is known about the inter-linkages between receiving remittances and the sending of private inter-household transfers. Receiving remittances might enable a household to share more of its resources with other households, which could lead to trickle-down effects on non-migrant households that do not directly receive remittances.[2] Investigating this issue is relevant because, if households increase their transfers when they receive international remittances, then the effect of international remittances on welfare in recipient countries extends beyond the direct recipient households. This paper uses five rounds of rich panel data spanning 15 years from urban Ethiopia to investigate whether international and domestic remittances stimulate private inter-household transfers.

Urban Ethiopia is a valuable setting for studying the role of international remittances in stimulating inter-household transfers. The value of international remittances received by the country has increased rapidly in the last decade, and it has been shown that they play an important role in reducing households' poverty (Alem, 2015) and in improving subjective well-being among both urban and rural households (Alem & Köhlin, 2013; Andersson, 2012). In recent years, Ethiopia has also experienced rapid economic growth and double-digit inflation. The high inflation has negatively affected the welfare of the urban population, and informal transfers have become an important coping mechanism (Alem & Söderbom, 2012). In this context, analysis of the potential links between remittances and private transfers using robust panel data models on relatively long panel data provides an important opportunity to explore the additional channels through which remittances can affect household outcomes in migrant source countries.

We provide regression-based evidence that international remittances stimulate private inter-household transfers, while domestic remittances do not. We estimate alternative panel data models, controlling for household fixed effects (time-invariant unobserved heterogeneity) to disentangle the effect of remittances on households' transfer behavior. Our results show that a one percent increase in the value of remittances received from abroad results in a 0.07 percent increase in transfers to other households. This finding provides some evidence on the trickle-down welfare effects of international remittances on households in recipient countries. However, we do not find a statistically significant impact of domestic remittances on inter-household transfers.

The rest of the paper is structured as follows. Section 2 discusses related literature and presents the Ethiopian context. Section 3 describes the panel data, and Section 4 outlines the empirical

[2]Other possible trickle-down effects of international remittances, which are beyond the scope of the current study, are community remittances and transfers. These are remittances sent by migrants to the wider community, e.g., charitable organizations in the countries of origin (Brown et al. 2014) and transfers made by households to community institutions (Deb et al. 2010).

models used in the analysis. Section 5 presents the main empirical results from alternative linear panel data models, and Section 6 concludes the paper.

2 Related Literature

2.1 Private Inter-household Transfers

Private inter-household transfers are likely to be the main source of loans and transfers in developing countries, where there are limited public welfare programs and imperfect formal financial markets. Households form economic ties with each other and engage in income transfers, gift exchange, and other transactions to smooth consumption. In a seminal paper, Townsend (1994) shows how households in a village create informal arrangements to mitigate risk. Empirical evidence shows that inter-household transfers, remittances, and gifts are used for consumption-smoothing purposes in rural areas (Lucas & Stark, 1985; Rosenzweig, 1988). Similarly, Fafchamps and Lund (2003) show that households in rural Philippines rely on gift-giving and zero-interest informal credit as risk-sharing mechanisms within networks of friends and relatives. Although most studies on private inter-household transfers have focused on rural households, there is some evidence that such transfers also play an important role in risk sharing in urban areas of developing countries (e.g., Cox & Jimenez, 1998a; Kanzianga, 2006; Alvi & Dendir, 2009).

Apart from acting as important risk-sharing mechanisms, private inter-household transfers can potentially affect household welfare by redistributing the income gains from remittances sent from abroad. Most studies investigating the impact of remittances on households assume that the benefits are limited to the recipient households. The three exceptions to this observation are Yang and Martinez (2006), Beyene (2012), and Brown et al. (2014). Yang and Martinez (2006) provide empirical evidence from the Philippines that remittances also affect non-recipient households. 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. They also show that an increase in the amount of remittances received from abroad increased the gift receipts by non-migrant households, suggesting that transfers between migrant and non-migrant households could at least partly explain the poverty reduction among non-migrant households in the Philippines. Using a simple insurance model and the 2004 wave of the panel data that we use in the present paper, Beyene (2012) documented that remittances have a positive impact on the amount of transfers sent to other households in urban Ethiopia, controlling for total household income and other covariates. The study by Brown et al. (2014) uses novel survey data on migrant households from Tonga, Samoa and the Cook Islands in Australia to investigate the role of social pressures on migrants to share their income with the wider community in their home country, a phenomenon described as

community remittances. These authors document that social pressures, the impact of which differs across locations, are important determinants of community transfers, which have impact beyond migrant households in the recipient countries.

How the sending of inter-household transfers responds to remittances received ultimately depends on the motives for sending transfers. Although determining the underlying transfer motives goes beyond the scope of this paper, theories of why households send transfers can give some guidance on how receiving remittances affects the sending of inter-household transfers. Three main models explaining the sending of private inter-household transfers are discussed and tested in the literature: *the altruistic model*, where the donor is driven by a concern about 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 enters into mutual agreements and uses transfers to smooth consumption (Townsend, 1994).[3]

Previous empirical studies on the motives driving inter-household transfers have typically been carried out by exploring how these transfers vary with the income of the recipient.[4] The studies are often motivated by concerns about crowding out, i.e., the effect of public transfer programs might be neutralized if public transfers are followed by compensatory reductions in private transfers. Controlling for all other relevant household variables, the present study will take the income (or more precisely the remittance income) of the donor into account to shed light on how different motives could imply different predictions regarding the relationship between remittances and inter-household transfers. If altruism is the dominant motive, and the donor is concerned about the well-being of the recipient, an increase in remittances will lead to an increase in the sending of inter-household transfers. The same prediction holds for the exchange motive: an increase in remittances received enables the donor to send more transfers in anticipation of more assistance in the future from transfer recipients. However, the predictions are more ambiguous if the decision to send inter-household transfers is based on insurance motives. Dercon (2005) 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. This could occur, for example, when a household experiences a positive income shock and prefers to make private investments rather than use the money to support others, or when the household gets access to a new source of risk reduction or protection.

