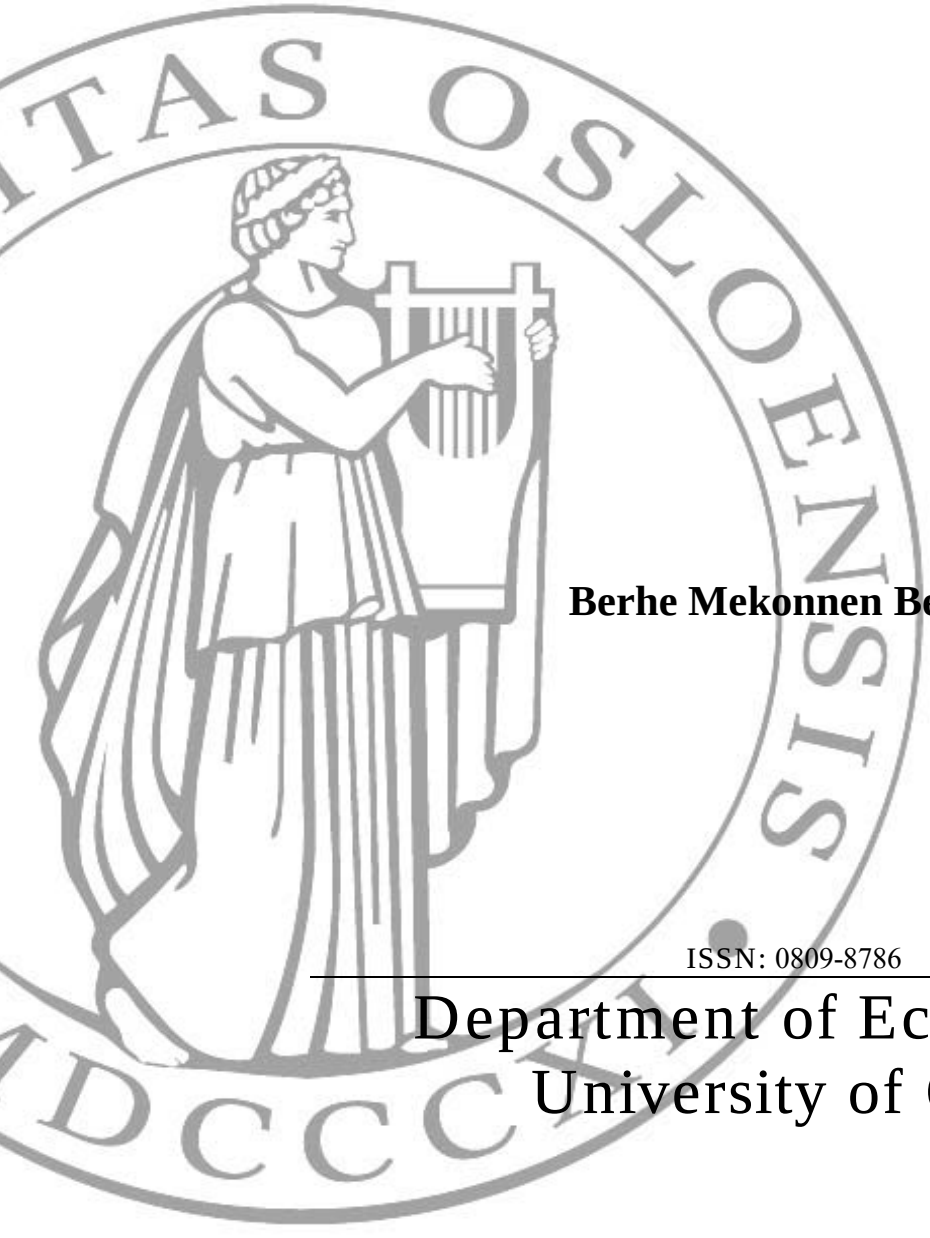
MEMORANDUM

No 14/2012

The Link between International Remittances and Private Interhoushold Transfers



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The Link between International Remittances and Private Interhousehold Transfers

Berhe M. Beyene[†]

March, 2012

Abstract

The paper studies the link between international remittances and interhousehold transfers. Using a simple insurance model, it is shown that households transfer a large fraction of the remittance they receive from relatives abroad to other households. The effect of remittances on interhousehold transfers is empirically investigated using an urban household survey from Ethiopia. Consistent with the prediction of the model, remittance has a strong positive effect on the amount of transfer given, controlling for total household income and other covariates.

Key words: international remittances, interhousehold transfers, mutual insurance, Ethiopia

JEL Classification: D-19, F-24, I-30, R-20

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I. Introduction

Research on the impact of international remittances on the receiving countries has been growing recently. Although the detailed findings differ from study to study, some patterns are observed. Remittances usually have significant welfare improving effect on the recipient households because they constitute large fractions of their incomes. There are also some evidences that remittance money is invested on physical and human capital. But remittances can also have negative effect on labor force participation. They tend to reduce poverty while their effect on inequality is unclear.[1]

The focus has so far been on the recipient households.[2] However, to fully understand the effect of remittances on the welfare of households in the receiving countries, it is important to take into account their impact on non-recipient households. There are many ways non-recipient households could be affected and one channel is through private interhousehold transfers. Studies on the welfare impact of remittances implicitly assume that remittances are used only by the receiving households. But it is possible that remittances are shared with non-recipient households.

While economists have studied private transfers in developed countries for a long period of time, there is also a growing literature on private transfers in developing countries due to the better availability of household data (for a survey on private transfers see Laferrere and Wolff, 2006 and Laitner, 1997). Despite the close relationship between the two topics, to my knowledge, there has been no study focusing on how remittances affect private transfers.

Theoretically, it is well established that the amount of transfer increases with the donor's income and decreases with the recipient's income when transfer is motivated by altruism. Insurance motive also leads to similar predictions. There are ample evidences that support such theoretical predictions (for example, Cox, 1987; Cox and Rains, 1985; Kazianga, 2006). The findings from the literature on private transfers have an important insight on the possible impact of remittances on interhousehold transfers. If remittance recipients are on the donors' side, remittances, by increasing the donors' income, will lead to more transfers.[3]

Remittances can also have additional effect on private transfers other than the general income effect. A case in point is where households, due to lack of well functioning insurance

[1] For a survey on the effect of remittances refer Adams (2006), Adams (2011), de Haas (2007), and Taylor (1999).

[2] A notable exception is the study by Yang and Martinez (2006) that tried to address the effect of remittances on non-remittance receiving households in Philippines.

