Remittances as Insurance: Evidence from Mexican Migrants

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July 24, 2002

This version prepared for Northeast Universities Development Consortium Conference, Williams College, Williamstown, MA., October 25-27, 2002. We are grateful for comments from the participants at the WMU Brown Bag workshop and the Midwest Economics Association Meeting. We are especially thankful to Eskander Alvi for his significant contributions with respect to the theoretical model developed in this paper.

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Abstract

Remittances, the repatriated earnings of emigrant workers, have grown to be an important source of foreign exchange earnings in many countries as immigrant workers transfer income to relatives at home. Most of the literature presumes that remittances represent altruistic payments to remaining family in the immigrant's country of origin. While we do acknowledge that migrants do behave altruistically with respect to family members, we argue that immigrants are also likely to behave as risk-averse economic agents who insure in the face of economic uncertainty. We argue that remittances are, in part, transferred to the home country to "purchase" family-provided and self-insurance. We use data on Mexican migrants with working experience in the United States to capture the various motives for sending remittances. We find that increases in income risk significantly increases both the propensity and the proportion of labor earnings sent home for family-provided insurance as well as for self-insurance.

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> "No matter how bad things got, he always had an escape route, he always had a home to go back to. The reason he sent money home was to maintain this way out." From, *The Lost Daughter of Happiness*, by Geling Yang.

I. Introduction

According to economic theory, international remittances, the repatriated earnings of emigrant workers, are accumulated and transferred for a variety of reasons. Remittances may be accumulated and transferred home to invest in physical capital by acquiring assets such as land, capital goods, or housing. Alternatively, remittances may represent earnings sent *altruistically* to accommodate the day-to-day consumption needs of the remitter's household in the home country. A third rationale for sending remittances is offered by Stark and Lucas (1988). According to these authors, remittances may be the means by which an immigrant "purchases insurance" in the face of uncertainty regarding the outcome of the migratory experience. The home family receives remittances in exchange for preserving the migrant's assets in the home country and to provide support upon return in the event that the migratory experience is unsuccessful. In this respect, remittances represent *insurance* intended to preserve the migrant's place should he or she choose to return home.

The remittances literature has tried to distinguish among the three motives – investment, altruism, and insurance, in order to better understand and to predict the effect of remittances on receiving economies. While it is generally accepted that remittances are often sent to the home country for altruistic purposes or to "invest" in physical assets, there appears to be more controversy regarding the insurance motive for sending of remittances. In particular, there have been attempts to differentiate insurance from altruistic motives by determining how remittances respond to variation in home country income levels (Lucas and Stark 1985, Faini 1994, Agrawal

and Horowitz 1998). If declines in home country economic conditions are associated with increasing remittances, the altruistic motive is suspected. If remittances and home country income move in tandem, remittances are thought to possibly represent insurance premiums paid to family members because the migrant views the preservation of his or her place back home as more valuable to insure. The findings from studies that attempt to distinguish between these two motives sometimes support the altruistic motive, while in other cases they seem to confirm the existence of an insurance motive.

Our primary purpose is to provide evidence of the insurance motive using an alternative method to capture the insurance motive. Instead of correlating changes in the level of home country income with variations in the volume of remittances, we analyze how personal risk variables affect the flow of migrants' remittances to their home countries. That is, do rising risks regarding the migrant's future stream of earnings in the host country affect the level of remittances? If we answer in the affirmative, remitters' motives will appear to be consistent with a model that assumes that migrants are risk-averse individuals who, in the face of greater income risk, insure themselves by remitting more. Since larger income risks in the host country should not affect remittances sent for altruistic purposes, we conclude that those remittances are sent to purchase additional insurance.

We depart from previous literature on remittances in yet another way. We envision two separate avenues by which immigrants may insure themselves against income risks. On the one hand, as Stark and Lucas suggest, we view periodic payments to family members back home as the premia that insures that the migrant will receive support from the family should he/she return home. But we also allow the migrant to "self-insure" in the face of income uncertainty by accumulating precautionary savings.