Consistent with Dercon's (2005) reasoning, households that receive remittances, and remittances

[3] In addition to these three motives, Mitrut and Nordblom (2010) find social norms to be an important determinant of gift-giving and sending remittances in Romania, and Brown et al. (2014) find similar motivations for migrants in Australia.

[4] One exception is Clément (2008), who also develops predictions for how inter-household transfers vary with the income of the donor.

from abroad in particular, might be less willing to engage in informal insurance arrangements if they feel that the income source in the form of remittances offers enough protection against adverse shocks. Hence, the effect of remittances on inter-household 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 inter-household transfers sent. The panel data we use in this paper, which spans the period when urban households in Ethiopia were severely affected by the 2008 food price inflation, enables us to shed light on the transfer motives of remittance-receiving households.

2.2 The Ethiopian Context

Ethiopia makes an interesting case study to investigate the links between remittances and inter-household transfers. International remittance flows to the country have increased rapidly over the past decade. Alvi and Dendir (2009) show that households in urban areas in Ethiopia use transfers (including remittances, inter-household transfers, and gifts) as insurance against risks. They show that about one-third of these households are involved in transfer activities and that gifts and transfers respond positively to measures of vulnerability such as unemployment and illness of household heads.

The historic migration patterns in Ethiopia have been shaped 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 spread to other parts of the urban population, and in the 1980s the Middle East attracted migrants from both rural and urban areas (Aredo, 2005). The migration to the Middle East has since then expanded, especially among women, and is today one of the largest migration flows from Ethiopia (Fransen & Kuschminder, 2009; Kebede, 2002). Following the increase in the number of Ethiopian migrants abroad, international remittances to the country have increased substantially in recent years. According to World Bank estimates, the total value of the remittances has increased almost threefold in only a few years: from USD 46 million in 2003 to USD 387 million in 2010. The National Bank of Ethiopia reports even higher numbers: 661 million USD in 2009-2010, as cited in Geda and Irving (2011). The discrepancy is likely due to the difficulty in estimating remittances sent through informal channels. The rapid increase in the amount of international remittances documented by the World Bank and the National Bank of Ethiopia is consistent with the findings by Alem (2015), who shows a 142 percent increase in the number of urban households that received international

remittances in the period 2004-2009.

In Ethiopia, domestic migration flows are larger than the international migration flows (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, shows that, although a large share of the internal migrants (more than 75 percent) stay in touch with their family and relatives in their area of origin, 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 domestic migrants. About one-third of the migrants in their sample sent remittances, which is a relatively low share compared with some of the large migration countries such as the Philippines and China. However, the figure is quite similar to other African contexts such as South Africa and the Kayes area of West Africa.[5] Migrants without skilled employment were less likely to send remittances, suggesting that internal remittances are low for reasons related to economic status.

The recent period when Ethiopia experienced a rapid increase in remittances (especially international remittances) was also characterized by rapid inflation. In July 2008, commodity prices were on average 52 percent higher than 12 months earlier, exhibiting the highest rate of inflation in Ethiopian history. The general inflation the country experienced in that period was mainly driven by food prices rising on average 92 percent in the 12-month period (Central Statistics Agency, 2008, 2009). Urban Ethiopian households were severely affected by the food price inflation and about 87 percent of them reported that it was the most influential shock during that period (Alem & Söderbom, 2012; Headey et al., 2012). Households had to cope with the shock by, for example, cutting back on quantities served per meal and receiving assistance from relatives and friends. One objective of the present paper is therefore to investigate how the links between remittances and inter-household transfers may be affected by an adverse shock.

3 Empirical Approach

Our main aim is to explore the effects of remittances on inter-household transfers in urban Ethiopia, and to shed light on whether the transfer behavior responds to the occurrence of shocks. Thus, our main outcome variable of interest is the real value of money transferred out by households. We specify a linear transfer equation for panel data as follows:

$$F_{it} = \beta_1 I_{it} + \beta_2 D_{it} + \beta_3 X_{it} + C_i + U_{it} \tag{1}$$

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

where subscript i denotes household, and t year. F_{it} is the real value of money sent by household i at time t. I_{it} corresponds to the real value of international remittances received by household i at time t, and D_{it} represents the real value of internal (domestic) remittances received. In addition to these core variables, we include a set of household head variables, other household-level variables, and city and time dummies as controls, X, which determine the amount of money sent by households. C_i corresponds to the household fixed effect (unobserved heterogeneity).