[3] But if remittances mainly go to the transfer recipients, they may have a crowding out effect similar to government transfers.

markets, have an informal norm of sharing income.[4] Since incomes from other sources are usually difficult to observe, households are more likely to depend on remittances to insure each other. If remittances are shared with other households, households who do not have migrant members abroad also benefit and that will boost the welfare improving impact of remittances. It can also make remittances more equalizing (or less unequalizing) and more poverty reducing than they would be in the absence of interhousehold transfers.

This paper studies the degree to which international remittances are shared with other households. Using a simple insurance model, I show that remittance money is equally shared with non-remittance receiving households. The extent to which remittances are transferred to other households is investigated empirically using an urban household survey from Ethiopia. The rest of the paper is organized as follows. In section two the theoretical model is presented. In section three the econometric method is dealt with, while data and summary statistics are presented in section four. The empirical result is given in section five and the last section concludes.

II. Theory

There could be different motives for private transfers and the one that is most discussed in the literature is altruism. Under altruism, people make transfers because they care about the wellbeing of the recipients. Altruistically motivated transfers are typically common among close family members, for example, from parents to children or vice versa. Another common reason for private transfers is insurance or risk sharing motive. Like many markets, insurance markets are imperfect or non-existent in developing countries. Thus, households usually rely on informal norms of income sharing to smooth their consumption.

In this paper two types of private transfers are considered. The first one is between close family members. More specifically, it is money sent by migrants to their families back home in the form of remittance. It is assumed that such transfers are motivated by altruism, i.e., migrants care about their families and hence remit part of their income. I assume that migrants do not care about other households (other than their families).

The second type of transfer occurs among distant relatives or community members and is assumed to be motivated by a norm of mutual insurance. They enter into an agreement to

[4] For a discussion on social norms refer Elster (1989). Another reason why remittances could be more transferable is reciprocity – when someone is nice for you, you feel a moral obligation to be nice for others in return (Kolm, 2006). Remittance income may also be seen as a windfall gain and hence can be spent/transferred with less pain (Christiaensen and Pan, 2010).

smooth their consumption by sharing their income. If some households face negative income shock, other members of the community help them by transferring part of their income. Similarly, windfall gains are also shared with the other households. I.e., transfers serve as insurance not only against bad luck but also against lack of good luck.

Apparently, informal insurance norms also have problems. A common problem, especially in urban areas, is asymmetric information about income. The vast majority of urban dwellers in developing countries work in the informal sector with different and irregular income streams which make it difficult for other households to observe (Alvi and Dendir, 2009a). This weakens the potential of informal sharing norms. But some households also get remittance from their relatives abroad which, unlike domestic income, is usually regular and fairly observable. Whether a household has a migrant member abroad or not is often a public knowledge and usually migrants send money to their families.

In the model that follows, households can only share remittance income to smooth their consumption. To fix idea, I assume that households have the same income from domestic sources. But some have migrant family members abroad and hence receive remittance while others do not. Those who receive remittance insure the others by transferring part of the remittance they receive.

I assume there are *n* identical households each with two household members; a father and a son. The father does not migrate and earns y_h at home. The son either migrates abroad with a probability π or stays at home with a probability $1-\pi$. Migration is costless. When the son migrates, he earns y_m (where $y_m > y_h$) and sends remittance *r* to his family. If he does not migrate, he forms his own family and earns the same income as his father. Those households, who receive remittance, transfer part of what they receive to other households. The transfer can be considered as a community tax levied on remittance income. The transferred money is shared equally by the non-recipients. Parents are selfish and hence the sons who do not migrate are not included in the sharing. The fractions of remittance receiving and non-receiving households are given by π and $1-\pi$ respectively. Denoting the transfer rate by *t*, each non-recipient household will then receive a transfer of:

$$\frac{\pi}{1-\pi} tr \qquad (1)$$

The community decides on the optimal *t*. Before discussing how the community decides on *t*, I first present the migrant's decision on *r* and how it is affected by changes in *t*.

The Migrant's Decision to Remit

The migrant cares about the welfare of his family in addition to his own welfare. Hence, he sends remittance to his family. More specifically, he drives utility from his own consumption, c_m (whose price is assumed to be unity for simplicity) and the increment in his family's consumption as a result of the remittance he sends.[5] The amount of remittance his family retains after transferring *tr* to other households is given by (1-*t*)*r* and can be termed as the 'disposable remittance'. The additional consumption of the family, which I denote as *d*, will then be the disposable remittance expressed in terms of purchasing power. Defining the real exchange rate as *e*, the additional consumption will be given as:

$$d = (1\text{-}t)re \tag{2}$$

Equation (2) shows that if the migrant wants his family to have an additional consumption of *d*, he has to send a total remittance of:

$$\begin{aligned} r &= \frac{1}{(1-t)e} d \\ &= p_d d; \text{ where } p_d = \frac{1}{(1-t)e} \end{aligned} \tag{3}$$

p_d measures the amount of money the migrant has to send for each additional unit of consumption by his family and hence can be considered as the 'price' of *d*. Since the price of c_m is one by assumption, p_d is also the relative price of *d* to c_m. I assumed the migrant has a CES utility function given as follows:

$$U(c_m, d) = \left[(c_m)^{\frac{\sigma-1}{\sigma}} + \alpha d^{\frac{\sigma-1}{\sigma}} \right]^{\frac{\sigma}{\sigma-1}}; \ \sigma \geq 0, \ 0<\alpha \leq 1 \tag{4}$$

where σ is the elasticity of substitution between c_m and *d*, and α is the weight the migrant attaches to *d* relative to c_m. α can be considered as a measure of the migrant's degree of care(altruism) towards his family. If α is equal to one, he cares about his family the same way as he cares for himself. Otherwise, he cares more for himself. He maximizes his utility subject to his budget constrain which is:

$$c_m + p_d d = y_m \tag{5}$$

[5] Such specification resembles the *separable earnings-bequest model* of Behrman et al (1982) where child's earning and bequest enter the parent's utility function separately.

Maximizing (4) subject to (5) yields the following first order condition:

$$\frac{\alpha d^{-\frac{1}{\sigma}}}{c_m^{-\frac{1}{\sigma}}} = p_d \tag{6}$$

The left hand side of equation (6) is the ratio of the two marginal utilities which is known as the marginal rate of substitution while the right side is the price ratio. Solving for c_m from equation (6) gives:

$$c_m = \left(\frac{p_d}{\alpha}\right)^{\sigma} d$$

and substituting c_m in the budget constraint and solving for the optimal quantities, I get:

$$d = \frac{\alpha^{\sigma} y^m}{p_d{}^{\sigma} + \alpha^{\sigma} p_d}, \quad c_m = \frac{y_m}{1 + \alpha^{\sigma} p_d{}^{1-\sigma}} \tag{7}$$

Noting that $p_d = \frac{1}{(1-t)e}$, it is easy to see from equation (7) that additional consumption for the family increases with the real exchange rate and decreases as the transfer rate increases.[6] Without loss of generality, I assume the real exchange rate to be one. Then, the additional consumption will be the same as the disposable remittance, i.e., d = (1-t)r and $p_d = \frac{1}{(1-t)}$.