The technique of linking individual income risks to remittances flows allows us to tease out the insurance motive from the altruistic. But, in order to further distinguish between purchasing insurance from family members and self-insuring (accumulating precautionary saving), we rely on migrants' information regarding the end use of the remittances. In particular, we look at whether remittances are intended for current family consumption or, rather, to accumulate assets. In the former case, when remittances increase with income risk in the host country and they are intended for current family consumption, we argue that remittances are purchasing "family-provided insurance." In the latter case, however, when remittances appear to increase with income risk in the host country but they are sent home to purchase assets, we argue that the immigrant is self-insuring via the accumulation of precautionary saving.

We use data on labor migration to the Northern Mexican border and to the U.S. from Mexican migrants in cities along the U.S.-Mexican border. In categorizing the level of income risk that individuals are subjected to, we consider factors such as their legal status, education, work experience, type of employment, availability of fringe benefits, and the industry in which they were employed while in the United States.

As hypothesized, we find that migrants appear to behave as risk-averse individuals who, in the face of greater income risk, remit more. In particular, the fraction of earnings remitted by undocumented migrants is approximately 5 percentage points higher than the fraction of earnings sent home by documented migrants. Once we adjust for other characteristics, the undocumented not only are about 7 percent more likely to remit than their documented counterparts but, in addition, they remit approximately 42 percent more when compared to documented migrants. Immigrants, and in particular undocumented immigrants (as are a sizable portion of Mexican migrants), are less likely to be eligible for social insurance programs relative to the native-born

and legal immigrants.[1] Hence, it is of interest to understand how these individuals respond to uncertainty in terms of insurance and saving. Both insurance and savings are likely to have implications for return migration and, therefore, for who is better able to weather downturns in business cycles and how those fluctuations are best handled.

With the purpose of learning about migrants' saving patterns, Paulson and Singer (2000) use information from Mexican migrants who reside in the U.S. to test the proposition that migrants with a higher probability of returning to Mexico save more due to anticipated future declines in earnings. They, in effect, test the permanent income hypothesis and claim to find the hypothesis valid so long as the migrant is above a "subsistence" threshold. In a related paper, Amuedo-Dorantes and Pozo (2001) examine the wealth accumulation patterns of immigrants relative to the native-born using the 1979 National Longitudinal Survey of Youth (NLSY79). The initial expectation is that comparable immigrants save more than the native-born due to the permanent income hypothesis (as in the case of Paulson and Singer (2000)), but also because immigrants bear higher risks than the native-born in the job market and are less likely to be eligible for income maintenance programs. As a consequence, immigrants may need to accumulate higher precautionary saving. However, the study finds that immigrants engage in less precautionary saving relative to the native-born. Nonetheless, it appears that this may simply be an artifact of the data resulting from the survey design, which does not specifically address immigrant's remitting behavior (of which some constitutes saving). This paper addresses to what degree migrants are saving and insuring themselves using cross-border avenues that may not be apparent from the information gathered by other surveys.

By allowing risk variables to determine the level of remittances, we expect to also further our understanding of results obtained by Massey and Basem (1992) regarding the remitting and

[1] Though it is the case that on account of the Illegal Immigration Reform and Immigrant Responsibility Act of

saving behavior of Mexican migrants. In their paper, they find migrants' remittances to be determined by certain family and educational characteristics, migrants' legal status, and their income. However, they are unable to explain migrants' saving using a similar set of variables. In this paper, we show that, by incorporating risk variables and by modeling altruistic behavior on the part of the migrant, we may make additional progress in explaining saving and remittance flows from the U.S. to Mexican communities by Mexican migrants.

II. Theoretical Background

Our purpose is to show how remittances sent by migrants for insurance purposes and for precautionary saving increase with exposure to greater income risk. To this end, we construct a two period model with uncertainty in period 2. In the first period the migrant earns income Y_H with certainty, while in period 2 her income is uncertain. The uncertainty derives from two possible states of the world during period 2. If the "good" state prevails in period 2, the migrant's labor income will be Y_H, equal in level to the income earned in period 1. But if the "bad" state prevails, she will earn a lower labor income, which we denote as Y_L.