The other explanatory variables captured in X_{it} include characteristics of the household head (age, gender, labor market status, and education); real monthly consumption expenditures per adult equivalent unit, a proxy measure of economic status; and occupational and demographic characteristics of other household members. Our consumption measure was constructed as the sum of food and non-food expenditures. The consumption expenditure aggregated at the household level has been adjusted for spatial and temporal price differences using carefully constructed price indices from the survey. In order to account for economies of scale and differences in needs, we computed consumption expenditure in adult equivalent units.[6]

Previous research has also suggested that there might be different underlying motives for private transfers depending on the standard of living of the sender household (Cox et al. 2004; Kazianga, 2006; Clément, 2008), i.e., the transfer response to remittances might depend on how well off the household is. We investigate this by allowing the effect of receiving remittances to vary with the education level of household heads, which captures the ability of households to generate income. In doing so, we create interaction terms between international remittances and education level of household heads and control for them in the empirical model specified above.

The fundamental problem encountered in estimating Equation (1) using OLS is the possible correlation between X_{it} and C_i. If such a correlation does not exist, i.e., if $E(X_{it}C_i) = 0$, OLS would be consistent. However, if there is no correlation, the random effects model, which works in a Generalized Least Square (GLS) framework, would yield a more efficient estimator of the β parameters. Very often in applied research, however, the assumption is made that $E(X_{it}C_i) = 0$ is strong, even though the $U_{it}s$ are independently distributed. There are several cases under which some of the explanatory variables including remittances (our core variables) would be correlated with the unobserved heterogeneity term C_i. For example, in the context of the transfer equation formulated above, sending a migrant abroad and receiving remittances would most likely be correlated with unobserved household characteristics. It is also possible to argue that, if recipient households that are under pressure to make transfers to other households in their communities are more likely to request more remittances from international migrants, the unobserved household heterogeneity term C_i will be correlated with the remittance variables in the regression model. C_i

[6]See Alem and Söderbom (2012) for details on construction of the consumption variable.

also could be correlated with many other explanatory variables, such as educational achievement, as some household members may have a higher level of motivation to pursue higher level education. All of these possible correlations will introduce endogeneity bias.

The most credible way of estimating the β parameters by disentangling the unobserved heterogeneity term is application of the fixed effects model, which works through OLS estimation of the within transformation of the basic equation stated in (1).[7] One limitation of this estimator, however, is that the coefficients of time-invariant observable characteristics cannot be identified, as they are dropped through the within transformation. If the interest is focused on the time-varying variables of the model, the fixed effects estimator provides the most robust parameter estimates (Wooldridge, 2010). If the random effects model is not supported by the test[8] and there is interest in the βs of the time-invariant variables, the reasonable model to consider is the Hausman-Taylor two-stage model. The model can be specified as:

$$F_{it} = \beta_0 + X'_{1,it}\beta_1 + X'_{2,it}\beta_2 + W'_{1i}\gamma_1 + W'_{2i}\gamma_2 + C_i + U_{it}, \tag{2}$$

where the X variables are time-varying and the W variables are time-invariant. The variables with index 1 are assumed to be uncorrelated with both C_i and U_{it}, while the ones with index 2 are correlated with C_i but not with U_{it}. Hausman and Taylor show that Equation (2) can be estimated by instrumental variables using the following variables as instruments: $X_{1,it}, W_{1i}$, $X_{2,it} - \overline{X}_{2i}$, and $\overline{X}_{1i}$.[9] Identification requires that the number of variables in $X_{1,it}$ is at least as large as that in W_{2i} (Verbeek, 2012).

In order to investigate the magnitude of the relationship between remittances and household transfer behavior, we estimate different panel data models. However, because the model identifies the coefficients of the time-invariant variables, we will mainly use the Hausman-Taylor model to discuss regression results for most of the variables.

4 Data and Descriptive Statistics

Our empirical analysis is based on five rounds of the Ethiopian Urban Socio-economic Survey (EUSS), a panel dataset collected in 1994, 1997, 2000, 2004, and 2009. The first four waves of

[7] This estimator is based on the key assumption that the unobserved household heterogeneity term C_i is time-invariant.

[8] The standard test for this is the Hausman test, which tests for the null hypothesis that $E(X_{it}C_i) = 0$ (Wooldridge, 2010).

[9] The exogenous variables serve as their own instruments, $X_{2,it}$ is instrumented by its deviation from individual means (as in the fixed effects approach), and W_{2i} is instrumented by the individual average of $X_{1,it}$. One attractive advantage of the Hausman-Taylor estimator is that it does not require the use of external instruments.

the data were collected by the Department of Economics at Addis Ababa University in collaboration with the University of Gothenburg. A stratified sampling technique was used to form 1,500 households in total, which represent the Ethiopian urban population. The sample households were allocated to seven representative cities - the capital Addis Ababa, Awassa, Bahir Dar, Dessie, Dire Dawa, Jimma, and Mekelle - based on the proportion of their population. Once the sample size for each city had been set, it was distributed over all weredas (districts) in each urban center. Using the resident registry available at the urban administrative units, households were then selected randomly from half of the kebeles (the lowest administrative units) in each wereda.

The most recent survey, fielded by the corresponding author in late 2008 and early 2009, covered 709 households in Addis Ababa, Awassa, Dessie, and Mekelle.[10] All panel households were surveyed in three of the cities, but not in Addis Ababa, which constituted about 60 percent of the original sample. About 350 of the original households in Addis Ababa were selected following the sampling procedure outlined above. Out of the 709 households surveyed in the 2009 round, 128 were new households chosen randomly and incorporated into the sample. These new households were surveyed in order to investigate whether the panel households initially selected in 1994 had become atypical and not representative of the Ethiopian urban population. Given, for instance, the rapid urbanization and structural change in Ethiopia over the past decade, the newly formed households might be systematically different in their characteristics from the panel households, affecting the representativeness of the data. However, Alem and Söderbom (2012) investigate this and find no significant difference in welfare between the panel and the newly incorporated households.

