



International Remittances and Private Interhousehold Transfers: Exploring the Links

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Published online: 11 February 2019

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Abstract We investigate the effect of international remittances from migrated family members on informal interhousehold transfers—an issue that has received limited attention in the literature. Using rich panel data from urban Ethiopia spanning 15 years, we show that receiving international remittances increases the value of private domestic interhousehold 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.

Résumé Nous étudions l’effet des transferts de fonds internationaux des membres de famille immigrés sur les transferts informels entre les ménages - une question qui a reçu peu d’attention dans la littérature. En utilisant de riches données de panel de l’Ethiopie urbaine sur 15 ans, nous montrons que la réception des transferts de fonds internationaux augmente la valeur des transferts domestiques privés entre les ménages, alors que la réception des transferts domestiques ne produit aucun effet. Nous

The paper has previously been published as a working paper with the same title in the Department of Economics, University of Gothenburg’s working paper series and the Environment for Development Network’s discussion paper series.

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montrons également que les transferts émis répondent dans une large mesure aux chocs. Nos résultats fournissent de nouvelles preuves sur les effets d'entraînement des transferts de fonds internationaux, effets importants à prendre en compte dans l'analyse de l'impact des transferts de fonds internationaux sur les ménages dans les pays bénéficiaires.

Keywords International remittances · Interhousehold transfers · Urban Ethiopia · Panel data · Shocks

Introduction

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 and Wolpin 1993; Udry 1995; Jacoby and 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 (2016), the value of international remittances to the developing world reached US \$432 billion in 2015, which is three times 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 In this paper, we use rich panel data from urban Ethiopia spanning 15 years to investigate whether international remittances stimulate interhousehold transfers, an issue that has not received sufficient attention in the literature.

Several previous studies (e.g., Alem 2015 in Ethiopia; Adams et al. 2008 in Ghana; Javed et al. 2017 in Pakistan; Lokshin et al. 2010 in Nepal; Satti et al. 2016 in Pakistan; Taylor et al. 2005 in Mexico; Yang and Martinez 2006 in the Philippines) 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 and Boucher 1998 for Nicaragua; Rodriguez 1998 for the Philippines; and Adams and Cuecuecha 2010 for Indonesia). However, it was also found that, as the number of migrants increases,

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 and Olmedo (2005), Ruiz and Vargas-Silva (2009), and the Social Science Research Council (2009).



income inequality may be reduced due to network effects that lower the migration costs and make migration affordable to low-income households (see, for example, McKenzie and Rapoport 2007; Taylor et al. 2005).

Remittances have also been shown to help households reduce consumption volatility (Combes and 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 interhousehold transfer flows within countries (see, e.g., Cox 1987; Cox et al. 1998, 2004). Studies from various developing countries indicate that a large share of the households are involved in private financial transfers and gift-giving with other households (e.g., Kazianga 2006) and that households use these transfers as risk-sharing mechanisms (Fafchamps and Lund 2003; Foster and 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 interlinkages between receiving remittances and the sending of private interhousehold transfers. Receiving remittances might enable a household to share more of its resources with other households, which could lead to trickle-down effects on nonmigrant 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 interhousehold transfers.

Urban Ethiopia is a valuable setting for studying the role of international remittances in stimulating interhousehold 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 and Köhlin 2013; Andersson 2012). In recent years, Ethiopia has also experienced rapid economic growth and double-digit inflation. The high inflation has affected the welfare of the urban population negatively, and informal transfers have become an important coping mechanism (Alem and Söderbom 2012). In this context, analysis of the potential links between remittances and private transfers using robust panel data estimators 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 interhousehold transfers, while domestic remittances do not. We estimate alternative panel data regressions controlling for household fixed effects

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 origin countries (Brown et al. 2014) and transfers made by households to community institutions (Deb et al. 2010).



(time-invariant unobserved heterogeneity) to disentangle the effect of remittances on households' transfer behavior. Our results show that a 1 % increase in the value of remittances received from abroad is associated with a 0.07 % 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: “[Related Literature](#)” section discusses related literature and presents the Ethiopian context. “[Empirical Approach](#)” section describes the panel data, and “[Data and Descriptive Statistics](#)” section outlines the empirical models used in the analysis. “[Regression Results](#)” section presents the main empirical results from alternative linear panel data estimators, and “[Conclusions](#)” section concludes the paper.