The migrant derives utility from consumption in period 1 (C_1) and from discounted period 2 consumption (C_2). Since most of the literature on remittances presumes that one of the primary motives for remittances is altruism, we allow for altruistic behavior by allowing the migrant to derive utility from altruistic payments made to her family back home during period 1. The weighing parameter w denotes the relative contributions to utility that are obtained from the consumption of goods and services in period 1 versus from the altruistic payments made to family members. The discount factor, d , specifies the relative tastes for future versus current consumption.

1996, the eligibility of legal immigrants for many social insurance programs is more tenuous.

$$U = w \ln C_1 + (1-w)\ln a + d \ln C_2 \quad (1)$$

Because income in period 2 is state-dependent, the migrant may choose to "insure" herself against the poor state. A payment of x to the family today will result in a payoff of $g(x)$ in period 2 should the poor state prevail and the migrant's income is only Y_L. We place few restrictions on $g(x)$, with the exception that: $g'(x) > 0$, $g''(x) < 0$, and $g(x) < Y_H - Y_L$. Larger "insurance" premia paid today (x) result in increasing coverage $(g'(x) > 0)$, but at a declining rate $g''(x) < 0$. Furthermore, insurance is not complete. One cannot insure against total losses as $g(x) < Y_H - Y_L$. Our model does not specify who is the insurer, but we do not rule out that both insurance payments (x) and altruistic payments (a) are made to the same family, the migrant's family back in her home country. We do specify, however, that the migrant is not expecting anything in return from a, they are purely altruistic payments. But payments of x do involve a quid quo pro of $g(x)$ should the poor state result in period 2.

In addition to "purchasing insurance" from family members, the migrant can choose to engage in precautionary saving, reducing current consumption by the amount of the saving, z, and getting back z with interest earnings in period 2 – that is: $z(1+r)$. Insurance coverage and precautionary saving differ in that the saving will always be available in period 2, while insurance coverage is forthcoming only if the bad state prevails in period 2.

Consumption in period 1 is, therefore, constrained by the migrant's decisions regarding the level of insurance she will purchase, the amount of precautionary saving she will undertake, and the amount of altruistic payments she will make to her family at home:

$$C_1 \leq Y_H - x - z - a \quad (2)$$

When the migrant looks ahead to period 2, she assumes that the poor state will prevail with probability p while the good state prevails with probability $(1-p)$. If the poor state

prevails, the migrant's consumption is constrained by her lower labor income: Y_L, the payoff that family members make: $g(x)$, and the principle and return: $z(1+r)$ that results from precautionary saving in the earlier period. If the good state prevails, the migrant's higher labor income, Y_H, is supplemented only by the principle and return from precautionary saving in period 1. That is:

$$C_2 \leq p\,(Y_L + g(x) + z(1+r)) + (1-p\,)(Y_H + z(1+r)) \tag{3}$$

The migrant thus chooses the level of altruistic payments: *a*, the amount of insurance to purchase: *x*, and the level of precautionary saving: *z* to maximize utility (1) subject to the budget constraints (2) and (3). The first-order conditions that result from this optimization problem are given by:

$$\text{FOC}_\text{a}: \ \frac{\partial U}{\partial a} = w\,a - C_1(1-w) = 0 \quad \text{or} \quad \frac{a}{(1-w)} = \frac{C_1}{w}, \tag{4}$$

where equation (4) suggests that the migrant's consumption and her altruistic payments in period 1 are in keeping with the weights she gives to self (w) versus her family's utility $(1-w)$. We can think of this as smoothing the migrant's utility over households.

Two additional first-order-conditions are:

$$\text{FOC}_\text{x}: \ \frac{\partial U}{\partial x} = w\,C_2 - C_1\,d\,p\,\,g'(x) = 0 \quad \text{or} \quad C_2 = \frac{C_1}{w} d\,p\,\,g'(x), \tag{5}$$

and

$$\text{FOC}_\text{z}: \ \frac{\partial U}{\partial z} = w\,C_2 - C_1 d\,(1+r) = 0 \quad \text{or} \quad C_2 = \frac{C_1}{w} d\,(1+r). \tag{6}$$

They suggest that, at the optimum, the ratio of period 2 to period 1's consumption depends on the marginal contribution of insurance premia and on the marginal contribution of saving.

