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ABSTRACT

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In the last two decades remittances have gained interest due to their large size. For several developing countries remittances constitute a large portion of their GDP and sometimes exceed FDI. While FDIs are usually profit driven, it is not clear what the driving force behind remittances is. This paper presents a simple theoretical model of migrants' remitting behavior. I consider two general motivations for remitting: altruism and self-interest. Using a heteroskedastic Tobit with a known form of variance I test the findings of the theoretical model with data from Nicaragua. Evidence suggests that migrants from Nicaragua remit for altruistic reasons. Moreover some gender heterogeneity seems to exist in the remitting behavior.

JEL Classification: J61, O15, D64

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1. Introduction

In the last two decades remittances have been on the rise. Official estimates show that remittances averaged around 60 billion U.S. dollars per year in the 1990s (World Bank) and reached 167 billion U.S. dollars in 2005 (World Bank's Global Economic Prospects). Several studies document that remittances already exceed foreign aid and foreign direct investment (FDI) for some developing countries Connell and Brown (2004), De Haas (2006), Heilmann (2006) and Chami *et al.* (2006). This fact raised questions on whether remittances can be seen as a possible source of growth Durand *et al.* (1996) and Widgren and Marin (2002).

Remittances differ from other types of capital flows in three main aspects. First, remittances go directly into the hands of the households in the receiving countries rather than indirectly through private or governmental institutions. Second, capital flows such as FDIs are in general profit driven and therefore are positively related to GDP growth. However, this is not always the case for remittances. Remittances are not always profit driven and can be altruistically motivated. Finally, FDIs tend to be less stable relative to remittances Orozco (2002).

Uncovering the reasons for remitting is crucial for policy implication for several reasons. From the original household perspective, the forces behind remittances can shed some light on households' migration strategies De La Brière *et al.* (2002). In fact Hoddinott (1994) stresses that remittances should be incorporated in the model of household migration decisions. Hoddinott also notes that remittances can be part of a

long term contract between the head of the original household and the migrating member.

From a macroeconomic look, remittances are thought to be intended to ease the burden of poor economic performance on local recipients Chami *et al.* (2005). Therefore altruistically motivated remittances are expected to be countercyclical with income growth and consequently can decrease the scope of the government intervention in recession times. In this particular case, policies built on predictions that remittances behave in the same manner as other types of capital flows might have unanticipated consequences.

The literature on remittances has mostly focused on finding the determinants of remittances. In this paper I present a simple theoretical model of remittance behavior. I consider remittances as unidirectional flows from the migrant in a host country to the original household in the home country which I refer to in this paper as the receiving household. This allows me to consider the reaction of remittances to a bad state outcome on the receiving household. This is the first paper that looks at the response of remittances to shocks that pertain to the receiving household. This is crucial in terms of investigating the remittance behavior since most remittances consider the migrant as a source and the receiving household as the end destination and therefore, they are expected to react to any income shocks at the receiving end. This setup gives two broad motivations for remitting: altruism where migrants simply care about the receiving household members' welfare and self-interest where migrants remit for investment opportunities that are expected to yield a certain payoff in the future. I test the theoretical

predictions of this model using survey data from Nicaragua. I quantify the results of the heteroskedastic Tobit for policy purposes.

Altruism seems to be the main motivation behind the remitting behavior to Nicaragua. Moreover the remitting behavior is not identical across gender. Female migrants seem to behave more altruistically toward the receiving household.

This paper proceeds as follows. Section 2 provides a brief summary of the existing literature. Section 3 presents a simple theoretical model of remittance behavior. Section 4 introduces the data and explains the estimation method. Section 5 includes the results and section 6 represents the conclusion.

2. Literature Review

Lucas and Stark (1985) discuss several hypotheses for motivations to remit. Three reasons for remitting are presented ranging from pure altruism to pure self-interest spanning a more tempered point of view combining these two extremes. Under pure altruism a migrant derives utility from the utility of those persons at home. A migrant therefore enjoys remitting because this will subsequently increase his utility. Under pure self-interest the migrant's satisfaction depends on self-interest goals that range from inheritance, investments, and the intention of one day returning home. A third possible motive is viewing remittances as part of an arrangement between the migrant and persons at home. This arrangement is seen as a mutually beneficial contract between the two parties.

Agarwal and Horowitz (2002) is one of the first papers that relate the remittance behavior and the motivation behind remitting in a theoretical model. Agarwal and

Horowitz set up a two period model taking into consideration the possibility of multiple migrants per household. They solve for the first order conditions of a migrant's expected utility function and define an implicit remittance function for two cases: pure altruism and the insurance motive. The key result lies in the significant effect of the number of other migrants on remittance under altruism. However the number of migrants does not affect average remittance under the risk-sharing case. Agarwal and Horowitz use data for Guyana to test their theoretical predictions. Their empirical findings show significant differences in the remitting process of migrants from multiple and single migrants' households. Their findings support altruism as a main motivation for remitting.

Brown and Poirine (2005) make use of the theory of intergenerational transfers to sketch a two-period informal, intrafamilial loan arrangement to analyze migrants' remittances of Pacific Island migrants in Sydney, Australia. They develop an alternative theory based on parental behavior that lies between strong altruism and self-interest that they refer to as "weak altruism". Their results imply that neither strong altruism nor pure self-interest needs to be used to explain intergenerational transfers in low-income countries. They suggest linking the theory of private intergenerational transfers, the theory of human capital investment to the theory of migrants' remittances when investigating remittance behavior.

In a more recent paper Amuedo-Dorantes and Pozo (2006) stress upon the part of remittances transferred to buy two types of insurance: family-provided and self-provided insurance. The authors use data on Mexican immigrants to measure income risk and find

that increases in the latter raise both the likelihood and the percentage of migrants' earnings remitted for insurance purposes.

All the papers listed above focus on the risk sharing aspect of remitting by investigating the effects of a bad state outcome in the host country on the migrants' remitting behavior. While an income shock in the host country is important in determining the remitting ability of the migrant, remittances are consequences of migration and they are expected to react to shocks in the receiving country. In the following section I present a theoretical model of migrant remitting behavior that allows for a bad state shock on the receiving household.

3. Theoretical Model

The goal of this paper is to derive a hypothesis on the migrant's remitting behavior. In this section I present a variant of the model presented in Agarwal and Horowitz (2002).