Related Literature

Private Interhousehold Transfers

Private interhousehold 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 interhousehold transfers, remittances, and gifts are used for consumption-smoothing purposes in rural areas (Lucas and Stark 1985; Rosenzweig 1988). Similarly, Fafchamps and Lund (2003) show that households in rural Philippines rely on gift-giving and zero-interest informal credits as risk-sharing mechanisms within networks of friends and relatives. Although most studies on private interhousehold 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 and Jimenez 1998a; Kazianga 2006; Alvi and Dendir 2009).

Apart from acting as important risk-sharing mechanisms, private interhousehold 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 nonrecipient 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 nonmigrant households. They also show that an increase in the amount of remittances received from abroad increased the gift receipts by nonmigrant households, suggesting that transfers between migrant and nonmigrant households could at least partly explain



the poverty reductions among nonmigrant households in the Philippines. Beyene (2012) used a simple insurance model and the 2004 wave of the panel data we use in the present paper and documented, controlling for total household income and other covariates, that remittances have a positive impact on the amount of transfers sent to other households in urban Ethiopia. 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, viz. 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 interhousehold 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 the receiving of remittances affects the sending of interhousehold transfers. Three main models explaining the sending of private interhousehold 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 and 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 interhousehold 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 crowding-out concerns; i.e., if public transfers are followed by compensatory reductions in private transfers, the effect of the public transfer programs might ultimately be neutralized. Controlling for all other relevant household variables, the present study takes 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 interhousehold 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 interhousehold 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 in the future from transfer recipients. However, the predictions are more ambiguous if the decision to send interhousehold transfers is based on insurance motives. Dercon (2005) argues that households may have incentives to leave a risk-sharing arrangement if

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

⁴ One exception is Clément (2008), who also develops predictions for how interhousehold transfers vary with the income of the donor.



they feel that staying in the arrangement is no longer in their interest. This could, for example, occur 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 begins to access a new source of risk reduction or protection.

Consistent with Dercon's (2005) reasoning, households that receive remittances, and remittances 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 interhousehold 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 interhousehold transfers sent. The panel data we use in this paper, which span 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.

The Ethiopian Context

Ethiopia makes an interesting case study to investigate the links between remittances and interhousehold 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, interhousehold 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 historical migration patterns in Ethiopia have been shaped by a mix of economic, political, and environmental factors. A noticeable international outmigration 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 and Kuchminder 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: US \$661 million 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 % increase



in the number of urban households that received international remittances between 2004 and 2009.

In Ethiopia, domestic migration flows are larger than the international migration flows (Fransen and 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 1115 households in Addis Ababa, shows that, although a large share (more than 75 %) of the internal migrants stay in touch with their family and relatives in their area of origin, only 13 % 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 Region of Mali in 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 % 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 % in the 12-month period (Central Statistical Agency 2008, 2009). Urban Ethiopian households were severely affected by the food price inflation, and about 87 % of them reported it to be the most influential shock during that period (Alem and 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. The fact that the final round of the Ethiopian Urban Socioeconomic Survey covers the period of rapid inflation and the detailed information on the coping mechanisms of the food price shock enables us to shed light on the links between remittances, interhousehold transfers, and an adverse shock.

Empirical Approach

Our main aim is to explore the effects of remittances on interhousehold 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:

$$F_{it} = \beta_1 I_{it} + \beta_2 D_{it} + \beta_3 X_{it} + C_i + U_{it}, \quad (1)$$

where subscript i denotes household, and t year. F_{it} is the real value of transfers sent out by household i at time t . I_{it} corresponds to the real value of international

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



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, other household-level variables, city and time dummies as controls, X , that determine the amount of transfers sent by households. C_i corresponds to the household fixed effect (unobserved heterogeneity), and U_{it} is a random error term.

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 units, 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 nonfood expenditure. 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. To take economies of scale and differences in needs into account, 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., that 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 the education level of household heads and control for them in the empirical model specified above.

The fundamental problem encountered in estimating Eq. (1) using ordinary least squares (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 squares (GLS) framework, would yield a more efficient estimator of the β parameters. Very often in applied research, however, the assumption that $E(X_{it}C_i) = 0$ is strong, even though the U_{it} are independently distributed. There are several cases in 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 could also 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.