The migrant's 'demand' for d can be characterized as follows:

$$d = f\left(\underset{+}{y_m}, \underset{-}{p_d}\right);\ f_1 = \frac{\partial d}{\partial y_m} = \frac{\alpha^{\sigma}}{p_d{}^{\sigma} + \alpha^{\sigma} p_d} > 0,\ f_2 = \frac{\partial d}{\partial p_d} = -\frac{\left(\sigma p_d{}^{\sigma-1} + \alpha^{\sigma}\right)\alpha^{\sigma} y_m}{\left(p_d{}^{\sigma} + \alpha^{\sigma} p_d\right)^2} < 0 \tag{8}$$

and the percentage change in d due to a percentage change in p_d which can be termed as the 'elasticity of disposable remittance' will be:

$$\varepsilon = f_2 \frac{p_d}{d} = -\frac{\left(\sigma p_d{}^{\sigma-1} + \alpha^{\sigma}\right)\alpha^{\sigma} y_m}{\left(p_d{}^{\sigma} + \alpha^{\sigma} p_d\right)^2} p_d \frac{p_d{}^{\sigma} + \alpha^{\sigma} p_d}{\alpha^{\sigma} y^m} \tag{9}$$

which after simplifying becomes:

[6] When the transfer rate increases, the family's consumption becomes more expensive and hence the migrant cuts its quantity. But when the real exchange rate increases, family consumption becomes cheaper and the migrant will demand more of it.

$$\varepsilon = -\frac{\sigma + \alpha^{\sigma} p_d^{1-\sigma}}{1 + \alpha^{\sigma} p_d^{1-\sigma}} = -\left[(1 - s_d)\sigma + s_d \right] \tag{10}$$

where s_d is the expenditure shares of d given by:

$$s_d = \frac{p_d d}{y_m} = \frac{\alpha^{\sigma} p_d^{1-\sigma}}{1 + \alpha^{\sigma} p_d^{1-\sigma}}$$

and, it is easy to see that:

$$|\varepsilon| \begin{cases} < 1 \text{ if } \sigma < 1 \\ = 1 \text{ if } \sigma = 1 \\ > 1 \text{ if } \sigma > 1 \end{cases} \tag{11}$$

The elasticity of remittance measures how responsive the migrant is to p_d which in turn depends on t. While the disposable remittance decreases as the transfer rate increases, the effect of change in the transfer rate on the gross remittance is not clear. Increase in the transfer rate has two opposing effects on the remitting behavior of the migrant. On the one hand, he wants to cut remittance as the transfer rate increases because his family's additional consumption becomes more expensive relative to his own consumption. But higher transfer rate also leaves his family with less consumption and the migrant wants to compensate them by remitting more. His ultimate response will then depend on the relative strength of the two effects.

If the elasticity of disposable remittance is equal to one, any change in the price of the disposable remittance is matched by a proportional change in the amount of the disposable remittance. Thus, the gross remittance will be the same regardless of the price level which implies that the total remittance does not depend on the transfer rate. I.e., the two opposing effects of change in the transfer rate which are discussed above are equally strong and they cancel out. But when the elasticity of disposable remittance is less than one, gross remittance increases with the transfer rate because the percentage fall in the disposable remittance is smaller than the percentage rise in price. In other words, the compensating effect of a higher transfer rate dominates the price effect and hence the migrant remits more as the transfer rate increases. If the elasticity of disposable remittance is greater than one, on the other hand, gross remittance decreases as the transfer rate increases.

The Optimal Transfer Rate

It is assumed that the community back home has a norm of sharing remittance money, i.e., households transfer part of the remittance they receive from relatives abroad to other households. The transfer rate is set as if there is a social planner whose objective is to maximize social welfare. Assuming that households have the same concave utility function, the social planner chooses *t* so that the expected utility of a representative household is maximized taking into account the migrant's response to changes in *t*. If the household does not receive remittance from abroad, consumption (assuming price at home is also one) is given by the sum of home income plus the transfer he gets from those who receive remittance, i.e.,

$$c_0 = y_h + \frac{\pi}{1-\pi} tr = y_h + \frac{\pi}{1-\pi}\frac{t}{1-t} d$$

And when he receives remittance, consumption will be home income plus the disposable remittance, i.e.,

$$c_1 = y_h + d \,.$$

The social planner's problem will then be:

$$\max_t V = (1-\pi)U\left(y_h + \frac{\pi}{1-\pi}\frac{t}{1-t} d \right) + \pi U\left(y_h + d \right)$$

$$\text{subject to:} \qquad c_1 \geq c_0 \qquad (12)$$

The condition $c_1 \geq c_0$ is an incentive compatibility constraint and states that having a migrant member abroad should at least be as good as not having a migrant member. Otherwise, it will not be in the interest of any household to send its family member abroad in the first place. Noting that $d = f\left(y_m, p_d\right)$ and $p_d = \frac{1}{1-t}$, the first order condition will be:

$$\begin{aligned} \frac{dV}{dt} = & \ (1-\pi)U'\left(y_h + \frac{\pi}{1-\pi}\frac{t}{1-t} d \right)\frac{\pi}{1-\pi}\frac{1}{\left(1-t\right)^2} d \\ & + (1-\pi)U'\left(y_h + \frac{t}{1-t} d \frac{\pi}{1-\pi} \right)\frac{\pi}{1-\pi}\frac{t}{1-t}\frac{\partial d}{\partial p_d}\frac{1}{\left(1-t\right)^2} \\ & + \pi U'\left(y_h + d \right)\frac{\partial d}{\partial p_d}\frac{1}{\left(1-t\right)^2} \ = \ 0 \end{aligned}$$

which after simplifying and using the definition of f_2 from equation (8) becomes:

$$\frac{dV}{dt} = \frac{\pi}{(1-t)^2}\left(U_0^{'} d + U_0^{'} \frac{t}{1-t} f_2 + U_1^{'} f_2 \right) = 0$$

where $U_0^{'} = U^{'}\left(y_h + \frac{\pi}{1-\pi}\frac{t}{1-t} d \right)$ and $U_1^{'} = U^{'}\left(y_h + d \right)$

which can also be put as:

$$\frac{dV}{dt} = \frac{\pi d}{(1-t)^2}\left(U_0^{'} + U_0^{'} t \frac{f_2}{(1-t)d} + U_1^{'} \frac{f_2}{d} \right) = 0$$

and using the definition of ε from equation (9) I get:

$$\frac{dV}{dt} = \frac{\pi d}{(1-t)^2}\left[U_0^{'} + t U_0^{'} \varepsilon + (1-t) U_1^{'} \varepsilon \right] = 0$$

or simply, the first order condition can be given as:

$$U_0^{'} + t U_0^{'} \varepsilon + (1-t) U_1^{'} \varepsilon = 0$$

which after rearranging terms becomes:

$$U_0^{'} + U_1^{'} \varepsilon + t\varepsilon\left(U_0^{'} - U_1^{'} \right) = 0 \tag{13}$$