The model presented in Agarwal and Horowitz (2002) defines the bad state shock to be migrant specific and therefore originates in the destination country of the migrant. In this paper I include a bad state shock on the receiving household and investigate the remitting behavior of migrants towards that shock. The main reason behind the placement of the bad state shock is that migration and remittances are to a certain extent related Hoddinott (1994). In this regard, exploring the reaction of remittances to an income shock in the receiving household might be crucial for determining the remitting behavior. Moreover, in the theoretical model presented in Agarwal and Horowitz (2002) migrants expect monetary transfers from the receiving household in case of a bad state outcome in the host country. The authors model the flow

of remittances as a two way stream. In this paper I model remittances as unidirectional monetary flows with the origin being the migrants and the final destination being the receiving households.

In effect, the Nicaraguan dataset analyzed in this paper includes 505 families that have migrants living abroad of which only 16 families send monetary transfers to these migrants. Out of these 16 families, six families also receive remittances from migrants. This last number of families is around 1.1% of the number of the families that have migrants living abroad in the Nicaraguan 2001 survey sample. Table 1 presents the characteristics of households and migrants by the level of monetary engagement of the receiving households in the remitting process conditional on having one migrant living abroad. Comparing households that receive remittances in column (B) to households that send remittances in column (C), the main difference is in the location of residence. Households that send remittances tend to reside in urban areas. In addition, differences include the gender composition and labor force status of the head of the household, the destination of the migrant, and the relationship of this migrant to the head of the receiving household. Male and working head of households tend to form the bulk of the receiving households that send remittances abroad. Moreover, it seems that a migrant's move to a developed country requires households in Nicaragua to share the cost of the move. In fact, receiving households that send remittances represented in columns (C) and (D) show larger percentages of migrants living in developed countries relative to those households that receive remittances and those that do not send or receive. For

those households with dual remittances flows, column (D), the striking difference is the location of the residence and the destination of the migrant.

To summarize, the receiving households that participate in sending remittances have on average notably higher percentages of working head of households, male head of households and younger head of households. Now focusing on only columns (A) and (B) I note that there might be a threshold level of households' characteristics that define receiving households which do not send or receive versus those that do send monetary transfers to migrants living abroad. The percentages of working head of the household, residing in urban areas and male head of household are indeed higher under column (A) than those in column (B) but still lower than the percentages in column (C). Also the migrants who belong to households in column (C) tend to be living in developed countries[2].

Additionally the small number of families who engage in two direction remittances seem to be consistent across low income countries. Agarwal and Horowitz (2002) report a very similar finding for Guyana (1.4%). For the purpose of this paper I ignore remittances from receiving households because it seems that across developing countries the frequency of two-way remittances is relatively small. In the following subsection I present the theoretical model.

3.1. Pure Altruism

[2] The subset of developed countries as a destination for Nicaraguan migrants includes Canada, Greece, Sweden and United States. The countries that did not make it in this sample are Algeria, Argentina, Brazil, China, Colombia, Costa Rica, Cuba, El Salvador, Guatemala, Guinea, Haiti, Honduras, Mexico, Panama and Tunisia. Both samples cover the destination of all the migrants in the Nicaraguan 2001 survey sample.

Based on the previous section, I assume that migrants do not receive monetary transfers from their original household. This assumption leaves out the specific case of risk-sharing that the literature has extensively modeled Agarwal and Horowitz (2002) and Amuedo-Dorantes and Pozo (2006) but it does follow the empirical evidence more closely. I build a two period model where a migrant who cares about the welfare of the receiving household has the following utility:

$$U_i = \alpha \log C_{i1} + \beta \log C_{i2} + \delta \log C_H \tag{1}$$

where α is the weight on migrant i's consumption in period 1 given by C_{i1}, β is the weight on migrant i's consumption in period 2 given by C_{i2} and δ is the weight on C_H, the recipient household consumption. The weights on consumption are positive such as $0 < \alpha$ and $0 < \beta$ and $0 \leq \delta$. The receiving household consumption depends on high income Y_H with probability of π and low income Y_L with probability of $1 - \pi$, with $Y_H - Y_L > 0$. The receiving household consumption also depends on the total remittances received by the household R. The total remittances R can be written as $r_i + kr_{-i}$ where r_i is migrant i's own remittances and, k is the number of other migrants belonging to the same receiving household who remit on average r_{-i}. The altruistic migrant chooses r_i to maximize utility subject to

$$C_{i1} = Y_{i1} - r_i \tag{2}$$

$$C_{i2} = Y_{i2} \tag{3}$$

and

$$C_H = \pi Y_H + (1-\pi)Y_L + r_i + kr_{-i} \tag{4}$$

where Y_{i1} is the migrant's income in the first period and r_i is the migrant's remittances. The second period migrant's consumption C_{i2} depends on the migrant's second period income Y_{i2}. The migrant chooses the level of remittances to maximize utility subject to (2), (3) and (4). The first order conditions (FOC) are:

$$\frac{\partial U}{\partial r} = \frac{-\alpha}{Y_{i1} - r_i} + \frac{\delta}{\pi Y_H + (1-\pi)Y_L + r_i + kr_{-i}} = 0 \tag{5}$$

Solving for r_i from equation (5) I define a remittance function given by:

$$r_i^* = r(Y_{i1}; Y_H; Y_L; k; \pi) \tag{6}$$

Equation (6) states that remittances sent by migrant i depends on the migrant's first period income, the receiving household income, the number of other migrants belonging to the same receiving household, and the probability of a good state in the receiving country. Using the implicit function theorem, I derive two hypotheses on migrants' remitting behavior[3]:

$$\frac{\partial r}{\partial k} = -\frac{-\delta C_H^{-2} r_{-i}}{-\alpha C_{i1}^{-2} - \delta C_H^{-2}} < 0 \tag{7}$$

$$\frac{\partial r}{\partial \pi} = -\frac{-\delta C_H^{-2}(Y_H - Y_L)}{-\alpha C_{i1}^{-2} - \delta C_H^{-2}} < 0 \tag{8}$$

Both derivations represented in equations (7) and (8) have a negative sign. This suggests that altruistic migrants' remittances respond negatively to both the number of other migrants belonging to the same receiving household and the probability of a good

[3] The derivations are in appendix I.

state in their original country. As the number of migrants from the same household increases, the amount of remittances sent by migrant i decreases. Also, as the likelihood of a good state increases it is more likely for an altruistic migrant to decrease remittances sent home. This is consistent with the belief that remittances are often thought to be intended to mitigate the burden of poor economic performance on the receiving household.