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



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 (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 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 test⁸ and there is interest in the β s of the time-invariant variables, the reasonable estimator to consider is the Hausman–Taylor two-stage estimator. The regression model can be specified as

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

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 Eq. (2) can be estimated by instrumental variables using the following variables as instruments: $X_{1,it}$, W_{1i} , $X_{2,it} - \bar{X}_{2i}$, and \bar{X}_{1i} .⁹ Identification requires that the number of variables in $X_{1,it}$ be 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 report results from different panel data estimators. However, because we have several time-invariant variables, we will mainly use the Hausman–Taylor estimator to discuss the regression results.

Data and Descriptive Statistics

Our empirical analysis is based on five rounds of the Ethiopian Urban Socioeconomic Survey (EUSS), a panel dataset collected in 1994, 1997, 2000, 2004, and 2009. The first four waves of 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 1500 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 *woredas* (districts) in each urban center. Using the resident registry available at the urban administrative units,

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.



households were then selected randomly from half of the *kebeles* (the lowest administrative units) in each *woreda*.¹⁰

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.¹¹ All panel households were surveyed in three of the cities, but not in Addis Ababa, which constituted about 60 % 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 living standard between the panel and the newly incorporated households.¹² Finally, the sample used in the panel data regressions constituted around 1285 households residing in 4 cities, 34 *woredas*, and 74 *kebeles* and surveyed in at least two rounds.

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 use the panel dataset for related research, attempt to investigate attrition bias using attrition probits (Fitzgerald et al. 1998) and a Becketti–Gould–Lillard–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.¹³

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.¹⁴ The transfers recorded in the survey can be divided into three main categories: remittances from abroad, remittances from domestic sources, and

¹⁰ See Bigsten et al. (2003) for more details on sampling design.

¹¹ Other cities were not covered due to resource constraints.

¹² Note that these households were surveyed to check the representativeness of the panel households. Because they were surveyed only once, they are dropped from the panel data regressions we present in “Regression Results” section.

¹³ In “Regression Results” section, we perform an additional check of whether attrition between 2004 and 2009 had possible effects on the parameter estimates of the variables of interest.

¹⁴ It is possible to be concerned about the possibility that some of the international remittances might have been transferred through the household for other households not covered in our survey. However, the EUSS questions were explicit and asked about remittances received by household members only, who sent them, and how they were spent. On average, about 85 % of international remittances have been used to augment household consumption.



gifts received.^{15,16} 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.¹⁷ There is no detailed information on the recipients of interhousehold transfers and what their purpose was.

Table 1 provides summary statistics of household transfer flows for all households by year. In order to take account of spatial and temporal price differences, all amounts are expressed in 1994 Ethiopian birr using price indices carefully constructed from the survey.¹⁸ 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 % of the households received international remittances and 25.9 % received domestic remittances, to be compared with the shares in 2004 of 13.9 % and 11.1 %, respectively. The share of households sending interhousehold transfers also increased substantially, from 9 % in 2004 to 20 % in 2009. This is the period when Ethiopia experienced rapid inflation. Thus, the rapid increase in the proportion of households receiving remittances and those sending interhousehold transfers is not surprising, as households used these informal transfers to cope with the food price shock (Alem and Söderbom 2012).

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 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

¹⁵ 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 very small proportions of the transfers received by the households and are also excluded from the analysis.

¹⁶ There were no specific questions on transfers received by the household from other households other than international remittances, domestic remittances, and gifts. The transfers that households send out should therefore be interpreted as gross transfers.

¹⁷ 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.

¹⁸ One US \$ was approximately 5 ETB in 1994.



Table 1 Remittances received and interhousehold transfers sent over time

	1994	1997	2000	2004	2009
Received international remittances (dummy)	0.060	0.073	0.107	0.139	0.272
	0.237	0.260	0.310	0.346	0.446
Received domestic remittances (dummy)	0.093	0.109	0.086	0.111	0.259
	0.291	0.312	0.280	0.315	0.438
Sent interhousehold transfers (dummy)	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 interhousehold 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

Source Own computation from EUSS (1994–2009). Standard deviations reported under means

consumption expenditures have been adjusted for spatial and temporal price differences using price indices constructed from the survey. Since prices increased more than threefold between 2004 and 2009, the nominal value of remittances in 2009 had to be deflated more proportionately than all other years. Indeed, descriptive statistics from the data show that the mean value of international remittances received in nominal terms in 2009 was 621 birr, being about 20 % higher than the value in 2004, which was 516 birr in nominal terms.¹⁹

Unlike the proportion of households sending interhousehold transfers, the mean value of interhousehold transfers sent documents a cyclical trend. Compared with 1994, the mean value of interhousehold transfers in real terms increased in 1997, declined in 2000, and increased again in 2004, with another decline 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.