Given that the sample size had to be reduced substantially in the most recent wave, it is reasonable to be concerned about bias in the estimation results as a result of attrition. Alem (2015) and Alem et al. (2014), who used the panel dataset for related research, attempted to investigate attrition bias using attrition probits (Fitzgerald et al., 1998) and a Becketti, Gould, Lillard, and Welch (BGLW) test (Becketti et al., 1988). Attrition probits represent estimates of binary-choice models for the determinants of attrition in later periods as a function of base year characteristics. The BGLW test, on the other hand, involves investigating the effect of future attrition on the initial period's outcome variable. Based on these tests, the authors conclude that it is unlikely that attrition in the sample would bias the results for the remaining sample.

The dataset contains rich information at the individual and household levels related to household demographics, education, health, labor market status, and household consumption. Information on domestic and international remittances received and transfers sent by households in the 12 months prior to the survey was also included.[11] The transfers recorded in the survey can be divided

[10] Other cities were not covered due to resource constraints.

[11] It is possible to be concerned that some of the international remittances might have been transferred through the household for other households not covered in our survey. However, the EUSS survey questions were explicit and

into three main categories: remittances from abroad, remittances from domestic sources, and gifts received.[12] In this study, we focus on the first two transfer flows. The survey recorded values of both cash and in-kind transfers. In the case of in-kind remittances, the households were asked to estimate the monetary value in the local currency, Ethiopian Birr (ETB). The variable for transfers sent by a household is derived from a survey question about the total value of transfers given by the household in the 12 months prior to the survey. The question about private transfers given is hence not as detailed as the questions about transfers received.[13] There is no detailed information about the recipient households and the purpose of the transfers.

Table 1 provides summary statistics of household transfer flows for all households by year. All amounts are expressed in 1994 Ethiopian birr.[14] As can be seen, the proportion of households that receive international and internal remittances increased over time, with the largest increase occurring between the two last waves. In 2009, 27.2 percent of the households received international remittances and 25.9 percent received domestic remittances, to be compared with the shares in 2004 of 13.9 percent and 11.1 percent, respectively. The share of households sending inter-household transfers also increased substantially between 2004 and 2009, from approximately 9 percent to almost 20 percent. This is the period when Ethiopia experienced rapid inflation. Thus, the rapid increase in the proportion of households receiving remittances and those sending inter-household transfers is not surprising, as households used these informal transfers to deal with the food price shock (Alem & Söderbom, 2012).

Table 1 about here

When looking at the amounts of transfer flows, the picture looks a bit different. Both real international and domestic remittances increased in the early years of the panel and decreased in the last year. The mean amounts of international remittances received in real terms were highest in 2004 and lowest in 2009. Domestic remittances also followed the same trend of increasing and then decreasing in the last round. Thus, it is evident that more households received remittances in later years, but the mean values received in real terms declined over time, especially in the case of international remittances. One potential explanation could be that, during the food price shock in 2008, the need for remittances increased and migrants consequently sent remittances to

asked about remittances received by household members only, who sent them and how they were spent. On average, about 85 percent of international remittances have been used to augment household consumption.

[12]The data in earlier waves did not differentiate between gifts from abroad and gifts from domestic sources. Consequently, we excluded gifts from the analysis. The mean value of gifts received in 2009 in real terms was negligible, about 17.06 ETB, ten times less than the mean value of international remittances. The survey also includes questions on public transfers, such as food aid and food-for-work. These transfers represent a very small proportions of the transfers received by the households and are also excluded from the analysis.

[13]As discussed by, e.g., Cox et al., (2004), asking much more detailed questions about transfers received than transfers sent could potentially lead to an underestimation of transfers sent.

[14]One US $ was approximately five ETB in 1994.

more households than in previous years, reducing the real value of each remittance. Another explanation is related to the rapid inflation the country experienced between 2004 and 2009, which affected the price index used to adjust for spatial and temporal price differences. Remittances and consumption expenditures have been adjusted for spatial and temporal price differences using price indices constructed from the survey. Because prices increased more than three-fold between 2004 and 2009, the nominal value of remittances in 2009 had to be deflated proportionately more than in all other years. Indeed, descriptive statistics from the data show that the mean value of international remittances received in 2009 was 621 birr in nominal terms, about 20 percent higher than the value in 2004, which was 516 birr.[15]

Unlike the proportion of households sending inter-household transfers, the mean value of inter-household transfers sent documents a cyclical trend. Compared to 1994, the mean value of inter-household transfers in real terms increased in 1997, declined in 2000, increased again in 2004 and declined again in 2009. The decrease in the last wave might reflect the more difficult times faced by urban households during the period of high food price inflation in 2008.

5 Regression Results

Table 2 presents panel data regression results for private transfer equations from different linear models for households in urban Ethiopia. To test for the robustness of the effect of remittances on inter-household transfers (both in log form), we estimated the regression using four alternative specifications: pooled ordinary least square (OLS), random effects (RE), fixed effects (FE), and Hausman-Taylor (HT) estimators. The robust Hausman test rejects the random effects estimator (p-value of 0.000) and consequently we do not present the RE results. Estimation results from the other three models are presented in Columns [1]-[3] of Table 2. The full set of variables used in the regressions are presented in Table A.1 in the appendix.