These two hypotheses follow from the altruistic migrant's utility function where the consumption of the receiving household directly enters the migrant utility. For self-interest motivated remitters the utility of the receiving household does not enter the migrant's utility function as explained in more detail in the next subsection.

3.2. Self-Interest

In the following I consider the opposite case of pure altruism. For a pure self-interest migrant the receiving household's welfare does not enter the utility function and this is given by $\delta = 0$. Therefore the utility function of a self-interest motivated remitter is:

$$U_i = \alpha \log C_{i1} + \beta \log C_{i2} \tag{9}$$

This migrant maximizes utility subject to:

$$C_{i1} = Y_{i1} - r_i \tag{10}$$

and

$$C_{i2} = Y_{i2} + g(r_i) \tag{11}$$

where for each dollar remitted migrants receive a return on their investment $g(1)$ where $g'(r_i) > 0$ and $g''(r_i) > 0$. Migrant i again chooses r_i to maximize the following utility:

$$U_i = \alpha \log(Y_{i1} - r_i) + \beta \log(Y_{i2} + g(r_i)) \tag{12}$$

subject to constraints (9) and (10). The FOC is the following:

$$\frac{\partial U}{\partial r} = \frac{-\alpha}{Y_{i1} - r_i} + \frac{\beta g'(r_i)}{Y_{i2} - g(r_i)} = 0 \tag{13}$$

From equation (13) and the implicit function theorem it is clear that $\frac{\partial r}{\partial k} = 0$, and $\frac{\partial r}{\partial \pi} = 0$ which suggests that the number of other migrants in the receiving household and the likelihood of a good state have no effect on the amount remitted by a self-interest motivated migrant. These findings follow from the self-interest migrant utility function which does not account for the welfare of any member of the receiving household.

Both cases of remittance behavior discussed above give distinct theoretical predictions that can be empirically tested. In the next section I describe the data and the estimation method.

4. Data and Estimation Method

4.1. Data

The data set is a national living standards measurement survey (LSMS) administrated in 2001 in Nicaragua. The LSMS was established by the World Bank. This nationally representative survey includes data on several aspects of the household and includes 4191 families in 4001 households[4]. The survey comprises a remittances module where a knowledgeable member of the receiving household in Nicaragua was asked about other household members living abroad. The remittances module includes a total of 897

[4] In some cases more than one family live in one household. For the migrants sample the number of families is the same as the number of households.

migrants who belong to 505 families residing in Nicaragua. I have information on the migrants' destination, labor force status, age, gender, education, and years of migration. I also have information on the receiving household. I know the number of migrants who belong to the same household, the labor force status, gender, age and education of the head of the receiving household, as well as the residence of the receiving household.

4.2. Estimation Method

In order to investigate the migrant's remitting behavior I need to determine the signs of two relationships: remittances r_i and the number of other migrants k and also remittances r_i and the likelihood of a good state π or a bad state $1-\pi$.

The dependent variable r_i is never negative. The level of remittances is zero for a large number of observations which means that the data on remittances are truncated since remittances are unobserved for the migrants that do not participate in the remitting process. In a censored regression model, equation (6) determines both the probability of remitting and the level of remittances. I consider a remittance equation which has remittances by Nicaraguan migrants as a function of individual and household characteristics:

$$r_i = \beta_0 + \beta_1 X_i + \beta_2 Z + u_i \tag{14}$$

where X_i includes migrants' individual characteristics, Z refers to the household characteristics and $u_i \sim N(0, \sigma^2)$. The migrants and households characteristics enter the remittances implicit function in equation (6) through the migrants' and the receiving households' income levels. In the Nicaraguan survey data, I do not observe migrants'

income. However I know the migrants' characteristics (age, gender, education, destination, years living abroad and labor force status) and I use those as a proxy for income. In equation (6) the migrant's first period income Y_{i1} is therefore a function of migrants' characteristics given X_i by $Y_i(X)$. For the receiving household I do observe the income but for endogeneity reasons I follow the same approach and use the receiving heads of households' characteristics Z to proxy for their income level.

Ordinary least squares (OLS) give biased estimates because of the nature of the dependent variable. The Tobit model uses the same set of covariates to model both the decision to remit and the amount of remittances. However the coefficients on the likelihood of remitting and the amount remitted from a Tobit have the same sign. Following Wooldridge (2003), comparing the results of a standard probit to the Tobit can be an assessment of the suitability of the Tobit model. For comparison reasons I show the results of a standard Probit and compare the signs of the statistically significant coefficients with the signs of the significant coefficients from the Tobit equation.

The Nicaraguan survey data identifies migrants who are remitters but does not identify the exact amount remitted by those migrants. I know the total supply of remittances received by a particular receiving household, the number of migrants living abroad and which of these migrants are remitters and which are not. It seems that this type of data problem is not uncommon. In fact the same problem exists in the Guyanese data explored by Agarwal and Horowitz (2002). To overcome this data limitation I proceed with two different approaches. The first approach is to define what I will refer to hereafter as the average model. I re-write equation (14) as follows:

$$r_{ij} = \beta_0 + \beta_1 X_{ij} + \beta_2 Z_j + u_{ij} \tag{15}$$

where i refers to a specific migrant belonging to the receiving household j. I take the average of equation (15) by summing over remitters in household j and dividing by the number of remitters s_j. This leads to the following equation:

$$\frac{1}{s_j}\sum_{i=1}^{s_j} r_{ij} = \frac{1}{s_j} R_j = \beta_0 + \beta_1 \frac{1}{s_j}\sum_{i=1}^{s_j} X_{ij} + \beta_2 Z_j + \frac{1}{s_j}\sum_{i=1}^{s_j} u_{ij} \tag{16}$$

where R_j is the total supply of remittances to household $_j$. If the number of remitting migrants s_j is either zero or one then the model follows equation (15). Otherwise the model is defined by equation (16). Note that the coefficients in equations (14), (15) and (16) are the same which insures the same interpretation of the results. Note that since $u_{ij} \sim N(0,\sigma^2)$ then the new error term $\frac{1}{s_j}\sum_{i=1}^{s_j} u_{ij}$ is not homoskedastic with $\frac{1}{s_j}\sum_{i=1}^{s_j} u_{ij} \sim N(0,\sigma_j^2)$. Therefore, equation (16) defines a heteroskedastic Tobit with a known form of heteroskdeasticity. In fact:

$$Var\left(\frac{1}{s_j}\sum_{i=1}^{s_j} u_{ij}\right) = Var\left(\frac{1}{s_j}\left(u_{1j} + u_{2j} + u_{3j} + \ldots + u_{s_j j}\right)\right) \tag{17}$$