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 interhousehold transfers (both in log form), we estimate the regression using four alternative specifications: pooled ordinary least squares (POLS), random effects (RE), fixed effects (FE), and Hausman–Taylor (HT)

¹⁹ Another plausible reason may be that remittance senders living abroad themselves might have been affected by the global economic crisis during the 2007–2008 period.



Table 2 Impact of remittances on interhousehold transfers sent—linear regression results

	[1]		[2]		[3]	
	POLS		FE		HT	
	Coef.	SE	Coef.	SE	Coef.	SE
Real value of international remittances (log)	0.048***	0.012	0.065***	0.015	0.069***	0.014
Real value of domestic remittances (log)	0.021	0.015	0.022	0.016	0.023	0.015
Real consumption aeu (log)	0.418***	0.049	0.254***	0.068	0.319***	0.049
Age of head	- 0.006	0.011	0.001	0.017	- 0.004	0.012
Age of head squared/100	0.003	0.010	- 0.001	0.018	0.001	0.012
Head, male	0.174**	0.066	0.019	0.098	0.194***	0.068
Head, primary schooling completed	0.058	0.058	- 0.052	0.074	- 0.034	0.094
Head, secondary schooling completed	0.115	0.081	0.105	0.089	0.159	0.107
Head, tertiary schooling completed	0.727***	0.160	0.288	0.261	0.484***	0.162
Head, employer/own-account worker	0.158*	0.080	0.131	0.110	0.161**	0.075
Head, civil/public-sector employee	0.114	0.088	- 0.162	0.120	0.107	0.089
Head, private-sector employee	0.104	0.125	- 0.041	0.122	0.089	0.110
Head, casual worker	- 0.032	0.076	- 0.016	0.109	- 0.047	0.100
No. of own-account worker members	0.199***	0.059	0.274***	0.060	0.201***	0.055
No. of civil/public-sector employee members	0.116**	0.056	0.120*	0.069	0.138***	0.048
No. of private-sector employee members	0.236***	0.047	0.117*	0.066	0.223***	0.039
No. of casual worker members	0.039	0.040	0.054	0.048	0.025	0.057
No. of unemployed members	0.033	0.024	0.058	0.036	0.026	0.028
No. of out-of-labor-force members	0.024	0.022	0.037	0.035	0.017	0.021
No. of child members	0.060***	0.016	0.066**	0.030	0.050***	0.019
No. of elderly members	- 0.093	0.094	- 0.053	0.134	- 0.091	0.095
Addis	- 0.197*	0.113	0.000	-	- 0.217**	0.106
Dessie	- 0.190	0.115	0.000	-	- 0.212	0.137
Awassa	- 0.041	0.185	0.000	-	- 0.027	0.147
Year 1997	0.078	0.093	0.090	0.091	0.085	0.075
Year 2000	- 0.310***	0.094	- 0.287***	0.094	- 0.314***	0.078
Year 2004	- 0.324***	0.078	- 0.275***	0.082	- 0.318***	0.078
Year 2009	- 0.948***	0.124	- 0.880***	0.128	- 0.933***	0.094
Intercept	- 1.612***	0.441	- 1.054**	0.499	- 1.133***	0.427
Observations	4424		4424		4424	

Standard errors clustered at the *woreda* (district) level

POLS pooled OLS estimator, *FE* fixed effects estimator, *HT* Hausman–Taylor estimator

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

estimators. The robust Hausman test rejects the random effects estimator (p value of 0.000), and consequently we do not present and discuss the RE results. Estimation results from the other three models are presented in columns [1] to [3] of Table 2.²⁰

²⁰ Both the pooled OLS and RE estimators are inconsistent due to the presence of unobserved household heterogeneity, which appears to be correlated with the explanatory variables in our case. We choose to



The regression results from all models indicate that international remittances increase interhousehold transfers. According to the POLS results, a 1 % increase in international remittances is associated with a 0.048 % 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 1 % increase in international remittances results in a 0.07 % increase in transfers sent. This represents a 42 % increase in the magnitude of the coefficient of the international remittances variable. The results therefore imply a strong need for controlling for unobserved household characteristics while modeling the transfer behavior of households. This is consistent with the large literature on international migration that documents that households sending a migrant abroad and receiving remittances have distinct unobserved characteristics, which should be controlled in regressions (Lopez-Cordova and Olmedo 2005; Ruiz and Vargas-Silva 2009; Adams 2011). We do not, however, find a statistically significant impact of domestic remittances. The variable is weakly significant (at 10 %) 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.