From the model outlined above, we can derive testable hypotheses regarding the migrant's remitting behavior. In particular, using the implicit function theorem, we obtain our first testable hypothesis:

$$\frac{\partial x}{\partial p} = -\frac{\dfrac{\partial FOC_x}{\partial p}}{\dfrac{\partial FOC_x}{\partial x}} = -\frac{w\left[g(x)+Y_L-Y_H\right]-C_1 d\, g'(x)}{w p\, g'(x) - C_1 d p\, g''(x) + d p\, g'(x)} > 0, \tag{7}$$

which argues that increases in the probability of the bad state (p) are accompanied by increases in demand for family-provided insurance.

Our second testable hypothesis regards the migrant's precautionary saving behavior. Specifically:

$$\frac{\partial z}{\partial p} = -\frac{\dfrac{\partial FOC_z}{\partial p}}{\dfrac{\partial FOC_z}{\partial z}} = -\frac{w\left[Y_L + g(x) - Y_H\right]}{(w+d)(1+r)} > 0. \tag{8}$$

According to equation (8), greater risks in the form of a greater likelihood of drawing from the "bad" state (and hence experiencing the lower future earnings) will result in greater amounts of precautionary saving on the part of the migrant.

In the above two comparative static results we have modeled increases in risk by increasing p, the probability of earning the lower income. We can model risk in an alternative way, as resulting from an increase in the difference between the labor income earned in the good versus the bad state: $(Y_H - Y_L)$. In particular:

$$\frac{\partial x}{\partial Y_H} = -\frac{\dfrac{\partial FOC_x}{\partial Y_H}}{\dfrac{\partial FOC_x}{\partial x}} = -\frac{w(1-p)+d p\, g'(x)}{w p\, g'(x) - C_1 d p\, g''(x) + d p\, g'(x)} > 0 \tag{9}$$

and

$$\frac{\partial x}{\partial Y_L} = -\frac{\frac{\partial FOC_x}{\partial Y_L}}{\frac{\partial FOC_x}{\partial x}} = -\frac{wp}{wp\ g'(x) - C_1 dp\ g''(x) + dp\ g'(x)} < 0 \qquad (10)$$

Together, results (9) and (10) imply that: $\frac{\partial x}{\partial (Y_H - Y_L)} > 0$, which indicates that increases in the potential loss in labor income from period 1 to period 2 will result in increased purchases of insurance. A similar result can be derived for precautionary saving, giving us the appealing result that individuals attempt to smooth consumption over the life-cycle by purchasing more insurance and/or saving more when income losses in the future are expected to rise relative to today's income. Overall, migrants will purchase more insurance not only as their likelihood of drawing from a "bad" state in the future increases, but also as the size of their potential income loss in that scenario rises. Both aspects of risk are captured to different extents by the income risk variables in our models.

III. The Data and Some Descriptive Evidence on Remittances by Income Risk

We use data collected by the Colegio de la Frontera Norte (COLEF)[2] on labor migration to the Northern Mexican border and to the United States (Encuesta sobre Migración en la Frontera Norte de México, EMIF) from Mexican migrants in eight different cities along the U.S.-Mexican border: Tijuana, Mexicali, Nogales, Ciudad Juárez, Piedras Negras, Nuevo Laredo, Matamoros and Reynosa. Our data come from five consecutive waves of the EMIF: the 1993-1994, 1994-1995, 1996-1997, 1998-1999, and 1999-2000 surveys. Each wave includes four quarterly surveys administered separately to four different groups of migrants: migrants coming from the South to the Northern border, migrants in Northern border cities originating from other Northern communities, migrants returning from the United States to or through the Mexican