Equation (17) can be rewritten as:

$$Var(\frac{1}{s_j}\sum_{i=1}^{s_j} u_{ij}) = \frac{1}{s_j}\sigma^2(1 + (s_j - 1)\rho) = \sigma_j^2 \tag{18}$$

where s is a migrant other than migrant i in household j, $\text{cov}(u_{ij};u_{ij}) = Var(u_{ij}) = \sigma^2$, $\text{cov}(u_{ij};u_{sj}) = \sigma_j$ and $corr(u_{ij};u_{sj}) = \frac{\text{cov}(u_{ij};u_{sj})}{std(u_{ij}) * std(u_{sj})} = \rho$. The variance of the new error term is a function of the variance of the original model in equation (8), the number of remitting migrants within the receiving household and the correlation of the error terms of different remitting migrants who belong to the same receiving household[5]. Finally I estimate the average model using maximum likelihood estimation[6].

The second approach is to limit the sample to those migrants belonging to households with at most one remitting migrant. For each of those migrants I can exactly identify the amount remitted. I count 387 households in that category which constitutes around 78% of the 494 receiving households. The new migrant sample is 555 which represent around 62% of the original 897 migrants. However, there is some concern regarding selectivity bias. Households with at most one remitting migrant probably share unobserved characteristics that make them form a non random sample. The selection issue comes into play in forming the limited sample: households with at most one remitting migrant. In order to overcome this issue I follow Heckman (1979). The next section discusses the selection bias problem in more details. In addition, section 5 elaborates more on the data and presents the results of these two approaches.

[5] This condition $\rho > \frac{-1}{s_j - 1}$ is necessary when $s_j \geq 2$ to guarantee a positive variance.

[6] More details on the likelihood function of the average model are presented in appendix II.

5. Results

To explore the remittance behavior of Nicaraguan migrants I need to investigate the relationship between r_i and k, and between r_i and π. However before going into the results I examine the data in more detail. Table 2 examines the characteristics of the receiving households by number of other migrants. Table 2 searches for any possible relationship between the number of other migrants and receiving household characteristics that might play a role in the sign of the coefficient on k. There is no clear pattern that can be inferred from Table 2. The percentage of head of household working seems to be decreasing with the number of other migrants but with 3 other migrants in the household this number picks up again and then with more than 4 other migrants it decreases again. Note that the larger the number of other migrants is, the smaller is the sample of households. The other household characteristics do not show any specific pattern.

In order to capture the probability of a good state versus the probability of a bad state I define two different measures. The first proxy is a dummy variable that is one if the head of the receiving household left the last job for a particular set of reasons. In total, fifteen different answers are listed. The question in the Nicaragua survey is not very clear about when the head of the receiving household left their last job. Table 3 lists the reasons and the distribution of households by reason. The list does not follow any particular order and the reasons are listed as they appear in the survey. The reasons that the heads of household mention include liquidation of the enterprise, being fired, retirement plans, end of contract, seasonal work, lack of work, personal duties, school

duties, lack of safety at work, harassment in the work place and illness. I presume that leaving for all of the reasons in Table 3 except for the following reasons: retirement plan, end of contract and studies (reasons numbered 3, 5 and 12 in Table 3) is a measure of bad outcome. I exclude these latter reasons from the construction of the bad outcome measure because they define reasons that could have been expected and therefore the receiving household could have acted upon ahead of time.

A second measure of the likelihood of a bad state is the length of time that the head of household has been without work. Out of 494 heads of household 128 have been looking for a job for at least one day. From Table 4, 101 heads of household out of 128 have been looking for a job for at least one year. I construct a dummy variable for those households that have been looking for a job for more than one year. I chose the longest search time (the other choices are days, weeks and months) since a long period of time better tests the remitting behavior of migrants. It also signals a worse financial situation for the households relative to the other search periods.

Note that both proxies define two different income levels for the receiving household. If the head of the household is unemployed or has been looking for a job for more than a year, then, in either case, the total income level of the receiving household must be different from the total household income in the opposite situation.

Table 5 presents the characteristics of households by measure of bad state and the characteristics of those households not affected by a bad state shock. For both measures the majorities of households are located in urban areas and have a female head of household. The mean age of the head of the household is around 60 years old. Those

households not affected reside in relatively more rural areas than those affected and also have a majority of male head of households.

Table 6 shows the characteristics of the pool of migrants who originated from non-affected head of households, from head of households who left their job for one of the 15 reasons in Table 3 and those head of households who have been looking for a job for at least one year. Table 6 investigates any differences in migrants' characteristics that determine migrants' income Y_i. The only striking difference is the gender composition of the migrants' population. More than 50% of the migrant population from unaffected households is male whereas more than 50% of migrants from affected households are females.

From the theoretical model in section 3 the characteristics of the head of the receiving household and of the migrants determine their respective income levels. Equation (14) includes migrants and household characteristics. Migrant's individual characteristics play a major role in the remitting decision. I control for age, level of schooling, gender, destination, years since migration and employment status of the migrant. These characteristics affect the migrant's ability to remit. Moreover, I control for the head of the household education level, age, gender, the receiving household area of residence and the number of household nonmigrating members. The main two covariates in the theoretical model, the number of other migrants and the measure of bad state are also considered household characteristics.

Before going into the results I investigate the selection bias problem in more details. Table 7 compares the households and migrants' characteristics across two

different samples: the limited sample, which includes migrants who belong to households with at most one remitting migrant, and the total migrant sample. All characteristics between these two samples seem to match suggesting that the limited sample is a reliable representation of the total migrant population. The only significant discrepancy is the percentage of migrants living in developed countries. For the limited sample, the percentage of migrant living in developed countries is 25% while for the total sample it is around 31%. However, since unobservable factors can affect the membership to the limited sample I investigate what variables can help determine the association with this sample.