As shown in the descriptive statistics presented in the previous section, the strong impact of international remittances on interhousehold 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 nonmigrant households that do not directly receive international remittances. The increases in interhousehold transfers in response to international remittances provide some support for the altruistic and insurance motives. About 82 % of international remittances received by households were sent by their grown children, which provides additional suggestive evidence for these motives.²¹

Sending out interhousehold transfers is also significantly correlated with the economic status of the sending household as measured by the log value of real consumption expenditure per capita. POLS regression results suggest that a 1 % increase in real consumption expenditure per capita is associated with a 0.42 % increase in transfers sent out. However, about 25 % of this impact is explained by unobserved household characteristics. This can be seen from the decline in the magnitude of the consumption variable to 0.32 in the HT model. The positive impact of consumption expenditure on interhousehold 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.

Footnote 20 (continued)

compare the FE and HT regression results with the OLS results to shed light on the possible gains of using panel data over cross-sectional data.

²¹ Unfortunately, due to data limitations, we are not able to econometrically identify the exact motives of either international remittances or interhousehold transfers. The evidence mentioned here is only suggestive.



Consumption expenditure is likely to be endogenous due to factors other than correlation with unobserved household heterogeneity. In order to explore robustness of the results on the relationship between transfers sent out and remittances received, we estimated the three liner regressions for the transfer equation (i.e., POLS, FE, and HT) excluding consumption expenditure. The results reported in Table 5 in the “Appendix” clearly indicate that the coefficients on international remittances and domestic remittances changed very little. More specifically, the coefficients on international remittances remained roughly the same in the FE and HT regressions, but not in the pooled OLS (POLS). The coefficient on domestic remittances, on the other hand, remained the same in magnitude, but was marginally statistically significant (at 10 %) in the POLS and HT regressions.

Given that the coefficient of the international remittances variable estimated using the Hausman–Taylor model presented in Table 2 is about 0.07, one may wonder whether such a magnitude is near 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 the 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 interhousehold 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 % higher likelihood of engaging in interhousehold transfers. The results also show that domestic remittances are weakly (at the 10 % level) significant in the binary choice models.

We now analyze how interhousehold 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 % more interhousehold 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 0.484, representing 48.4 % more interhousehold transfers compared with a household headed by an illiterate individual. Previous studies in urban Ethiopia (e.g., Alem and Söderbom 2012; Alem et al. 2014; Alem 2015; Gebremedhin and Whelan 2005) have documented that these types of households enjoy higher level of consumption and subjective well-being and are less likely to be in poverty. This most probably reflects the large return to tertiary education in the rapidly growing Ethiopian urban sector. The results also



Table 3 Impact of remittances on interhousehold transfers sent—binary regression results

	[1]		[2]		[3]		[4]	
	POP		PME		CREP		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 au (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 child 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



Table 3 (continued)

	[1]		[2]		[3]		[4]	
	POP	SE	PME	SE	CREP	SE	CREME	SE
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			

POP pooled probit estimator, PME marginal effects of the pooled probit estimator, CREP correlated-random effects probit estimator, CREME marginal effects of the correlated random effects probit estimator

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

show that male-headed households are more likely than female-headed households to send interhousehold 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 interhousehold 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 living in the household transfer more. This may appear to be counterintuitive as higher dependency ratio is expected to put financial pressure on the household, reducing the tendency to engage in transfers to other households. There is, however, empirical evidence from earlier studies (e.g., Cox and Stark 1998b; Jellal and Wolff 2000) documenting that parents directly teach children to give to the community. More recently, Deb et al. (2010) use data from both parent households and child households in Indonesia and show that parental giving has a direct impact on children's giving behavior to other households and the community at adult age. The positive sign of the coefficient for the variable "No. of child members" we robustly document in this paper is therefore plausible.²²

Finally, the coefficients on the city and time dummies indicate a clear spatial and temporal variation in the amount of interhousehold transfers sent by households in urban parts of Ethiopia. Compared with the reference group (households in Mekelle), households in the capital Addis send 21.7 % lower interhousehold transfers. 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 may have a lower likelihood of engaging in transfer arrangements. The results also show that interhousehold transfers increased significantly in the most recent wave, i.e., in 2009. This wave mainly captured the country's unprecedented food price shock, which led to a significant proportion of households engaging in interhousehold transfers.²³ 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.²⁴ The data show that approximately 22 % of the households

²² We checked the robustness of the results by controlling for dependency ratio, instead of the number of children and the number of elderly members. The regression results reported in Table 6 in the "Appendix" show that our findings remained robust; i.e., households with higher dependency ratio transfer more.