Northern border region, and Mexican migrants deported from the United States. For the purpose of this study, we focus on one of these 4 different groups of migrants–Mexican migrants returning from the United States. As with other Mexican migration data (e.g. the Mexican Migration Project), the data refer to Mexican migrants interviewed in Mexican cities; therefore, the data are not necessarily representative of Mexican migrants in the United States.[3] However, given the quarterly surveying and the geographic scope of the survey, the data do have the potential to capture the migration fluxes between the two countries, with good representation of undocumented migrants and of migrants returning to *all* points in Mexico.[4] Finally, while some of the migrants in the survey may have been returning to Mexico permanently, most of them appear to have been returning temporarily to visit with family and friends.[5]

To familiarize ourselves with the data, we display in Table A in the appendix a list of the variables being used in our analysis along with their means and standard deviations. We find that 32 percent of Mexican migrants in our sample were undocumented at the time of their last entry into the U.S. Approximately 86 percent were male and 35 years old on average. A large percentage of our sample were household heads, with 37 percent of them having migrated alone to the U.S. despite possibly having networks of friends and family here. An average of 79 percent of our sample lacked a high school education, and a similar percentage worked during

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[2] COLEF carried out the survey for the Secretaría del Trabajo y Previsión Social and the Consejo Nacional de Población.

[3] The Mexican Migration Project does interview a small number of Mexican migrant households residing in the U.S. (about 700), but most of the respondents (about 11,000) are interviewed in Mexico. (www.pop.upenn.edu/mexmig/databases/databases.htm on 5/30/2002.)

[4] This is one advantage over the Mexican Migration Project, which has tended to focus, for the most part, on migrants residing or visiting the communities in *western* Mexico.

[5] When asked about the reason for returning to Mexico, fourteen percent of migrants declared they were returning because they couldn't find work in the U.S., their job in the U.S. had finished, or because they were going to take a job in Mexico. One may presume that these respondents may be planning to remain in Mexico; if not permanently, for an extended period of time. In contrast, fourteen percent of migrants declared returning to Mexico for vacation purposes, while another 58 percent responded they were returning for personal reasons. Though we can never be one hundred percent certain, it seems reasonable to presume that these two latter groups of migrants are more likely to be returning to the United States in a foreseeable future.

their last stay in the U.S. Of those who worked, about 36 percent received some kind of fringe benefit.

A significant fraction of migrants (47 percent) sent remittances to Mexico. The average percentage of monthly earnings sent home by those sending remittances reached approximately 46 percent.[6] Seventy-three percent of those who remitted claimed to do so to cover family consumption needs, while approximately 25 percent sent remittances with the intention of purchasing physical assets. The remaining 2 percent remitted for "other" unidentified purposes.

In categorizing the type and the level of income risk that individuals were subjected to, we consider their legal status, whether they had social networks in the host destination to rely upon, their educational attainment, time in the U.S., U.S. work experience, type of work contract they held, whether they received fringe benefits from their employers, and industry where they were employed. In general, we hypothesize that immigrants facing greater income risk (either because they lacked immigration and work papers, had a lower educational attainment and less U.S.-specific human capital, held more precarious work contracts, lacked fringe benefits, or worked in more cyclical industries) remitted more than those facing less income risk.

Preliminary evidence of this result can be gleamed by looking at workers subjected to differing risk characteristics. Table 1 displays the proportion of Mexican migrants who remitted money back home according to documentation status, educational attainment, and industry of employment. As hypothesized, a higher proportion of undocumented immigrants remitted (51 percent) relative to documented immigrants (46 percent). Additionally, less educated migrants appeared more likely to remit. Similarly, migrants working in more cyclical industries -- such as agriculture and construction -- were also more likely to remit earnings home.

[6] If we include respondents who do not remit, the average percentage of monthly earnings remitted to Mexico drops to approximately 22 percent.

Table 2 displays the percentage of earnings remitted (conditional on remitting) according to selected risk characteristics. The undocumented remitted 50 percent of their income in contrast to the documented migrants in our sample, who remitted 44 percent of their monthly earnings. Similarly, immigrants lacking fringe benefits remitted 49 percent of their monthly earnings, while migrants who received fringe benefits from their employers remitted approximately 41 percent of their monthly earnings. Finally, migrants employed in the agriculture and mining sectors remitted in excess of fifty percent of their earnings in contrast to migrants employed in the other sectors, whose remittances did not exceed, on average, 46 percent of their monthly earnings.