Table 8 compares the relationship of the migrant to the head of the receiving household for three samples: limited sample, the remaining migrants not belonging to the limited sample and total migrant sample. The first column in Table 8 is notably different from both columns 2 and 3. It seems that migrants forming the limited sample are more likely to be spouses and parents to the head of the receiving household than the migrants belonging to the other two samples. The migrants forming the limited sample are less likely to be the child of the head of the receiving household relative to the other two migrant samples. I proceed with spouse and parent as the variables defining membership to the limited sample to correct for selection bias. I do that partly because of the differences of the percentages in Table 8 and partly because I expect that in the case of being the spouse or the parent of the head of the receiving household chances are that there would be at most one remitting migrant. I also include in the selection equation the labor status, education level, age, gender, destination, years since migration of the

migrant and the residence location, education level, age and gender of the head of the receiving household because these characteristics have an effect the ability to remit[7].

Table 9 presents the results of a standard Probit on equation (14). As mentioned in section 4, I can exactly identify the remitters from the non-remitters and this fact will identify the dependent variable in the Probit equation. I compare the signs of the statistically significant coefficients in the Probit equation to the signs of the coefficients in the main results presented in Tables 10a and 10b. All the statistically significant coefficients from the Probit equation and from tables 10a and 10b have the same signs. I turn now to the main results.

Table 10a presents the results of two proxies of good state following the average model explained in section 4. Table 10b limits the sample to those receiving households with at most one remitting migrant. In Tables 10a and 10b column (1) refers to a dummy variable for households where the head had lost the last job for one of the reasons discussed above and column (2) refers to a dummy variable for those head of households who have been looking for a job for at least one year. I control for the budget constraint of the migrant by including age, gender, level of education, labor force status and destination of migrants which implicitly determine migrants' income. I also control for household characteristics as the level of education, the age and gender of the head of the receiving household and the location of the household.

In the average model the variables of interest for this paper have the sign of the altruistic migrant model. However the coefficient on k is also significant at the 1%

[7] The results of the selection equation (first stage Probit) are in Table A in appendix III.

significance level. Nicaraguan migrants decrease the amount remitted with the increase of migration in the original household that they belong to. The coefficients on $1-\pi$ match the theoretical predictions of the altruistic model but are not statistically significant under both proxies. Having a job, being a female and living in a developed country increase remittances. Being older than 30 seems to positively affect the remitting decision. The location of the residence of the receiving household also matters.

Table 10b presents the results of a sample selection corrected estimation on equation (14) limiting the sample to migrants belonging to receiving households with at most one remitting migrant. Similar results to the average model are found in this sample of 555 migrants. The signs on k and $1-\pi$ match the theoretical predictions of the altruistic migrant. Again, only the coefficient on k is statistically significant. The other covariates also follow the same pattern as the variables in the average model except now the gender of the head of the household significantly affects remittances.

To summarize, there is some empirical evidence that points to some extent to the theoretical predictions of the altruistic migrant model developed in section 3. Controlling for the migrants' budget constraint and some head of household characteristics, migrants remit less when the number of other migrants increase and they also remit more in case of negative income shock in the receiving household. However, Nicaraguan migrants seem to react more to the number of migrants in their original household in Nicaragua. In both approaches the coefficient on k is negative and significant. The coefficient on $1-\pi$ is positive in all these cases but again not statistically significant. The labor status, destination and gender of the migrant affect the remitting decision and

seem to be robust across all three approaches. The receiving household income level also seems to affect the remitting decision since the household income level is determined by the education of the head of the household, the gender of the head of the household and the location of the residence. All these characteristics affect the remitting decision.

Note that the average model computes the correlation coefficient between the error terms of the remitting migrants belonging to the same receiving households. The correlation coefficient ρ is positive, statistically significant and close to 0.63 in value. This positive value suggests that the remitting decision of migrants belonging to the same receiving household is positively correlated. Also, from table 10b I calculate the sample selection parameter λ to be around -0.48 and statistically significant suggesting that a sample selection bias does exist in building the limited sample.

For policy purposes, Table 11 separates the Tobit coefficients of both variables of interests from the average approach into two effects: a change in the probability of a remitting and a percentage change in the amount remitted. One additional migrant decreases the probability of remittances by no more than 13%. Migrants are 6% more likely to remit in case of a bad state shock. For the amount percentage changes, migrants remit 28% less with one additional migrant and they remit between 13% more in response to a bad income shock.

This finding raises questions concerning the consequences of the trade-off between migration and per migrant remittances in developing countries. One additional migrant leaving the labor exporting country decreases per migrant remittances by a number close to 13%. This negative relationship might have unanticipated effects on the

overall impact of migration and remittance on the original country. For instance, the finding in Adams and Page (2005) that an increase in both international migration and remittances decrease poverty in developing countries might not hold anymore.

One interesting finding across both approaches is the robustness of the migrant gender variable. In all equations (including the Probit equations) female migrants seem to remit more than male migrants. In the Nicaraguan sample female migrants constitute more than 47% of the total migrants' population. This gender neutrality makes the remitting behavior across gender an interesting topic. Following Vanwey (2004) I further investigate the gender heterogeneity in the migrant behavior. Table 12 repeats the same estimation approaches while limiting the sample to male and then female migrants. In all cases the coefficient on the number of other migrants k is negative and significant. However the coefficient on the bad state measure $1-\pi$ is only positive and significant for female migrants. The results seem to point out that male migrant do not really respond to an income shock at the receiving household. However, female migrants respond to the same income shock and their response falls under the altruistic model predictions. Table 12 suggests that female migrants have a different remitting behavior.

6. Conclusion

This paper presents a theoretical model of migrants' remitting behavior. I consider two main motivations towards remitting: altruism and self-interest. This paper contributes to the remittances literature by investigating the reaction of remittances to a bad state outcome on the receiving household rather than on the migrant. The remittance literature has focused on studying the remittance behavior in regards to a bad outcome shock to

the migrant which leads to an ex-ante risk-sharing behavior. In this paper migrants do not expect monetary transfers from the original households. This assumption is consistent with the data evidence from poor developing countries.

In the theoretical predictions of the model a pure altruistic migrant receives direct satisfaction from the welfare of the original household. The total supply of remittances enters the receiving household consumption function and therefore the migrant's utility function. On the contrary pure self-interest motivated migrants do not receive satisfaction from the welfare of the receiving household. The theoretical predictions suggest that the number of other migrants who belong to the same receiving household has a negative effect on remittances in the case of altruistically motivated migrants and no effect at all on the self-interest driven migrants. Also the probability of a good state in the receiving country which affects the level of income in the receiving household has a negative effect on remittances for an altruistic migrant and again no effect for a self-interest motivated migrant.