²³ It is important to note that the dummy for 2009 captures other macrolevel changes that took place in the country in addition to inflation. The results, which are also supported with descriptive statistics, should therefore be interpreted with caution and as suggestive evidence only.

²⁴ As shown by Alem and Söderbom (2012), the most widespread and severe shock that the households faced was by far the food price shock: 94 % of the households stated that they had experienced such



stated assistance from relatives or friends as their main mechanism to cope with the food price shock, making it second in importance only to cutting back on quantities served per meal.

As discussed in “[Data and Descriptive Statistics](#)” section, the sample size of the Ethiopian Urban Socioeconomic Survey had to be reduced by about 40 % in the most recent round (2009). In order to investigate the possible impact of attrition, we estimate the transfer equations excluding the 2009 round of data. The regression results reported in [Table 7](#) in the “[Appendix](#)” confirm that the magnitude and statistical significance of almost all the explanatory variables remained robust, further supporting the evidence documented by previous authors (Alem [2015](#); Alem et al. [2014](#)) that attrition in the most recent round is unlikely to bias regression results. This finding is plausible because the panel households that were excluded in 2009 did not self-select themselves; They were excluded randomly by the survey team due to resource constraints.

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 in interhousehold transfer behavior—an aspect that has not received sufficient attention in previous studies. The availability of such a long panel dataset enables us to control for confounding time-invariant unobserved household factors and explore the role of remittances in households’ transfer behavior. We estimate 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 1 % increase in international remittances results in a 0.07 % increase in interhousehold transfers sent. The magnitude of domestic remittances, on the other hand, is very low (0.02) and statistically insignificant, suggesting that it plays little role in stimulating interhousehold 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 documented that both remittances and private transfers increased substantially in the period when the country experienced a rapid food price shock.

Footnote 24 (continued)

a shock, and 87 % identified the increase in food prices as the shock with the strongest impact on the household.



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 international remittances in stimulating private transfers, as the coefficient from the Hausman–Taylor model is only 0.07, although it is statistically significant at the 1 % level. Results from the correlated random effects probit model of transfer also show that households receiving international remittances have a 3.4 % higher probability of engaging in transfers, and the coefficient is statistically significant at the 1 % level. Our paper therefore provides the first comprehensive evidence on the possible role of international remittances in stimulating interhousehold transfers using panel data that track the same households for a long period in a developing country. In this sense, the results provide useful insight. 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 on this trickle-down effect, and thus our results are relevant in that they shed light on the possible additional channels through which remittances can affect household outcomes in migrant source countries.

Although our panel data are rich and the longest ever to be used in the context of analysis of interhousehold transfers, we acknowledge the possible limitations of our study. Our data did not contain information on which countries the international remittances were transferred from, and what the exact motives for interhousehold transfers were. 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 data limitation. Future research with more detailed data on households' transfer motives and the characteristics of recipients of interhousehold transfers, and using a more robust empirical framework, such as an instrumental variables estimation method to tackle endogeneity of remittances, could therefore shed additional light on the topic.

Acknowledgements We thank two anonymous reviewers, Arne Bigsten, Andreea Mitrut, Kristina Mohlin, Haileselassie Medhin, and seminar participants at the Department of Economics, University of Gothenburg, for helpful comments on earlier versions of the paper. Financial support from the Swedish International Development Agency (Sida) through the Environment for Development Initiative (EfD), and from the Gothenburg Center of Globalization and Development, University of Gothenburg, is gratefully acknowledged.

Compliance with ethical standards

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



Appendix

See Tables 4, 5, 6 and 7.