These broad propensities and proportions are not out of line with others previously discussed in the literature. Using the Mexican Migration Project, DeSipio (2000) reports that 60 percent of Mexican migrants remit. A recent survey of 1000 Latin American immigrant in the United States reports that 69 percent send remittances home, with non-citizen immigrants being more likely to remit relative to citizen immigrants (Bendixen, 2002). Since neither the Bendixen nor the DeSipio data match the EMIF in scope and time period, differences in the descriptive statistics are to be expected. Nonetheless, the broad similarities are reassuring.

Our descriptive statistics also seem to accord broadly with those reported by Juan Hernandez, director of Mexico's Office of the President for Mexicans Abroad. He finds that the undocumented remit more than do the documented. He also reports that Mexican workers who are temporarily residing in the U.S. remit between 40 to 60 percent of their earnings, while more permanent workers remit about 15 percent of their earnings[7] (Handlin, Krontoft and Testa, 2002).

[7] It is unclear whether Hernandez's estimates are referred to all Mexicans migrants or exclusively to those remitting a positive sum home.

Overall, the conditional descriptive statistics suggest that riskier personal and labor market characteristics are associated with a greater propensity to remit, and that a greater percentage of earnings is likely to be remitted by migrants bearing higher levels of income risk in the United States. We now turn to examining whether these relationships persist once we control for migrants' personal, family, and work characteristics, as well as for macroeconomic changes in the United States and Mexican economies as captured by time dummies.

IV. Empirical Methodology

Our primary purpose is to provide evidence of the insurance motive by demonstrating that the proportion of earnings remitted back home varies with income risk and uncertainty in the host country. In particular, we hypothesize that documented immigrants remit less relative to undocumented migrants because unauthorized migrants endure more precarious and less secure jobs and residency in the United States. Immigrants who display greater educational attainment, labor force attachment, and receive fringe benefits are also expected to remit relatively less. Migrants with friends and family in the host city (i.e. social networks) are expected to remit less since they have better access to information regarding jobs and other aspects of residing in the United States, making them subjected to less income risk. Finally, by the same token, workers employed in industries that are considered to be less cyclical and less seasonal are also expected to remit relatively lower amounts.

We isolate the association between risk and remittances suggested by the descriptive statistics in the previous section by estimating an equation explaining the proportion of monthly U.S. earnings remitted back home by Mexican migrants as a function of a series of personal, family, and job characteristics. In particular, the use of proportion data implies the following linear equation:

$$Y_i = \ln[P_i/(1-P_i)] = \beta' X_i + \varepsilon_{it}, \quad (11)$$

where Y_i is the dependent variable, P_i is an estimate of the population proportion, and X_i refers to individual characteristics in our sample–including the variables used to categorize the level of income risk that migrants are subject to, such as their legal status, educational attainment, time in the United States, U.S. work experience, type of job held in the United States, whether they receive any fringe benefits, and industry of employment.

Equation (11) is estimated for individuals remitting earnings back home, thus with $0 < P_i < 1$. As previously suggested by Greene (2000), the estimation of the maximum likelihood estimates using proportion data breaks down when $P_i = 0$ or when $P_i = 1$; that is, when migrants do not send any fraction of their earnings in the form of remittances or when they send all their earnings back home, [8] respectively. As noted by Greene (2000), one common ad hoc method used to solve this problem is to add and subtract a small constant, such as 0.001, to the observed value when the latter is equal to zero or one. We follow the literature and use this technique in order to include those migrants with $P_i = 1$, who are declaring to remit all of their monthly earnings (approximately 4 percent of our sample). However, given the large fraction of migrants who remit none of their earnings–approximately 53 percent of our sample, we choose, in this case, to forego the ad hoc procedure of converting zeros to small positive values and, instead, we allow the non-remitters to be dropped from the ML estimation. We then correct for the sample selection incurred when excluding these observations from the analysis using Heckman's two-step procedure (Greene 2000). The distribution that applies to the sample data is, therefore, a mixture of discrete and continuous distributions.[9]

[8] This may be the case for dependent teenagers and partners who are able to save and remit all their earnings.