I test the findings of the theoretical model with data from Nicaragua. I use a 2001 LSMS data and define two proxies for the bad state outcome and find some empirical evidence supporting altruism as a main motivation behind remittances in Nicaragua. The results here are in accord with Agarwal and Horowitz (2002). The number of other migrants belonging to the same household seems to play a crucial role in determining the remittance behavior. I also test the gender heterogeneity of the remitting behavior and find supporting evidence that female migrants seem to behave more altruistically than their male counterparts.

Remittances can be motivated by pure altruism without any economic aspirations but they can also be self motivated in terms of an implicit contract between the original household and the migrant which includes for example inheritance plans. In the former case migrants belonging to the same original household together insure that the original household is not in financial need and therefore an increase in the number of migrants is expected to decrease remittances per migrant. In the latter case there is no clear connection between the number of migrants and remittances since migrants act by self-interest. From policy perspective and in the case of altruistically motivated remittance, to maximize remittances per migrant, labor exporting countries can work on incentives for keeping potential migrants from joining other household members. Therefore sending countries' governments can affect remittances per migrant by targeting potential migrants. These governments need to be aware of the existing trade-off between the number of migrants belonging to the same receiving household and remittances per migrant. One potential policy interest is to find the optimal k that maximizes remittances per migrant.

Finally, researchers such as Hoddinott (1994) model remittances and migration as a family decision. From that point of view there is some concern regarding the endogeneity of the number of other migrants. This concern raises questions pertaining to the choice of instruments and their validity. This forms the next step in research.

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Table 1. Characteristics of Receiving Households and Migrants by Remitting Process

	Households that Do Not Receive Nor Send Remittances (A)	Households that Receive Remittances (B)	Households that Send Remittances (C)	Households that Send and Receive Remittances (D)
Receiving Households				
Percent Residing in Urban Areas	73.3	71.8	81.2	100.0
Percentage Head of Household Male	58.3	49.1	60.0	66.6
Percent Head of Household Working	75.0	57.6	86.6	100.0
Mean Age Head of Household	51.6	54.5	50.6	48.5
Mean Years of Education of Head of Household	3.2	2.8	2.8	3.3
Sample	180	309	16	6
Migrants				
Mean Migrant Age	28.0	30.3	29.5	33.1
Mean Migrant Education	6.9	4.5	4.5	4.8
Mean Years of Migration	5.7	6.7	7.4	9.0
Percent Residing in Developed Countries	20.0	36.3	48.6	66.6
Percent Working	62.3	78.5	75.6	94.4
Percent Male	54.2	52.8	51.3	50.0
Sample	260	600	37	18

Note: 1- All the households in this table have at least one migrant living abroad. 2- Developed Countries include Canada, Greece, Sweden and United States.

Table 2. Characteristics of Receiving Households by Number of Other Migrants *k*

k	Percentage Residing in Urban Areas	Percentage Working Head of Household	Percentage Head of Household Male	Mean Age Head of Household	Mean Years Education Head of Household	Sample
0	75.3	68.3	49.6	52.7	2.9	300
1	64.7	62.8	58.1	52.4	2.7	105
2	63.4	56.1	58.5	57.8	2.4	41
3	90.9	59.0	59.0	56.8	2.9	22
4 or more	69.2	46.1	50.0	54.9	2.2	26
All	72.4	64.5	52.6	53.4	2.8	494

Table 3. Distribution of Households by Reason of Head of the Household Leaving the Last Job

Reasons	Percentage	Count
1- The enterprise was liquidated	1.8	9
2- You were dismissed	0.6	3
3- Retirement Plan	0.2	1
4- By age	3.6	18
5- End of the contract	1.6	8
6- Agricultural cycle/seasonal work ended	0.2	1
7- You are pensioned off	2.4	12
8- You earned not much money	2.0	10
9- You did not like your job	0.6	3
10- Not much work	0.0	0
11- Family/home duties	4.6	23
12- Studies	0.0	0
13- Insufficient industrial safety	0.4	2
14- Improper treatment or psychological pressures	6.6	33
15- Illness	1.0	5
Sample	25.6	128

Table 4. Distribution of Households by Length of Job Search

Time Spent looking for a Job	Percentage	Count
Days	0.7	1
Weeks	0.7	1
Months	19.5	25
Years	78.9	101
Sample	25.6	128

Table 5. Characteristics of Receiving Households by Measures of Bad State versus Unaffected Households

Measure of Bad State	Percentage Residing in Urban Areas	Percentage Head of Household Male	Mean Age Head of Household	Mean Years of Education Head of Household
Left Last Job (Sample: 128)	82.8	38.2	60.1	2.6
More than 1 Year looking for a Job (Sample: 101)	84.1	31.6	61.8	2.5
Not Affected (Sample: 366)	68.8	57.6	51.0	2.8

Table 6. Migrants' Characteristics by Measures of Bad State versus Unaffected Households

Characteristics	Head of Household Not Affected	Head of Household Left Last Job	Head of Household More than 1 Year looking for a Job
Male	56.3	44.58	44.1
Working	74.6	73.9	76.9
Residing in a Developed Country	30.9	33.7	35.3
Mean Age	28.9	30.1	31.3
Mean Education	3.6	3.9	3.9
Sample	623	249	195

Note*:* 1- Male, Working and Residing in a Developed Country are percentages. 2- Developed Country destination includes the United States, Canada, Greece and Sweden.

Table 7. Characteristics of Receiving Households and Migrants for Households with at most One Remitting Migrant (Limited Sample) versus Full Migrant Sample

	Households with at Most One Remitting Migrant	Full Migrant Sample
Receiving Households		
Percent Residing in Urban Areas	0.74	0.72
Percentage Head of Household Male	0.51	0.52
Percent Head of Household Working	0.67	0.64
Mean Age Head of Household	52.8	53.4
Mean Years of Education of Head of Household	2.8	2.6
Sample	387	494
Migrants		
Mean Migrant Age	28.5	29.3
Mean Migrant Education	3.4	3.7
Mean Years of Migration	5.7	6.0
Percent Residing in Developed Countries	0.25	0.31
Percent Working	0.70	0.74
Percent Male	0.52	0.53
Sample	555	872

Note: 1- All the households in this table have at least one migrant living abroad. 2- Developed Countries include Canada, Greece, Sweden and United States.