The regression results from all models indicate that international remittances increase inter-household transfers. According to the OLS results, a one percent increase in international remittances results in a 0.049 percent increase in transfers to other households. However, the panel data models that control for time-invariant unobserved factors reveal larger magnitudes. For example, the HT regression results show that a one percent increase in international remittances results in a 0.07 percent increase in transfers sent. This represents a 42 percent increase in the magnitude of the international remittances variable. The results therefore imply a strong need for controlling for unobserved household characteristics while modelling transfer behavior of households. This is consistent with the large literature on international migration, which documents that households

[15] Another plausible reason may be that remittance senders living abroad might have been affected themselves by the global economic crisis during the 2007-2008 period.

sending a migrant abroad and receiving remittances have distinct unobserved characteristics that should be controlled in regressions (Lopez et al., 2005; Ruizz & Vargas-Silva, 2009; Adams, 2011). We do not, however, find a statistically significant impact of domestic remittances. The variable is weakly significant (at 10 percent) in the OLS regression but not in any of the panel data models and its magnitude (0.02) is substantially lower than that of international remittances.
Table 2 about here

As shown in the descriptive statistics presented in the previous section, the strong impact of international remittances on inter-household transfers is likely due to international remittances being larger and having increased substantially in recent years. The results provide evidence that receiving international remittances enables households to share more of their resources with other households, which leads to trickle-down effects on non-migrant households that do not directly receive international remittances. The increases in inter-household transfers in response to international remittances provide some support for the altruistic and insurance motives. About 82 percent of international remittances received by households were sent by their grown children, which suggests additional evidence for these motives.

Sending of inter-household transfers is also influenced by the economic status of the sending household, as measured by the log value of real consumption expenditure per capita. OLS results show that a one percent increase in real consumption expenditure per capita increases transfers sent by 0.41 percent. However, about 25 percent of this impact is explained by unobserved household characteristics. This can be seen from the decline in the magnitude of the consumption variable to 0.31 in the HT model. The positive impact of consumption expenditure on inter-household transfers is consistent with the altruistic motive of sending transfers, i.e., sender households are concerned about the well-being of the recipient and hence increase the transfer amounts as their income increases.

Given that the coefficient of the international remittances variable estimated using the Hausman-Taylor model presented in Table 2 is 0.07, one would wonder if such magnitude is large enough to be economically meaningful. We attempt to shed more light on this using binary models of transfer where the dependent variable and the remittance variables are all dummies. The regression results are presented in Table 3. Column 1 reports results from a pooled probit model, and Column 2 reports the corresponding marginal effects. The panel version of the binary probit model uses a random effects framework with a strong assumption of orthogonality in the vectors of the explanatory variables and unobserved household heterogeneity. In order to generate meaningful parameter estimates, we allowed correlation between the explanatory variables and the unobserved heterogeneity term following Mundlak (1978) and Chamberlain (1982) and estimated the "correlated random effects probit estimator" (Column 3). Column 4 reports the marginal effects from this model. Both models confirm the strong statistical significance of international remittances in

affecting inter-household transfers. According to the marginal effects computed from the correlated random effects probit model (Column 4), a household that receives international remittances has a 3.4 percent higher likelihood of engaging in inter-household transfer. The results also show that domestic remittances are weakly significant (at the 10 percent level) in the binary choice models. Table 3 about here

We will now analyze how inter-household transfers sent are affected by observable household head characteristics. Regression results reported in Table 2 suggest that households headed by individuals with tertiary education and those headed by an employer or a self-employed worker transfer more than the reference groups (uneducated heads and out-of-the-labor-force heads, respectively). OLS results show that, compared with a household with an illiterate head, a household headed by an individual with tertiary education sends 72.4 percent more inter-household transfers. However, controlling for time-invariant household unobservables reduces the impact of tertiary education as well. According to the HT model, the impact of a household being headed by a person with tertiary education is 0.486, representing a 48.6 percent greater inter-household transfer compared with a household headed by an illiterate individual. Previous studies in urban Ethiopia (e.g., Alem & Söderbom, 2012; Alem et al., 2014; Alem, 2015; Gebremedhin & Whelan, 2005) have documented that these types of households enjoy higher levels of consumption and subjective well-being and are less likely to be in poverty. This probably reflects the large return to tertiary education in the rapidly growing Ethiopian urban sector. The results also show that male-headed households are more likely than female-headed households to send inter-household transfers.

The present paper takes a comprehensive view of the household and considers the role of other household members in household decisions. We control for a broad set of other household members' occupational and demographic characteristics in our transfer equations. All three linear models presented in Table 2 suggest that not only household head characteristics but also other household members' occupational and demographic characteristics have a significant effect on the amount of transfers sent. Consistent with our discussion above, households with more members earning a living as a self-employed worker, a civil/public sector worker, or a private sector worker send more inter-household transfers. This likely captures the role of other household members in household-level decisions and highlights the importance of controlling for them in addition to the commonly used household head characteristics. All regression results consistently suggest that households with a larger number of children transfer more. This may appear to be counter-intuitive, as a higher dependency ratio is expected to put financial pressure on the household, thus reducing the tendency to engage in transfer to other households. There is, however, empirical evidence from earlier studies (e.g., Cox & Stark, 1998; Jellal & Wolff, 2000) documenting that parents directly teach children to give to the community. More recently, in Indonesia, Deb et al. (2010) compare households whose children have started households of their own to the grown children's households

and show that parental giving has a direct impact on the adult children's giving behavior. The positive sign of the coefficient for the variable "Number of children members," which we robustly document in this paper, is therefore plausible.