The expected utility of the representative household will be maximized when equation (13) holds. But if equation (13) does not hold, there is room to increase the expected utility by changing *t*. More specifically, if $U_0^{'} + U_1^{'} \varepsilon + t\varepsilon\left(U_0^{'} - U_1^{'} \right) > 0$, the marginal expected utility is positive and the expected utility of the representative household can be increased by increasing *t*. If $U_0^{'} + U_1^{'} \varepsilon + t\varepsilon\left(U_0^{'} - U_1^{'} \right) < 0$, on the other hand, the marginal expected utility is negative and *t* should be decreased.

Depending on the value of the elasticity of disposable remittance there will be three cases which are discussed below.

Case 1: $|\varepsilon| = 1$

The first case is where the elasticity of disposable remittance is equal to one which implies that total remittance is the same regardless of the transfer rate. I.e., the remitting behavior of the migrant is not affected by the transfer rate. To solve for the optimal transfer rate, I replace $|\varepsilon| = 1$ in equation 13 and get:

$$(1-t)\left(U_0^{'}-U_1^{'}\right)=0$$

which under the incentive compatibility constraint has only one solution; $U_0^{'}=U_1^{'}$ which implies:

$$c_0=c_1 \Rightarrow y_h+\frac{\pi}{1-\pi}\frac{t}{1-t}d=y_h+d$$

and solving for *t* gives the following result:

$$t^{*}=1-\pi \tag{14}$$

When the elasticity of disposable remittance is one, the optimal transfer rate is chosen such that the benefit from migration, which is remittance, is shared equally and hence every household consumes the same amount; i.e., remittances do not create inequality. It also means households consume the same amount during bad and good times; there is complete insurance. This is because there is no efficiency cost associated with insurance when total remittance is fixed. Thus, the community cares only about insurance which implies that the benefit from migration should be shared equally.

Case 2: $|\varepsilon|<1$

To see what the optimal *t* will be when $|\varepsilon|<1$, I start with $t=1-\pi$ which is the optimal transfer rate when the elasticity of disposable remittance is equal to one. When $t=1-\pi$, the left hand side of equation (13) becomes:

$$U_0^{'}+U_1^{'}\varepsilon+(1-\pi)\varepsilon\left(U_0^{'}-U_1^{'}\right)=U_0^{'}+U_1^{'}\varepsilon;\ \text{because}\ t=1-\pi \Rightarrow U_0^{'}=U_1^{'}$$

and it is easy to see that $U_0^{'}+U_1^{'}\varepsilon>0$ which implies that the marginal expected utility of the representative household is positive. Thus, the expected utility of the representative household can be increased by increasing *t*. I.e., $t^{*}>1-\pi$. The reason is, when the elasticity of disposable remittance is less than one, remittance increases with *t* and the community has incentive to trade-off insurance for efficiency by increasing *t*. But the incentive compatibility constraint in equation (12) implies that $t\le 1-\pi$. Therefore, the optimal *t* will be:

$$t^{*}=1-\pi \tag{15}$$

Like in the first case, remittances are equally shared and the transfer rate is given by the fraction of non-remittance receiving households. But the total remittance amount is larger

than the amount under no transfers (i.e., $t = 0$) implying that transfer has an additional benefit (from the community's point of view) on top of smoothing consumption. It is as if the migrant rewards the norm of sharing by sending more remittance.

Case 3: $|\varepsilon| > 1$

Following similar approach used in Case 2 above, it is easy to show that at $t = 1-\pi$, $U_0^{'} + U_1^{'}\varepsilon + t\varepsilon\left(U_0^{'} - U_1^{'}\right) = U_0^{'} + U_1^{'}\varepsilon < 0$. This implies that t is too big and should be reduced. Thus, the optimal t will be:

$$0 \le t^{*} < 1-\pi \tag{16}$$

When the elasticity of disposable remittance is greater than one, remittance can be increased by decreasing t and this continues as far as the benefit from doing so is positive. But since the community also cares about insurance, t need not go all the way to zero.[7] If a positive t is chosen, total remittance will be smaller than the case with no transfers. I.e., though transfer improves welfare by smoothing consumption, it comes at a cost. The fact that the optimal transfer rate is less than $1-\pi$ implies that there is no equal sharing or complete insurance unlike in the first two cases. Remittances create inequality, but the level of inequality will be less than the case with no transfers.

The above three cases show how the elasticity of disposable remittance affects the optimal transfer rate. Since the migrant cares only about his family, any transfer to other households makes his family's consumption more expensive. Increase in the transfer rate has similar effect on the migrant as increase in the transaction cost of sending remittance (which is implicitly assumed to be zero in this model). As sending remittance becomes more expensive, the migrant may keep his total remittance expenditure (including transaction cost) constant in which case the burden of the additional cost falls on his family entirely. He may, as well, share the burden by increasing his total remittance spending. But it is unlikely for him to cut his total spending and to avoid such unrealistic result I make the following assumption about the elasticity of substitution between the migrant's own consumption and the additional consumption by his family.

[7] For a sufficiently large (in absolute terms) ε, the optimal transfer rate will be zero. From equation (13) it is easy to see that $\frac{dV}{dt} < 0$ at t=0 when $|\varepsilon| > \frac{U_0^{'}}{U_1^{'}}$ which implies that the transfer rate that satisfies the first order condition is a negative one. Thus, we will have a corner solution at t^{*}=0.

Assumption 1: $\sigma \leq 1$

Under the above assumption, it follows from equation (11) that the elasticity of disposable remittance is less than or equal to one which as discussed in cases 1 and 2 above leads to the following proposition.

Proposition 1: *When the elasticity of substitution between the migrant's consumption and his family's additional consumption is less than or equal to one, remittance money will be equally shared between remittance receiving and non-receiving households which implies that the optimal transfer rate will be given by the fraction of non-remittance receiving households.*

When the elasticity of substitution is less than or equal to one, the model gives the stark prediction that remittances are shared equally among all households. But in reality remittance recipients will resist equal sharing. Besides, the assumption that migration is costless does not hold. As a result, the transfer rate will be less than what the model predicts. One should, nonetheless, expect that a large share of remittance income will be transferred to other households. Remittance money is also expected to be more transferrable than income from other sources. This is tested in the empirical part where total income and other household characteristics are controlled for.