Table 8. Relationship of the Migrant to the Head of the Receiving Household for Households with at most One Remitting Migrant, Full Migrant Sample and the Remaining Sample

	Limited Sample	Not in Limited Sample	Full Sample
Relationship of the Migrant to the Head of the Receiving Household			
Percentage if Spouse	5.9	2.5	4.7
Percentage if Parent	3.4	1.8	2.8
Percentage if Child	55.6	65.2	59.1
Sample	555	317	872

Note: 1- All the households in this table have at least one migrant living abroad. 2- Developed Countries include Canada, Greece, Sweden and United States.

Table 9. Probit Estimates for Equation (14): All Migrants

	Amount Remitted	
Variables	(1)	(2)
Intercept	-0.5137**	-0.4993**
	(0.2199)	(0.2188)
Number of other Migrants = k	-0.0443*	-0.0434*
	(0.0248)	(0.0247)
Bad State Measure = $1-\pi$	0.1726	0.1041
	(0.1120)	(0.1194)
1 if Working	1.0687***	1.0648***
	(0.1149)	(0.1151)
1 if Education less than 4 Years	-0.206**	-0.2062**
	(0.1022)	(0.1020)
1 if Male	-0.1807*	-0.1834*
	(0.0953)	(0.0954)
1 if Age greater than 29	0.2805***	0.2805***
	(0.1085)	(0.0954)
1 if Destination is Developed Country	0.4598***	0.4572***
	(0.1160)	(0.1157)
1 if Years since Migration greater than 5	-0.0456	-0.0469
	(0.1108)	(0.1106)
1 if Urban Residence	-0.2863**	-0.2806**
	(0.1123)	(0.1122)
1 if Education of HHH less than 4	-0.3084**	-0.3011**
	(0.1216)	(0.1212)
1 if HHH Male	-0.0221	-0.03164
	(0.0957)	(0.0954)
1 if HHH age is greater than 64	0.0696	0.0910
	(0.1060)	(0.1067)
Number of Nonmigrants	0.0436**	0.0434**
	(0.0172)	(0.0171)
Log Likelihood	-506.38	-507.17
Sample	872	872

Note*:* 1- Columns refer to three different measures for the good state probability: column (1) refers to a dummy variable for households where the head had lost the last job for one of the reasons discussed in table 3. Column (2) refers to a dummy variable for those head of households who have been looking for a job for at least one year. 2- HHH refers to head of the receiving household. 3-*** means significant at the 1 percent level; ** at the 5 percent level; * at the 10 percent level.

Table 10a: Tobit Estimates for Equation (14) following the Average Model: All Migrants

	Amount Remitted	
Variables	(1)	(2)
Intercept	-0.9169*	-0.8821
	(0.5610)	(0.5586)
Number of other Migrants = k	-0.8700***	-0.8713***
	(0.1071)	(0.1078)
Bad State Measure = $1-\pi$	0.3896	0.3695
	(0.2887)	(0.3143)
1 if Working	2.5565***	2.5498***
	(0.3339)	(0.3344)
1 if Education less than 4 Years	-0.2452	-0.2519
	(0.2706)	(0.2699)
1 if Male	-0.8370***	-0.8404***
	(0.2448)	(0.2497)
1 if Age greater than 29	0.8398***	0.8379***
	(0.2778)	(0.2780)
1 if Destination is Developed Country	1.1550***	1.1574***
	(0.2871)	(0.2876)
1 if Years since Migration greater than 5	-0.1876	-0.1898
	(0.2703)	(0.2702)
1 if Urban Residence	-0.4500*	-0.4528*
	(0.2801)	(0.2806)
1 if Education of HHH less than 4	-0.2080	-0.1915
	(0.2687)	(0.2673)
1 if HHH Male	-0.3634	-0.3650
	(0.2376)	(0.2399)
1 if HHH age is greater than 64	-0.1087	-0.1030
	(0.2939)	(0.2960)
Number of Nonmigrants	0.0508	0.0482
	(0.0407)	(0.0407)
Log Likelihood	-641.29	-641.49
Theta = θ	0.3899***	0.3898***
	(0.0151)	(0.0151)
Rho = ρ	0.6398***	0.6373***
	(0.2109)	(0.2116)
Sample	708	708

Note: 1- Columns refer to three different measures for the good state probability: column (1) refers to a dummy variable for households where the head had lost the last job for one of the reasons discussed in table 3. Column (2) refers to a dummy variable for those head of households who have been looking for a job for at least one year. 2-*** means significant at the 1 percent level; ** at the 5 percent level; * at the 10 percent level. 3- Robust standard errors are in parentheses.

Table 10b: Sample Selection Estimates for Equation (14): Households with at Most One Remitting Migrant

	Amount Remitted	
Variables	(1)	(2)
Intercept	1.1499***	1.1617***
	(0.3101)	(0.3109)
Number of other Migrants = k	-0.2568***	-0.2540***
	(0.0378)	(0.0388)
Bad State Measure = $1-\pi$	0.2153	0.1435
	(0.1721)	(0.1912)
1 if Working	0.7901***	0.7926***
	(0.1419)	(0.1415)
1 if Education less than 4 Years	-0.1472	-0.1446
	(0.1484)	(0.1485)
1 if Male	-0.2828**	-0.2866**
	(0.1241)	(-0.1246)
1 if Age greater than 29	0.3843**	0.3808**
	(0.1533)	(0.1537)
1 if Destination is Developed Country	0.6309***	0.6273***
	(0.1849)	(0.1858)
1 if Years since Migration greater than 5	-0.0510	-0.0522
	(0.1522)	(0.1526)
1 if Urban Residence	-0.0918	-0.0776
	(0.1617)	(0.1605)
1 if Education of HHH less than 4	-0.1198	-0.1009
	(0.1866)	(0.1868)
1 if HHH Male	-0.2720**	-0.2898**
	(0.1345)	(0.1347)
1 if HHH age is greater than 64	0.1323	0.1458
	(0.1784)	(0.1861)
Number of Nonmigrants	0.0173	0.0154
	(0.0244)	(0.0243)
Log Likelihood	-1516.47	-1517.04
Sigma = σ	1.4529	1.4544
Lambda = λ	-0.4866***	-0.4871***
Sample	555	555

Note*:* 1- Columns refer to three different measures for the good state probability: column (1) refers to a dummy variable for households where the head had lost the last job for one of the reasons discussed in table 3. Column (2) refers to a dummy variable for those head of households who have been looking for a job for at least one year. 2-*** means significant at the 1 percent level; ** at the 5 percent level; * at the 10 percent level. 3- Robust standard errors are in parentheses.