[9] Alternatively, we could think of having censored observations when $P_{it} = 0$ and, thus, estimate a Tobit model. Nonetheless, since the Tobit model is known to produce inconsistent estimates in the presence of heteroscedasticity and censoring (Arabmazar and Schmidt 1982), we opt to correct for the biases using the inverse Mill's ratio as suggested by Greene (2000). The basic difference between using Tobit estimation procedure versus Heckman's

However, it is important to note that the EMIF surveys only ask respondents about their remitting behavior if they declare to have been working in the United States for pay. In that event, working migrants are subsequently asked how much they earned monthly and how much of their monthly earnings they remitted home. Consequently, instead of a selection equation of the likelihood that the migrant sent any fraction of last month's earnings back home, we first estimate a bivariate probit model with sample selection (Van de Ven and Van Pragg 1981, Greene 2000) outlining the migrant's decision to remit a positive sum had she/he worked in the U.S. According to this model, the decision to send money home can be described as:

$$Y_i^{Remit} = \theta' W_i^{Remit} + u_{1i} \text{ with } u_{1i} \sim N(0,1), \quad (12)$$

where W_i^{Remit} is a vector of variables influencing the likelihood of remitting money back home.[10] However, we only observe the binary outcome:

$$T_i^{Remit} = 1 \text{ if } Y_i^{Remit} > 0$$

$$T_i^{Remit} = 0 \text{ if } Y_i^{Remit} \leq 0. \quad (13)$$

Nonetheless, since only those migrants declaring to be working for pay are asked about their remitting behavior, we would only observe T_i^{Remit} if and only if the migrant worked for pay in the U.S. That is, if and only if:

$$T_i^{Work} = 1 \text{ or } Y_i^{Work} = (\delta' W_i^{Work} + u_{2i}) > 0 \text{ with } u_{2i} \sim N(0,1), \quad (14)$$

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two-step procedure resides in the possibility of including different regressors in the selection and structural equations in the latter case while in the former both coincide. The advantage of using Heckman's two-step procedure to correct for the sample biases is the fact that it produces consistent coefficient estimates, while still inefficient in the presence of heteroscedasticity. The latter can be corrected using weighted OLS or lessened by computing White's robust errors.

[10] The variables included in W_i^{Remit} are: age, gender, education, a dummy variable indicating whether the migrant came alone but has family in Mexico, the proportion of family members working for pay, the migrant's legal status, time in the U.S., and survey year. As we shall discuss later in the paper, the equation for having remitted a positive sum to Mexico is identified by the inclusion of the following statistically significant regressors, all of which are excluded from the remaining regressions in the model: the dummy variable indicating whether the migrant came alone but has family in Mexico, the proportion of family members working for pay, and the migrant's time in the U.S.

where T_i^{Work} is a binary variable equal to 1 if the respondent worked in the U.S. and W_i^{Work} is a vector of characteristics influencing the migrant's decision to work.[11] Thus, following Greene (2000), there are three types of observations in the sample, with unconditional probabilities given by:

$T_i^{Work} = 0$: $\quad \text{Prob}(T_i^{Work} = 0) = 1 - \Phi_1(\delta' W_i^{Work})$,

$T_i^{Remit} = 0, T_i^{Work} = 1$: $\quad \text{Prob}(T_i^{Remit} = 0, T_i^{Work} = 1) = \Phi_2(-\theta' W_i^{Remit}, \delta' W_i^{Work}, -\rho)$, and