Under the assumption that the elasticity of substitution between the migrant's own consumption and his family's additional consumption is less than or equal to one, the model has also another testable implication. As highlighted above, the total remittance flow does not decrease (though the disposable remittance decreases) as the transfer rate increases. More specifically, total remittance may either increase or remain constant as the transfer rate increases depending on whether the elasticity of substitution is less than or equal to one. This can be tested if a richer data set is available with exogenous variation in sharing norms.

III. Econometric Method

Probability of Giving Transfer

The main objective of the paper is to investigate the extent to which remittances are shared with non-recipient households. In other words, I am interested in studying the effect of remittance on the amount of transfer given to other households which requires running a regression of transfer amount on remittance. But it is also interesting to study the effect of

remittance on the likelihood of giving transfer. I define an unobservable latent variable D^*, which measures the propensity to give transfers, as follows:

$$D_i^* = \alpha_0 + \alpha_1 R_i + \alpha_2 X_i + \varepsilon_i \tag{17}$$

where R_i is the amount of remittance received, X_i is a vector of income and other covariates, and ε_i is a normally distributed error term. The decision variable which shows whether transfer is given or not can be put as:

$$D_i = \begin{cases} 1 \text{ if } D_i^* > 0 \\ 0 \text{ otherwise} \end{cases}$$

The probability of giving transfer will be:

$$\begin{aligned} \Pr(D_i = 1) &= \Pr(\alpha_0 + \alpha_1 R_i + \alpha_2 X_i + \varepsilon_i > 0) \\ &= \Pr(-\varepsilon_i < \alpha_0 + \alpha_1 R_i + \alpha_2 X_i) \end{aligned} \tag{18}$$

The coefficients are estimated using the Probit method and $\hat{\alpha}_1$ shows the effect of remittance on the probability of giving transfer and is expected to be positive.

Amount of Transfer Given

Now I turn to the main focus of the paper, which is assessing the effect of remittance on transfer amount. The amount of transfer given can be written as:

$$T_i = \beta_0 + \beta_1 R_i + \beta_2 X_i + \mu_i; \quad \mu_i \sim N(0, \sigma^2) \tag{19}$$

where R_i and X_i are defined the same way as in equation (17). OLS can be used to estimate equation (19), but the fact that the amount of transfer is zero for many of the households might lead to biased estimates. To account for the censoring of transfers at zero, the following equation is estimated using the Tobit model.

$$\begin{aligned} E(T_i / T_i > 0) &= E(\beta_0 + \beta_1 R_i + \beta_2 X_i + \mu_i / T_i > 0) \\ &= \beta_0 + \beta_1 R_i + \beta_2 X + E(\mu_i / T_i > 0) \end{aligned} \tag{20}$$

Net Transfer Given

In the transfers literature, it is common to use net transfer as the dependent variable instead of gross transfer, though the choice is hardly motivated by theoretical or practical justifications (for example, Cox et al, 1998; Cox et al, 2004; Kazianga, 2006). Alvi and Dendir

(2009b:1339) used net transfer as an alternative to gross transfer and argue that "Because informal transfers may be reciprocal, carried out within a well-connected group of family members and friends, it may not be unusual for households to think in terms of net-status rather than just the gross amounts."

Whether the choice of net transfer over gross transfer is convincing or not, it makes the result comparable with other studies. It is also worth noting that most empirical works focus on transfers received due to the huge emphasis on testing whether transfer receipts decrease with the recipients' income which is taken as an evidence for the presence of a crowding out effect of public transfers. But with net transfers, the difference between receiving and giving is not important as both negative and positive net transfers are included. Though this paper (unlike most other studies) focuses on transfers given, using net transfers makes the result comparable with the existing literature. Therefore, as an alternative to gross transfer, net transfer which is defined as transfer given minus transfer received is used as a dependent variable. Remittance, as before, is expected to have a positive effect on net transfer. Net transfer can be written as:

$$T_i = a_0 + a_1 R_i + a_2 X_i + v_i; \quad \mathrm{v}_i \sim N\left(0, \sigma^2\right) \tag{21}$$

Using OLS will lead to similar problem discussed in connection with gross transfer because the value of net transfer is zero for many households. To account for the special type of censoring, I use the friction model proposed by Rosset (1959), and applied by Kazianga (2006) and Song (2009) in similar contexts. The latent net transfer amount T^* is defined as follows:

$$T_i^* = b_0 + b_1 R_i + b_2 X_i + e_i; \quad \mathrm{e}_i \sim N\left(0, \sigma^2\right) \tag{22}$$

and the actual net transfer amount is:

$$T_i = \begin{cases} T_i^* \text{ if } T_i^* \le \tau_1 \\ 0 \quad \text{if } \tau_1 < T_i^* < \tau_2 \\ T_i^* \text{ if } T_i^* \ge \tau_2 \end{cases} \tag{23}$$

where τ_1 and τ_2 are respectively the minimum (in absolute terms) negative and positive net transfer values between which net transfer is zero.[8] The Model is estimated using maximum likelihood estimation method outlined by Maddala (1983). Though τ_1 and τ_2 are assumed to be unobservable parameters in the original Rosset model, I assume them as fixed known values similar to Song (2009).

IV. Data and Summary Statistics

Data

The data for the empirical part comes from the 2004 Ethiopian Urban Socio-economic Survey (EUSS) collected by Addis Ababa University in collaboration with Gothenburg University. It has detailed information about income and other household characteristics. Income sources are divided into four major groups namely wage/salary employment, business/own account, female/children business, and transfers. Transfers are further disaggregated into international remittances, government transfers (like pension and aid), and private interhousehold transfers. Households were also asked if they transferred money or goods to other households within 12 months before the interview. For those who gave transfers the amounts were also reported.

The sample includes 1424 households drawn from Addis Ababa and six other major cities. The sample was distributed to the cities according to their population size and finally households were drawn randomly. After dropping observations with missing information on income, the sample is reduced down to 1330 households of which, 136(10%) gave and 208 (16%) received transfers. The total number of households who participated in transfers is 315 (24%) and 29 (2%) households participated in both giving and receiving. The summary of transfers by remittance status is reported in table 1.

[8] Under the same spirit as the original friction model, Kazianga (2006) and Song (2009) assumed that τ_1 and τ_2 are transaction costs associated with participation in transfers. I.e., households will participate in transfer only if their latent transfer value is greater than the transaction cost. Accordingly, the actual net transfer will be $T_i^* - \tau_1$ if $T_i^* < \tau_1$, $T_i^* - \tau_2$ if $T_i^* > \tau_2$, and zero otherwise.