Table 11. Summary of The Change in Amount of Remittances and Change in Probability of Remitting Results for columns (1) in Table 10a

	Percentage Change in Probability	Percentage Change in Amount
Variables		
Number of other Migrants = k	-13.39	-28.95
Bad State Measure = $1-\pi$	5.99	12.97

Table 12. Estimates for Equation (14) with Different Specifications: Male versus Female

	Average Model		Limited Sample	
	Male	Female	Male	Female
Number of other Migrants = k	-1.8871*** (0.3846)	-1.1680*** (0.2200)	-0.2868*** (0.0462)	-0.2178*** (0.0589)
Bad State Measure = $1-\pi$	0.2501 (0.3844)	0.7544** (0.3708)	-0.1093 (0.2160)	0.6097** (0.2611)
Likelihood	-376.39	-363.94	-787.17	-713.53
Sample	400	370	290	265

Note*:* 1- The bad state measure is the first proxy used under column (1) in Tables 10. The same results are found using the second measure of the bad state but they are not reported here. 2-*** means significant at the 1 percent level; ** at the 5 percent level; * at the 10 percent level. 3- Robust standard errors are in parentheses. 4- All the equations in this table include the same set of covariates in tables 8a through 8c.

Appendix I:

Derivations of equations (6) and (7):

From the FOC equation (5) in the altruism model

$$\frac{\partial U}{\partial r} = \frac{-\alpha}{Y_{i1} - r_i} + \frac{\delta}{\pi Y_H + (1-\pi)Y_L + r_i + kr_{-i}} = 0$$

and the implicit function theorem I can write:

$$\frac{\partial r}{\partial k} = -\frac{\frac{\partial FOC}{\partial k}}{\frac{\partial FOC}{\partial r}} = -\frac{-\delta C_H^{-2} r_{-i}}{-\alpha C_{i1}^{-2} - \delta C_H^{-2}} \prec 0$$

$$\frac{\partial r}{\partial \pi} = -\frac{\frac{\partial FOC}{\partial \pi}}{\frac{\partial FOC}{\partial r}} = -\frac{-\delta C_H^{-2}(Y_H - Y_L)}{-\alpha C_{i1}^{-2} - \delta C_H^{-2}} \prec 0$$

where $Y_H - Y_L \succ 0$.

For the self-interest model $\delta = 0$ which leads to $\frac{\partial r}{\partial k} = 0$ and $\frac{\partial r}{\partial \pi} = 0$.

Solving for r_i^* in equation (5):

Equation (5) gives $\frac{-\alpha}{Y_{i1} - r_i} + \frac{\delta}{\pi Y_H + (1-\pi)Y_L + r_i + kr_{-i}} = 0$ which leads to

$$\alpha\pi Y_H + \alpha(1-\pi)Y_L + \alpha r_i + \alpha k r_{-i} = \delta Y_{i1} - \delta r_i$$

and therefore I can write $(\alpha + \delta) r_i = \delta Y_{i1} - \alpha\pi Y_H - \alpha(1-\pi)Y_L - \alpha k r_{-i}$

and then after rearranging some terms I get to the following:

$$r_i^* = \frac{\delta}{(\alpha+\delta)} Y_{i1} - \frac{\alpha}{(\alpha+\delta)} \pi (Y_H - Y_L) - \frac{\alpha}{(\alpha+\delta)} Y_L - \frac{\alpha}{(\alpha+\delta)} k r_{-i} = r(Y_{i1}; Y_H; Y_L; k; \pi)$$

The utility function is strictly quasi-concave which insures the uniqueness of the solution r_i^*.

Appendix II:

The likelihood function $L_j = \sum_{i=1}^{k_j} \ln L_{ij}$ for the average model is the following where s_j is the number of remitting migrants in household j:

$$\ln L_{ij} = \ln\left[1 - \Phi\left(X'\gamma\right)\right] = \ln\left[1 - \Phi\left(X'\beta * \theta\right)\right] \qquad \text{if } s_j = 0 \qquad (12)$$

$$\ln L_{ij} = 0.5 * \left[\ln\left(\theta^2\right) - \left(\theta R_{ij} - X'\gamma\right)^2\right] \qquad \text{if } s_j = 1 \qquad (13)$$

$$\ln L_{ij} = 0.5 * \left[\ln\left(\frac{\theta^2}{h_j + \rho\left(1 - h_j\right)}\right) - \frac{1}{h_j + \rho\left(1 - h_j\right)}\left(\theta R_{ij} - X'\gamma\right)^2\right] \qquad \text{if } s_j > 1 \qquad (14)$$

where $\Phi(.)$ is the standard normal cumulative distribution function and $\gamma = \frac{\beta}{\sigma}; \theta = \frac{1}{\sigma}$.

The likelihood function for the third case ($s_j > 1$) is derived from the likelihood function of the second case ($s_j = 1$) with $\gamma_j = \frac{\beta}{\sigma_j}$; $\theta_j = \frac{1}{\sigma_j}$; $\sigma_j = \sigma\left(h_j + \rho\left(1 - h_j\right)\right)^{0.5}$ and $h_j = \frac{1}{s_j}$. I maximize L_j with respect to $\gamma; \theta$ and ρ.

Appendix III:

Table A: First Stage Probit Estimates for the Sample Selection Estimates on Equation (14) in Table 10b

Variables	Amount Remitted
Intercept	0.6395***
	(0.1864)
1 if Parent	0.4331
	(0.3023)
1 if Spouse	0.6224
	(0.2434)
1 if Working	-0.2575
	(0.1119)
1 if Education less than 4 Years	0.1249
	(0.1032)
1 if Male	-0.0177
	(0.0926)
1 if Age greater than 29	-0.1553
	(0.1126)
1 if Destination is Developed Country	-0.4801***
	(0.1095)
1 if Years since Migration greater than 5	0.0372
	(0.1070)
1 if Urban Residence	0.2512
	(0.1072)
1 if Education of HHH less than 4	0.0101
	(0.1149)
1 if HHH Male	-0.1876
	(0.0931)
1 if HHH age is greater than 64	-0.1286
	(0.1066)
Log Likelihood	-540.00
Sample	872

Note*:* 1- Columns refer to three different measures for the good state probability: column (1) refers to a dummy variable for households where the head had lost the last job for one of the reasons discussed in table 3. Column (2) refers to a dummy variable for those head of households who have been looking for a job for at least one year. 2-*** means significant at the 1 percent level; ** at the 5 percent level; * at the 10 percent level. 3- Standard errors are in parentheses.