Finally, the coefficients on the city and time dummies indicate a clear spatial and temporal variation in the amount of inter-household transfers sent by households in urban parts of Ethiopia. Compared with the reference group (households in Mekelle), households in the capital Addis transfer 21.2 percent less money to other households. Addis is a more developed metropolitan city than Mekelle, with better access to modern financial institutions. As a result, controlling for all other relevant variables, households in Mekelle may have a lower likelihood of engaging in transfer arrangements. The results also show that inter-household transfers increased significantly in the most recent wave, i.e., in 2009. This wave captured the country's unprecedented food price shock, which led to a significant proportion of households engaging in inter-household transfers. The 2009 wave included a question on households' strategies to cope with the food price shock. The responses to this question are consistent with this observation.[16] The data shows that approximately 22 percent of the households identified assistance from relatives or friends as their main coping mechanism to cope with the food price shock, making it second in importance only to cutting back on quantities served per meal.

Heterogeneous Effects by Education

Previous research has suggested that the motives for inter-household transfers for the sending household may vary with 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 depends on how well off the household is. We investigate whether receiving remittances has a differential impact on transfers sent out by allowing the effect of receiving remittances to vary with the education level of household heads, which captures the underlying ability of households to generate income. In doing so, we created interaction terms between the educational level of household heads and international remittances and ran all regression models.[17]

The regression results with interaction terms for private transfer equations are presented in Table 4. The results provide interesting insights regarding the role of international remittances on inter-household transfers based on education level of household heads. The effect of international

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

[17] The ideal variable that captures the living standard of households would be real consumption expenditure. However, this variable appear to be highly collinear with the value of international remittances. Consequently, we decided to use educational status of heads of households.

remittances on private transfers is lower for households headed by an individual with tertiary education. The magnitude of the interaction term between tertiary education and international remittances is -0.09 and -0.08 in the fixed effects and Hausman-Taylor models, respectively. This indicates that receiving international remittances has a lower effect on inter-household transfers if the household head has completed tertiary education. Households headed by an individual with tertiary education are relatively well off and often the head works in the formal sector. In view of this, they are likely to have access to modern financial institutions and hence are less likely to engage in inter-household transfers.
Table 4 about here

6 Conclusions

Households in developing countries without access to formal financial institutions engage in a variety of informal strategies to deal with risk and shocks. International remittances are a type of informal transfer that has attracted increasing attention in the literature on transfers in developing countries. This paper used five waves of panel data to investigate the role of remittances on inter-household transfer behavior, an aspect that has not received sufficient attention in previous studies. The availability of such a long panel dataset enabled us to control for confounding time-invariant unobserved household factors and explore the role of remittances in households' transfer behavior. We estimated alternative linear panel data models for transfer equations by households in urban Ethiopia.

Regression results show that receiving international remittances increases the value of transfers sent by recipient households. A one percent increase in international remittances results in a 0.07% increase in inter-household transfers sent. The magnitude of domestic remittances, on the other hand, is very low (only a 0.02% increase in transfers in response to a one percent increase in domestic remittances) and statistically insignificant, suggesting that domestic remittance plays little role in stimulating inter-household transfers. The most plausible explanation for these results - suggested by the patterns in our data and the regression results - is that international remittances are larger in amount and have a positive impact on transfers sent, mainly through the altruistic and informal insurance motives. Most international remittances (about 82%) are transferred by children of household heads, providing additional evidence for these motives. We also document that both remittances and private transfers increased substantially in the period when the country experienced a rapid food price shock. This provides strong evidence that informal transfers serve as an important mechanism to cope with shocks.

It is reasonable to wonder about the economic significance of the international remittances

in stimulating private transfer, as the coefficient from the Hausman-Taylor model is only 0.07, although it is statistically significant at the one percent level. Results from the correlated random effects probit model also show that households receiving international remittances are only 3.4 percent more likely to engage in transfers, although again the coefficient is statistically significant at the one percent level. Nevertheless, the paper provides the first comprehensive evidence on the possible role of international remittances in stimulating inter-household transfers, using panel data that tracks the same households for a long period in a developing country. In this sense, the results provide useful insights. If households transfer more when they receive more international remittances, the effect of international remittances on welfare in recipient countries extends beyond the direct recipient households. We document some evidence of this trickle-down effect, and thus our results shed light on the possible additional channels through which remittances can affect household outcomes in migrant source countries.

Although our panel data is rich and the longest ever to be used in the context of our topic, we acknowledge the possible limitations of our study. Our data did not contain information on which countries the international remittances were transferred from, or what were the exact motives for inter-household transfers. In addition, there are other channels - e.g., community remittances and transfers - through which remittances from abroad could have further trickle-down effects that we are not able to capture in the current study due to lack of data. Finally, while the fixed effects estimator assumes that unobserved household heterogeneity is time-invariant, there is a possibility that such heterogeneity varies over time, and as a result the parameter estimates of international remittances would be subject to some endogeneity bias. Future research with more detailed data on households' transfer motives and the characteristics of recipients of inter-household transfers, and research using a more robust empirical framework, such as an instrumental variables estimation method, could shed additional light on the topic explored.