Table 1. Summary of transfers by remittance status

	Remittance recipients	Non-remittance recipients	All households
Number of households (% in parentheses)			
Transfer donors	34(17.3)	102(9)	136(10.2)
Transfer recipients	16(8.1)	192(17)	208(15.6)
Donors/Recipients	45(22.8)	270(23.8)	315(23.7)
Non participants	152(77.2)	863(76.2)	1015(76.3)
All households	197(100)	1133(100)	1330(100)
Amount of Transfers			
Transfers given	266(624)	60.41(98)	111.69(332)
Transfers received	134.05(170)	135.46(262)	135.35(256)
Net transfers given	153(563)	-74(244)	-41(319)

Note: Transfer amounts are monthly mean values in Birr (the exchange rate was $ ≈ 8.5 Birr in 2004) with standard deviations given in parentheses. Though transfers were reported annually they are converted into a monthly amount.

In the first panel of table 1, the distribution of households by transfer status is given for both remittance receiving and non-receiving households. Percentages are provided in parentheses. Out of the 197 households who received remittance, 17% gave and 8% received transfers. Of the non-remittance recipients, 9% are donors and 17% are recipients. This indicates that remittance recipients are more likely to be transfer donors and less likely to be transfer recipients compared with non-remittance recipients.

In the lower panel of the table, the summary of transfer amount by remittance status (conditional on participation) is reported. The average monthly transfer given is 266 Birr for the remittance receiving group while it is 60 Birr for the non-recipients. For the whole sample it is 112 Birr. This shows that, not only a bigger fraction of remittance recipients give transfers, but they also transfer larger amount on average compared with the non-remittance receiving group. The difference in the amount of transfer received between the two groups is negligible and the average monthly amount for the whole sample is 135 Birr. I.e., though remittance recipients are less likely to receive transfers compared with non-remittance recipients, when they do, they receive the same amount on average. The average monthly net transfer given is positive for remittance recipients while it is negative for non-remittance recipients.

Overall, there are more transfer recipients than donors and the amount received is also bigger on average than the amount given. This might suggest that transfers given were underreported relative to transfers received. If there is under-reporting, it would normally be expected to go the other way round as households, in general, tend to under report their

incomes and over report their expenditures. But the attitude towards transfers might be different. Another reason for the discrepancy might be the way the questions about transfers were asked. While there were detailed questions about receipts, there was just one question about transfers given. Such discrepancy is not, however, uncommon in the literature (see for example Cox et al, 2004 in Philippines and Davies, 2010 in Malawi).

Explanatory Variables: Description and Summary Statistics

The main objective of the paper is to investigate the extent to which remittances are shared with non-recipient households. Therefore, I included the amount of remittance received by the household as the main explanatory variable. To identify the separate effect of remittance, I controlled for total income of the household including remittance. The coefficient of total income captures the general income effect which is expected to be positive because society normally demands more transfer from households with larger income. But due to the problem of observability, the effect is expected to be weaker compared with that of remittance. The remittance variable measures the additional effect on top of the general income effect; the coefficient of remittance represents the effect of a unit change in remittance keeping total income constant. I included pension income as a regressor to check if it has a separate effect on transfers.[9]

Other household characteristics are also controlled for. A host of household head characteristics are included as proxies for economic and social conditions of the household. Age, gender, education, employment, and health condition of the household head are included. Age of the household is likely to be related with earning capacity which can influence transfer and to capture a possible non-linear effect, age squared is added. Education of the household head is associated with higher and more stable income potential and hence is expected to affect transfers positively. Having a female household head is usually associated with economic vulnerability and is likely to have a negative effect on transfers. Similarly, households who have unemployed, sick, or disabled heads are expected to transfer smaller amounts.

[9] Information about remittance and other income variables for the households who receive the transfers is not available and hence could not be included in the regression. Given that incomes of donors and recipients are likely to be correlated; this might lead to omitted variable bias. Studies that attempted to identify this bias found that there is small and positive bias on the effect of recipients' income on transfers received (see for example Cox et al, 1998 in Peru; Kazianga, 2006 in Burkina Faso and Mitrut and Nordblom , 2010 in Romania). This suggests that the bias on the effect of income on transfers given will be small and negative. The correlation between remittances received by donors and recipients is expected to be positive similar to the correlation for total incomes which implies, if there is a bias, it will be downwards.

In addition, household size and the number of employed household members are included. Household size is likely to have negative effect because larger households have bigger needs and hence they will be expected to transfer less, other things being constant. The number of employed household members is likely to have a positive effect because it represents higher and more diversified income generating capacity. To control for family history, dummy for households who migrated to their current location from another place is included. Another dummy is also included for those households who have new household members who came from another place (within Ethiopia). Migrant households are likely to keep their social tie with people at the place of origin which might lead to different transfer norm.[10] A dummy variable is included for households who live in Addis Ababa. Since Addis Ababa is by far bigger than the other cities, social ties may be weaker which in turn leads to weaker transfer norms. A summary of the explanatory variables by transfer status is reported in table 2 while their definitions are given in table 5 in the appendix.

Table 2. Summary Statistics of Explanatory Variables

Variables	Transfer donors	Transfer recipients	Remittance recipients	All households
Remittance	97(272)	27(149)	347(412)	52(201)
Pension	71(362)	20(60)	42(135)	36(156)
Income	4235(24126)	1132(6934)	1539(2415)	1305(7962)
Pre-transfers income	4210(24129)	996(6941)	1528(2416)	1284(7963)
Age of head	49(14)	51(16)	53(14)	51(13.81)
Primary head	.30	.32	.31	.33
Secondary head	.43	.21	.30	.26
Female head	.37	.59	.50	.43
Unemployed head	.23	.49	.43	.27
Sick head	.11	.11	.12	.08
Disabled head	.14	.11	.13	.09
Household size	5.83(2.68)	4.85(2.41)	5.76(2.58)	5.69(2.58)
Employed members	1.42(1.32)	.85(1.00)	1.12(1.22)	1.20(1.17)
Migrant household	.09	.07	.05	.08
New member	.45	.25	.37	.27
Addis Ababa	.56	.58	.73	.61
Sample Size	136 (10.23%)	208(15.64%)	197(14.81%)	1330(100%)

Note: For continuous variables, standard deviations are provided in parentheses

[10] To the best of my knowledge there is no study that included migration history as a determinant of transfers

Table 2 shows that there are considerable differences among the different sub samples on remittance and the other income variables. The mean monthly remittance is 52 Birr for the whole sample while it is 97 Birr and 27 Birr for transfer donors and recipients respectively. The difference in the mean remittance received between the two groups is mainly due to the significant difference in the fraction of households who receive remittance. As can be seen from table 1, 25% of the donors receive remittance while only 8% of the recipients receive remittance. But the average remittance is also larger for the donors than for the recipients even conditioning on receiving; the average conditional remittance is 389 Birr for the donors and 347 Birr for the recipients.