Table 4 Descriptive statistics of variables (1994–2009)

	Coef.	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, secondary 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-sector 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-sector 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	1.819	1.669
No. of elderly	0.077	0.282
Addis	0.750	0.433
Awassa	0.071	0.257
Dessie	0.088	0.283
Mekelle	0.091	0.287
No. of <i>kebeles</i>	74	
No. of <i>woredas</i>	34	
Observations	4426	



Table 5 Impact of remittances on interhousehold transfers sent—linear regression results

	[1]		[2]		[3]	
	POLS		FE		HT	
	Coef.	SE	Coef.	SE	Coef.	SE
Real value of international remittances (log)	0.070***	0.013	0.070***	0.016	0.078***	0.014
Real value of domestic remittances (log)	0.026*	0.015	0.024	0.016	0.026*	0.015
Age of head	−0.003	0.012	−0.002	0.018	−0.004	0.013
Age of head squared/100	0.000	0.011	0.000	0.018	0.000	0.012
Head, male	0.225***	0.065	0.062	0.097	0.247***	0.069
Head, primary schooling completed	0.108*	0.062	−0.058	0.075	−0.030	0.094
Head, secondary schooling completed	0.260***	0.083	0.116	0.089	0.200*	0.107
Head, tertiary schooling completed	1.009***	0.167	0.307	0.261	0.582***	0.162
Head, employer/own-account worker	0.205**	0.082	0.137	0.112	0.181**	0.076
Head, civil/public-sector employee	0.143	0.086	−0.160	0.121	0.127	0.091
Head, private-sector employee	0.113	0.125	−0.030	0.122	0.090	0.112
Head, casual worker	−0.124*	0.073	−0.036	0.115	−0.118	0.101
No. of own-account worker members	0.165**	0.064	0.264***	0.062	0.178***	0.056
No. of civil/public-sector employee members	0.140**	0.055	0.119*	0.068	0.158***	0.049
No. of private-sector employee members	0.279***	0.049	0.112*	0.065	0.249***	0.040
No. of casual worker members	−0.050	0.043	0.025	0.048	−0.038	0.057
No. of unemployed members	−0.017	0.025	0.028	0.034	−0.010	0.028
No. of out-of-labor-force members	−0.011	0.022	0.008	0.032	−0.010	0.021
No. of child members	0.010	0.013	0.039	0.028	0.011	0.018
No. of elderly members	−0.124	0.095	−0.075	0.133	−0.112	0.097
Addis	−0.259**	0.110	0.000	−	−0.251**	0.110
Dessie	−0.314***	0.110	0.000	−	−0.293**	0.141
Awassa	−0.049	0.176	0.000	−	−0.021	0.153
Year 1997	0.119	0.095	0.117	0.093	0.118	0.075
Year 2000	−0.264**	0.101	−0.241**	0.098	−0.267***	0.078
Year 2004	−0.260***	0.083	−0.214**	0.088	−0.261***	0.078
Year 2009	−0.907***	0.130	−0.815***	0.133	−0.887***	0.094
Intercept	0.305	0.332	0.264	0.433	0.429	0.365

Regressions exclude household consumption. Standard errors clustered at the *woreda* (district) level

POLS pooled OLS estimator, *FE* fixed effects estimator, *HT* Hausman–Taylor estimator

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



Table 6 Impact of remittances on interhousehold transfers sent—linear regression results

	[1]		[2]		[3]	
	POLS		FE		HT	
	Coef.	SE	Coef.	SE	Coef.	SE
Real value of international remittances (log)	0.048***	0.012	0.065***	0.015	0.069***	0.014
Real value of domestic remittances (log)	0.021	0.016	0.021	0.016	0.022	0.015
Real consumption aeu (log)	0.405***	0.045	0.246***	0.065	0.316***	0.049
Age of head	− 0.000	0.011	0.004	0.018	0.000	0.012
Age of head squared/100	− 0.004	0.010	− 0.005	0.018	− 0.004	0.012
Head, male	0.186***	0.064	0.039	0.099	0.204***	0.067
Head, primary schooling completed	0.058	0.058	− 0.053	0.074	− 0.034	0.094
Head, secondary schooling completed	0.108	0.082	0.095	0.090	0.146	0.107
Head, tertiary schooling completed	0.721***	0.158	0.286	0.260	0.485***	0.162
Head, employer/own-account worker	0.163*	0.081	0.129	0.111	0.163**	0.075
Head, civil/public-sector employee	0.113	0.088	− 0.157	0.120	0.105	0.089
Head, private-sector employee	0.105	0.125	− 0.039	0.121	0.090	0.110
Head, casual worker	− 0.040	0.076	− 0.024	0.111	− 0.053	0.100
No. of own-account worker members	0.211***	0.057	0.282***	0.058	0.211***	0.055
No. of civil/public-sector employee members	0.127**	0.057	0.131*	0.068	0.146***	0.048
No. of private-sector employee members	0.249***	0.046	0.124*	0.065	0.233***	0.040
No. of casual worker members	0.059	0.043	0.069	0.050	0.042	0.057
No. of unemployed members	0.043*	0.024	0.063	0.038	0.035	0.029
No. of out-of-labor-force members	0.041*	0.023	0.045	0.037	0.031	0.022
Dependency ratio	0.101**	0.037	0.097*	0.057	0.081**	0.041
Addis	− 0.193*	0.111	0.000	−	− 0.214**	0.106
Dessie	− 0.189	0.113	0.000	−	− 0.210	0.137
Awassa	− 0.022	0.187	0.000	−	− 0.011	0.147
Year 1997	0.086	0.091	0.097	0.089	0.092	0.075
Year 2000	− 0.303***	0.092	− 0.287***	0.091	− 0.308***	0.078
Year 2004	− 0.324***	0.074	− 0.287***	0.080	− 0.320***	0.077
Year 2009	− 0.964***	0.123	− 0.911***	0.120	− 0.949***	0.093
Intercept	− 1.662***	0.435	− 1.021*	0.520	− 1.199***	0.433
Observations	4400		4400		4400	