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Table 1: Remittances received and inter-household transfers sent over time

	1994	1997	2000	2004	2009
Received International Remittances	0.060	0.073	0.107	0.139	0.272
	0.237	0.260	0.310	0.346	0.446
Received Domestic Remittances	0.093	0.109	0.086	0.111	0.259
	0.291	0.312	0.280	0.315	0.438
Sent Inter-household Transfers	0.094	0.120	0.081	0.092	0.195
	0.292	0.325	0.274	0.289	0.396
Real Value of International Remittances Received	178.384	282.390	363.772	417.257	181.44
	1141.627	1584.864	1744.703	1630.806	603.630
Real Value of Domestic Remittances Received	81.637	106.538	90.132	130.635	67.1350
	433.543	571.814	546.131	631.136	210.6430
Real Value of Inter-household Transfers Sent	57.102	68.528	34.301	66.911	28.2348
	334.236	407.304	185.512	409.219	205.1867
Observations	968	934	970	979	580

Table 2: The impact of remittances on inter-household transfers sent - linear regression results

	OLS		**FE**		**HT**	
	Coef.	SE	Coef.	SE	Coef.	SE
Real value of international remittances (log)	0.049***	0.015	0.067***	0.014	0.070***	0.014
Real value of domestic remittances (log)	0.022*	0.013	0.023	0.015	0.024	0.015
Real consumption aeu (log)	0.414***	0.042	0.254***	0.053	0.318***	0.049
Age of head	-0.006	0.011	0.001	0.017	-0.003	0.012
Age of head squared	0.000	0.000	-0.000	0.000	0.000	0.000
Head, male	0.173***	0.058	0.019	0.115	0.193***	0.068
Head, primary schooling completed	0.059	0.057	-0.048	0.096	-0.031	0.094
Head, secondary schooling completed	0.115	0.072	0.107	0.111	0.160	0.107
Head, tertiary schooling completed	0.724***	0.155	0.292*	0.172	0.486***	0.162
Head, employer/own-account worker	0.157**	0.068	0.138	0.110	0.163**	0.074
Head, civil/public sector employee	0.116	0.087	-0.143	0.134	0.115	0.088
Head, private sector employee	0.101	0.110	-0.032	0.149	0.091	0.110
Head, casual worker	-0.032	0.078	-0.008	0.137	-0.043	0.099
No. of own-account worker members	0.199***	0.071	0.273***	0.071	0.201***	0.055
No. of civil/public sector employee members	0.108**	0.050	0.104*	0.063	0.129***	0.048
No. of private sector employee members	0.235***	0.051	0.120**	0.051	0.223***	0.039
No. of casual worker members	0.039	0.037	0.054	0.070	0.025	0.056
No. of unemployed members	0.034	0.025	0.058	0.038	0.026	0.028
No. of out-of-labor-force members	0.023	0.021	0.037	0.029	0.016	0.021
No. of children members	0.060***	0.019	0.066**	0.029	0.050***	0.019
No. of elderly members	-0.088	0.090	-0.047	0.128	-0.086	0.094
Addis	-0.195**	0.098	-	-	-0.212**	0.105
Dessie	-0.189	0.123	-	-	-0.207	0.135
Awassa	-0.039	0.145	-	-	-0.022	0.145
Year 1997	0.137*	0.077	0.158**	0.077	0.145*	0.074
Year 2000	-0.135*	0.074	-0.114	0.085	-0.142*	0.078
Year 2004	-0.108	0.077	-0.062	0.087	-0.107	0.077
Year 2009	0.214**	0.105	0.257**	0.112	0.201**	0.095
Intercept	-1.603***	0.360	-1.100**	0.529	-1.175***	0.422
Observations	4424		4424		4424	

Table 3: The impact of remittances on inter-household transfers sent, binary regression results

	[1] POP		[2] PME		[3] CREP		[4] CREME	
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
Received international remittances (dummy)	0.225***	0.078	0.039***	0.015	0.218***	0.081	0.034***	0.013
Received domestic remittances (dummy)	0.164*	0.083	0.028*	0.015	0.170*	0.087	0.027*	0.014
Real consumption aeu (log)	0.421***	0.041	0.065***	0.006	0.271*	0.059	0.043***	0.009
Age of head	-0.005	0.012	-0.001	0.002	-0.005***	0.013	-0.001	0.002
Age of head squared/100	0.001	0.012	0.000	0.002	0.001	0.013	0.000	0.002
Head, male	0.175***	0.066	0.027***	0.010	0.181***	0.071	0.028***	0.011
Head, primary schooling completed	0.174**	0.083	0.028*	0.014	0.154*	0.089	0.024	0.014
Head, secondary schooling completed	0.227**	0.090	0.037***	0.015	0.192**	0.097	0.030**	0.015
Head, tertiary schooling completed	0.405***	0.116	0.078***	0.027	0.316***	0.126	0.050***	0.02
Head, employer/own-account worker	0.083	0.076	0.013	0.013	0.07	0.083	0.011	0.013
Head, civil/public sector employee	0.127	0.086	0.021	0.015	0.109	0.091	0.017	0.014
Head, private sector employee	0.065	0.105	0.01	0.017	0.072	0.115	0.011	0.018
Head, casual worker	-0.12	0.114	-0.017	0.016	-0.095	0.12	-0.015	0.019
No. of own-account worker members	0.159***	0.053	0.025***	0.008	0.176***	0.054	0.028***	0.008
No. of civil/public sector employee members	0.123***	0.044	0.019***	0.007	0.124***	0.046	0.020***	0.007
No. of private sector employee members	0.167***	0.034	0.026***	0.005	0.156***	0.037	0.025***	0.006
No. of casual worker members	0.000	0.066	0.000	0.010	0.019	0.075	0.003	0.012
No. of unemployed members	0.047	0.029	0.007	0.004	0.057*	0.031	0.009*	0.005
No. of out-of-labor-force members	0.040*	0.021	0.006*	0.003	0.042*	0.022	0.007*	0.003
No. of children members	0.059***	0.018	0.009***	0.003	0.071***	0.019	0.011***	0.003
No. of elderly members	-0.004	0.095	-0.001	0.015	0.008	0.099	0.001	0.016
Addis	-0.178*	0.094	-0.029*	0.016	-0.17	0.104	-0.027	0.016
Dessie	-0.253*	0.129	-0.034**	0.015	-0.245*	0.142	-0.039*	0.022
Awassa	-0.036	0.125	-0.005	0.019	-0.037	0.137	-0.006	0.022
Year 1997	0.155*	0.082	0.026*	0.014	0.188**	0.085	0.030**	0.013
Year 2000	-0.111	0.09	-0.017	0.013	-0.075	0.092	-0.012	0.015
Year 2004	-0.082	0.087	-0.012	0.013	-0.028	0.091	-0.004	0.014
Year 2009	0.356***	0.095	0.066***	0.02	0.455***	0.102	0.072***	0.016
Intercept	-3.639	0.384	-	-	-4.495***	0.461	-	-
Observations	4424				4424			