Looking at the mean total income which includes transfers, it is apparent that the donors are by far better-off than the recipients. The mean total income for the recipient group is lower than the mean for the whole sample. The pre transfer mean income for the recipient group is smaller even compared with the mean for those who do not participate in transfers (who neither give nor receive) though not shown in table 2. I.e., the recipients were the poorest group before transfers. This implies that transfers on average flow from high income to low income households. The mean income for the remittance receiving group is moderately larger than for the whole sample.

Differences are also observed on the other explanatory variables. The percentage of households with high school graduate heads is considerably bigger for the transfer recipients (43%) than for the donors (21%). Relative to their share in the whole sample, the share of female headed households is smaller in the donors' group and bigger in the recipients' group. Half of the transfer recipient households have unemployed heads while the percentage of households with unemployed head is 23% for the donors. In terms of household size, the recipients are smaller on average compared with the donors. The average number of employed members is larger for the donors than for the recipients. Proportionally, more transfer donors have new members compared with transfer recipients.

V. Result

Main Results

Even though I am mainly interested in the effect of remittance on the amount of transfer given, I have also investigated the effect of remittance on the probability of giving transfer. The Probit estimates for the probability of giving transfer are reported in table 3. The effect of remittance is positive as expected though the magnitude is not very big. A 100 Birr additional

remittance leads to a 0.63% increase in the likelihood of giving transfer, which is 7% of the predicted probability of giving transfer.

Table 3. Probit Estimates: The Probability of Giving Transfers

Variables	Coefficients	Marginal Effects
Remittance/100	.0394(.0212)*	.0063(.0707)
Pension/100	.0350(.0260)	.0057(.0629)
Income/100	.0038(.0018)**	.0006(.0067)
Age of head	-.0171(.0206)	.0028(.0314)
Age of head squared/100	.0135(.0200)	.0022(.0247)
Primary head	.1111(.1374)	.0183(.2054)
Secondary head	.4112(.1490)***	.0755(.8474)
Female head	.0038(.1212)	.0006(.0067)
Unemployed head	.0038(.1349)	.0006(.0067)
Sick head	.0424(.1796)	.0070(.0786)
Disabled head	.2650(.1651)	.0491(.5511)
Household size	-.0030(.0219)	-.0005(.0056)
Employed members	.0512(.0445)	.0083(.0932)
Migrant household	.0910(.1752)	.0154(.1728)
New member	.3345(.1079)***	.0597(.6700)
Addis Ababa	-.2398(.1040)**	-.0401(.4501)
Constant	-1.1118(.5362)	
Pseudo R-Squared	.0746	
Predicted Probability		.0891

Note: Standard errors of the coefficients are given in parenthesis. For the marginal effects, the effects as fractions of the predicted probability are given in parentheses. For continuous variables, the marginal effect is due to a small change in the variable measured at its mean value while for dummy variables it is due to a change from 0 to 1 keeping the other variables at their mean values. *, **, and *** represent level of significance at 10%, 5%, and 1% respectively

Next, the effect of remittance on the amount of transfer is presented. To account for the fact that transfer amount is censored at zero, I used a Tobit regression and the result is reported in column 2 of table 4 (for comparison purpose, the estimates based on OLS regression are presented in table 6 in the appendix).

Table 4. Estimates of Transfers Given

Variables	Tobit Regression (gross transfers)	Rosett-Tobit Regression (net-transfers)
Remittance	.3547(.0707)***	.1583(.0167)***
Pension	.1069(.0843)	.0321(.0214)
Income	.0034(.0014)**	
Pre-transfer income		.0013(.0004)***
Age of head	-13.63(7.45)*	-1.84(1.42)
Age of head squared/100	14.37(7.12)**	2.40(1.35)*
Primary head	58.84(52.51)	-3.06(8.51)
Secondary head	139.11(57.76)**	-19.38(9.93)*
Female head	.4722(46.10)	-9.32(7.91)
Unemployed head	-9.61(51.40)	-28.95(8.47)***
Sick head	-1.61(68.67)	-13.29(12.45)
Disabled head	47.35(64.04)	-24.55(11.92)**
Household size	-2.96(8.24)	-2.18(1.42)
Employed members	27.31(16.60)*	11.28(3.02)***
Migrant household	-1.11(68.34)	-4.28(11.95)
New member	134.07(41.45)***	16.90(7.60)**
Addis Ababa	-84.42(40.03)**	-9.01(6.93)
Constant	-336.12(199.94)*	30.11(37.06)
Pseudo R-Square	.0296	.0825

Note: Standard errors of the coefficients are given in parentheses. *, **, and *** represent level of significance at 10%, 5%, and 1% respectively

Remittance has a strong and highly significant effect on the amount of transfer given. Conditional on transferring, a one Birr increase in remittance leads to a 0.35 Birr rise in transfer which is fairly large. This implies that more than one third of the remittance is transferred to others. The result is consistent with the prediction of the theoretical model that a large fraction of remittance is transferred to other households.

Finally, the result for net transfer based on the friction (Rosett-Tobit) model is presented in column three of table 4 (the result of the OLS regression is given in table 6 in the appendix). The dependent variable is net transfer which is given by the difference between transfer given and transfer received while the explanatory variables are the same except for total income which is replaced by pre-transfer total income. I assume that the actual net transfer is zero if the latent transfer is between -10 Birr and 10 Birr, i.e., I assume $|\tau_i| = 10$ for τ = 1, 2.[11] Net transfer values between -10 and 10 Birr are recoded as 0's. The main variable of interest, remittance amount, has a positive effect on net transfer. An additional Birr of remittance leads to 0.16 Birr more net transfer which is considerable. But it is smaller than the effect on gross transfer which was 0.35 Birr.

[11] The result is robust to alternative assumptions about the minimum positive and negative net transfers

The results show that international remittance has a strong and significant effect on transfer given whether gross transfer or net transfer is used. In other words, a significant proportion of remittance is transferred to other households consistent with the prediction of the theoretical model. This has important implication for the understanding of the overall effect of remittances. The fact that remittances are shared with non-recipient households magnifies the positive welfare effect of remittances by extending the benefit beyond the direct beneficiaries. It will also make remittances more equalizing (or less unequalizing) and more poverty reducing.