Regressions run using dependency ratio instead of no. of children and elderly members. Standard errors clustered at the *woreda* (district) level

POLS pooled OLS estimator, *FE* fixed effects estimator, *HT* Hausman–Taylor estimator

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



Table 7 Impact of remittances on interhousehold transfers sent—linear regression results

	[1]		[2]		[3]	
	POLS		FE		HT	
	Coef.	SE	Coef.	SE	Coef.	SE
Real value of international remittances (log)	0.053***	0.011	0.070***	0.017	0.076***	0.015
Real value of domestic remittances (log)	0.020	0.017	0.026	0.017	0.027	0.017
Real consumption aeu (log)	0.358***	0.054	0.171**	0.074	0.249***	0.052
Age of head	-0.013	0.012	-0.022	0.018	-0.013	0.013
Age of head squared/100	0.010	0.011	0.017	0.017	0.009	0.013
Head, male	0.126*	0.067	-0.196*	0.111	0.143**	0.072
Head, primary schooling completed	0.031	0.064	-0.134	0.087	-0.118	0.101
Head, secondary schooling completed	0.107	0.076	0.093	0.096	0.128	0.112
Head, tertiary schooling completed	0.590***	0.182	-0.044	0.274	0.186	0.177
Head, employer/own-account worker	0.086	0.087	-0.007	0.111	0.078	0.079
Head, civil/public-sector employee	0.088	0.082	-0.089	0.131	0.099	0.094
Head, private-sector employee	0.084	0.134	-0.072	0.163	0.068	0.120
Head, casual worker	-0.047	0.087	-0.051	0.137	-0.069	0.104
No. of own-account worker members	0.219***	0.066	0.233***	0.070	0.209***	0.059
No. of civil/public-sector employee members	0.120**	0.053	0.096	0.071	0.143***	0.051
No. of private-sector employee members	0.249***	0.057	0.084	0.075	0.235***	0.045
No. of casual worker members	0.059	0.046	0.078	0.058	0.048	0.061
No. of unemployed members	0.030	0.027	0.039	0.036	0.020	0.029
No. of out-of-labor-force members	0.024	0.022	0.062	0.039	0.024	0.023
No. of child members	0.047***	0.017	0.070**	0.030	0.039**	0.020
No. of elderly members	-0.064	0.101	0.095	0.134	-0.036	0.099
Addis	-0.221**	0.108	0.000	-	-0.230**	0.116
Dessie	-0.246*	0.134	0.000	-	-0.273*	0.151
Awassa	0.049	0.215	0.000	-	0.054	0.165
Year 1997	0.085	0.092	0.086	0.088	0.092	0.072
Year 2000	-0.317***	0.094	-0.283***	0.095	-0.319***	0.076
Year 2004	-0.334***	0.076	-0.249***	0.078	-0.323***	0.075
Intercept	-1.035**	0.464	0.138	0.613	-0.431	0.456

Regressions exclude the 2009 round. Standard errors clustered at the *woreda* (district) level

POLS pooled OLS estimator, *FE* fixed effects estimator, *HT* Hausman–Taylor estimator

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

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