Table 4: Heterogenous impact of remittances on private transfer sent out by educational status

	OLS		**FE**		**HT**	
	Coef.	SE	Coef.	SE	Coef.	SE
Real value of international remittances (log)	0.044*	0.026	0.071***	0.026	0.071***	0.026
Real value of domestic remittances (log)	0.022*	0.013	0.023	0.015	0.024	0.015
Real consumption aeu (log)	0.409***	0.042	0.249***	0.053	0.303***	0.049
Age of head	-0.006	0.011	0.002	0.017	-0.003	0.012
Age of head squared	0.000	0.000	-0.000	0.000	0.000	0.000
Head, male	0.174***	0.058	0.010	0.115	0.194***	0.067
Head, primary schooling completed	0.035	0.055	-0.065	0.100	-0.066	0.098
Head, secondary schooling completed	0.108	0.071	0.111	0.114	0.132	0.110
Head, tertiary schooling completed	0.799***	0.164	0.440**	0.182	0.672***	0.171
Head, employer/own-account worker	0.161**	0.068	0.149	0.110	0.167**	0.074
Head, civil/public sector employee	0.118	0.087	-0.125	0.134	0.110	0.088
Head, private sector employee	0.109	0.110	-0.017	0.149	0.096	0.110
Head, casual worker	-0.025	0.078	0.009	0.137	-0.038	0.099
No. of own-account worker members	0.196***	0.071	0.269***	0.071	0.197***	0.055
No. of civil/public sector employee members	0.106**	0.050	0.108*	0.063	0.123***	0.047
No. of private sector employee members	0.238***	0.051	0.125**	0.051	0.229***	0.039
No. of casual worker members	0.040	0.037	0.055	0.070	0.025	0.056
No. of unemployed members	0.032	0.025	0.057	0.038	0.024	0.028
No. of out-of-labor-force members	0.023	0.021	0.038	0.029	0.018	0.021
No. of children members	0.059***	0.019	0.066**	0.029	0.048***	0.019
No. of elderly members	-0.089	0.090	-0.044	0.128	-0.090	0.094
International Remittances*Primary	0.030	0.037	0.024	0.033	0.022	0.031
International Remittances*Secondary	0.007	0.035	-0.001	0.033	-0.017	0.031
International Remittances*Tertiary	-0.063	0.060	-0.099**	0.046	-0.080*	0.042
Addis	-0.196**	0.098	0.000	.	-0.207**	0.104
Dessie	-0.198	0.124	0.000	.	-0.215	0.135
Awassa	-0.043	0.145	0.000	.	-0.025	0.144
Year 1997	0.140*	0.077	0.163**	0.077	0.151**	0.074
Year 2000	-0.135*	0.074	-0.113	0.085	-0.131*	0.077
Year 2004	-0.106	0.077	-0.059	0.087	-0.101	0.077
Year 2009	0.213**	0.105	0.254**	0.112	0.204**	0.095
Intercept	-1.568***	0.360	-1.097**	0.528	-1.086***	0.420
Observations	4424		4424		4424	

Table A.1: Descriptive statistics of variables 1994-2009

	Coeff.	SD
Real consumption per capita (log)	4.645	0.800
Age of head	50.168	13.693
Head, male	0.567	0.496
Head, primary schooling completed	0.338	0.473
Head, jun-sec schooling completed	0.331	0.471
Head, tertiary schooling completed	0.081	0.272
Head, employer/own-account worker	0.266	0.442
Head, civil/public servant	0.198	0.399
Head, private sector employee	0.079	0.270
Head, casual worker	0.111	0.314
No. of own-account worker members	0.160	0.481
No. of civil/public servant members	0.255	0.580
No. of private sector employee members	0.322	0.694
No. of casual worker members	0.144	0.473
No. of unemployed members	0.614	1.005
No. of out-of-labor-force members	1.488	1.375
No. of children members	1.819	1.669
No. of elderly members	0.077	0.282
Addis	0.750	0.433
Awassa	0.071	0.257
Dessie	0.088	0.283
Observations	4424	