Additional Results

The main result presented above is consistent with the implication of the model. In general, the results for the other variables also confirm with the main result. Like remittance income, total income increases the odds of giving transfer though the magnitude is very small. A 100 Birr additional income increases the odds of giving transfer by .06% which is less than 1% of the predicted probability. Pension income does not have a significant effect implying that it does not have a separate effect on the probability of giving transfers unlike remittance income.

Compared with those households whose heads have not completed primary education, those with high school graduate heads have 7.6% higher probability of giving transfer which is 85% of the predicted probability. Having educated household head implies larger and more stable income potential and with that social expectations increase. Households with new members have 6% higher probability of giving transfer. Having a new member might proxy stronger social network and transfer norms. Finally, households from Addis Ababa are 4% less likely to give transfers. Due to its larger size and the more heterogeneous nature of its residents, compared with the regional cities, the norm of mutual insurance is likely to be weaker in Addis Ababa.

The three variables which positively affect the probability of giving transfer also affect the amount of transfer positively. A one Birr increase in total income leads to a .003 Birr increase in the amount of transfers. The effect is very small and shows that total household income is not an important determinant of transfers.[12] Compared with those households whose heads

[12] But it is likely that income is measured with error which leads to attenuation bias. There may also be an omitted variable bias arising from the exclusion of the recipient's income from the regression. Since recipient's and donor's income are usually positively correlated, the bias will likely be negative since recipient's income usually has a negative effect on transfers. It could be due to one or two these reasons why the effect of income

have not completed primary education, those with high school graduate heads transfer 139 Birr more. Households with new members give 134 Birr more compared with those who do not have new members. In addition, age of the household head and the number of employed household members affect the amount of transfer significantly. Age of the household head has a negative effect while its square has a positive effect indicating that there is a U-shaped relationship between age of the household and transfer (the turning point being 47 years).[13] The number of employed members has a positive effect; an additional working member leads to 27 Birr more transfer. The larger the number of working members, the bigger and the more diversified the household's income will be and that leads to more transfers.

The result for net transfer is more or less similar to that of the gross transfer though some differences are observed. Age of the household does not have a significant effect and the effect of the squared age of the household is significant only at 10%, but the signs of their coefficients suggest that there is a U-shaped relationship between age and net transfer as was the case with gross transfer. The effect of having a household head who is a high school graduate is negative though the magnitude is small (and it is significant only at 10%). It decreases net transfer by 19 Birr. This is contrary to the positive effect on gross transfer and implies that households with educated heads also receive transfers which more than offset the amount they give. Controlling for current income, more schooling implies higher future income which might lead to more demand for current loans in order to smooth consumption. And, because of the imperfect credit markets, private transfers might be used as substitutes for loans (Cox et al, 1998; Cox et al, 2004). Coming from Addis Ababa does not have a significant effect now. Unemployment and disability of the household head, which did not have significant effect on gross transfer, are associated with 29 and 25 Birr lower net transfer respectively.

VI. Conclusion

In this paper I have studied the link between international remittances and private interhousehold transfers in a developing country context. I first presented a simple theoretical

is very small. But the result suggests that the effect of income will be small relative to the effect of remittance even after correcting for the bias.

[13] Given that earnings are expected to rise with age at earlier stage and fall later on, the result is contrary to expectation. This could be because people form families late (the average household head age is 51 years with a standard deviation of 14 years) and hence as age increases further, income might not increase much while family responsibility increases, a situation that leads to the initial negative effect. On the other hand, after some age, social commitment increases and that entails more transfers.

model of interhousehold transfers based on mutual insurance. Households insure each other by sharing the remittance money they receive from relatives abroad. The main prediction of the model is that, households who receive remittance transfer a large fraction of it to other households.

Consistent with the prediction of the model, international remittance increases the amount of transfer significantly. Conditional on giving, a one Birr additional remittance leads to a .36 Birr increase in transfer which implies that more than a third of the remittance money is transferred to others. The result for net transfer is similar except that the magnitude is smaller. A one Birr additional remittance, leads to a .16 Birr increase in net transfer given. This shows that whether gross transfer or net transfer is used, international remittance is an important determinant of private interhousehold transfer.

The fact that a significant fraction of the remittance money is transferred to other households implies that the benefits of remittances are extended beyond the families of the migrants. To the extent that remittance recipients are on the donors' side, transfers make remittances more equalizing (or less unequalizing) and more poverty reducing. By presenting one way that non-recipient households could be affected, the paper contributes to the overall understanding of the effect of remittances on developing countries. It also adds to the literature on private transfers by focusing on how international remittances affect private transfers and shifting focus from transfers received to transfers given.

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Appendix

Table 5. Description of Explanatory Variables

Name of Variable	Description of Variables
Remittance	Monthly international remittance
Pension	Monthly pension income
Income	Monthly total income
Pre-transfers income	Pre-transfer monthly total income
Age of head	Age of household head in years
Age of head squared	Age squared of the household head
Primary head	Dummy for household heads with primary education
Secondary head	Dummy for household heads with secondary education
Female head	Dummy for female household head
Unemployed head	Dummy for unemployed household head
Sick head	Dummy for households head who have been sick
Disabled head	Dummy for households heads with disability
Household size	Household size
Employed members	Number of employed household members
Migrant household	Dummy for households who moved to their current location with in the last ten years
New member	Dummy for households with a member who moved in from another place in the last ten years
Addis Ababa	Dummy for Addis Ababa

Table 6. OLS estimates of transfers Given

Variables	Gross transfers	Net-transfers
Remittance	.1335(.0151)***	.1580(.0183)***
Pension	.0215(.0195)	.0321(.0236)
Income	.0012(.0004)***	
Pre-transfer income		.0013(.0004)***
Age of head	-3.17(1.29)*	-1.81(1.56)
Age of head squared	3.79(1.23)**	2.37(1.49)
Primary head	8.24(7.73)	-3.09(9.36)
Secondary head	.6458(9.02)**	-19.33(10.92)*
Female head	.5337(7.19)	-9.36(8.7)
Unemployed head	-5.03(7.69)	-28.90(9.31)***
Sick head	-1.85(11.30)	-13.27(13.69)
Disabled head	-13.44(10.83)	-24.38(13.11)*
Household size	-1.50(1.29)	-2.16(1.57)
Employed members	4.47(2.74)*	11.31(3.32)***
Migrant household	-7.73(10.85)	-4.01(13.13)
New member	13.46(6.90)***	16.78(8.35)**
Addis Ababa	-4.66(6.29)**	-9.04(7.61)
Constant	60.56(33.64)*	29.59(40.74)
Adjusted R-Squared	.0833	.0871

Note: Standard errors of the coefficients are given in parentheses. *, **, and *** represent level of significance at 10%, 5%, and 1% respectively