$T_i^{Remit} = 1, T_i^{Work} = 1$: $\quad \text{Prob}(T_i^{Remit} = 1, T_i^{Work} = 1) = \Phi_2(\theta' W_i^{Remit}, \delta' W_i^{Work}, \rho)$, (15)

where $(u_{1i}, u_{2i}) \sim BVN(0,0,1,1,\rho)$, $\rho = corr(u_{1i}, u_{2i})$, Φ_2 is the cumulative bivariate normal, and Φ_1 is the standard cumulative normal. Therefore, the log-likelihood function for the bivariate probit model with sample selection can be written:

$$L = \sum_{i \in S}^{T_i^{Remit} \neq 0} \{\ln[\Phi_2(\theta' W_i^{Remit}, \delta' W_i^{Work}, \rho)]\} + \sum_{i \in S}^{T_i^{Remit} = 0} \{\ln[\Phi_2(-\theta' W_i^{Remit}, \delta' W_i^{Work}, -\rho)]\}$$

$$+ \sum_{i \notin S} \{\ln[1 - \Phi_1(\delta' W_i^{Work})]\}, \qquad (16)$$

where S is the set of observations for which Y_i^{Remit} is observed. The predictions from this bivariate probit with sample selection are then used to compute the inverse Mill's ratio (λ_i^{Remit}),[12] which is subsequently included in the estimation of the structural regression to correct for the bias incurred in the maximum likelihood estimation of the proportion data model when $P_i = 0$ as follows:

[11] In particular, W_i^{Work} includes: age, gender, household head dummy, education, a dummy variable indicating whether the migrant has friends or family in the city (e.g. social networks), undocumented work status, and survey year. Once more, as we shall discuss in greater detail in what follows, the equation for having worked in the U.S. is identified by the inclusion of the following regressors, both of which are excluded from the remaining regressions in the model: *social networks* and *household head*.

[12] Computed as: $\lambda_i^{Remit} = \phi_2(\theta' W_i^{Remit}, \delta' W_i^{Work}, \rho)/\Phi_2(\theta' W_i^{Remit}, \delta' W_i^{Work}, \rho)$, where: ϕ and Φ stand for the normal probability density and the normal cumulative distribution functions, respectively.

$$Y_i = \ln[P_i/(1-P_i)] = \beta' X_i + \gamma \lambda_i^{Remit} + \varepsilon_i. \quad (17)$$

Nevertheless, the error term in equation (17) is heteroscedastic due to: (a) the use of proportions data and (b) the inclusion of the inverse Mill's ratio amongst the structural equation's regressors. In order to be able to do inference, the consistent but inefficient estimates need to be corrected for heteroscedasticity. As suggested by Greene (2000), we first correct for heteroscedasticity introduced through the use of proportions data using the weights: $w_i = [n_i \Lambda_i(1-\Lambda_i)]$, where Λ stands for the logistic cumulative density function, based on the first step estimates for a second step weighted least squares. Subsequently, we correct the variance-covariance matrix to account for the heteroscedasticity, the additional source of variation in the compound disturbance, and the correlation across observations introduced by the inverse Mill's ratio in equation (17) following Greene (1981) and Murphy and Topel (1985). Finally, White's robust standard errors are computed with the purpose of purging the standard errors of any remaining heteroscedasticity. Using this procedure, we can then conclude that a positive and statistically significant coefficient on the variables proxying for income risk included in X_i is indicative of remittances being sent to purchase insurance.

While the previous analysis permits us to get at the immigrants' intended use of remittances as insurance, we would like to go one step further and distinguish between the two forms of insurance we discussed earlier: family-provided insurance and self-insurance. In order to do so, we identify whether migrants claim to have sent remittances to defray household expenses in Mexico or to accumulate assets in Mexico. We then create two dummy variables to indicate when remittances were sent to satisfy family consumption versus saving/asset accumulation. We estimate two separate bivariate probits with sample selection–similar to the one specified in equation (16)–for the likelihood that the migrant remitted earnings home for consumption or for saving/asset accumulation purposes, respectively. Subsequently, we use the

predictions from each one of those bivariate probits with sample selection to construct the inverse Mill's ratios. These ratios are included in the structural models examining the determinants of the percentage of monthly earnings sent to Mexico for consumption and for asset accumulation purposes–comparable to that in equation (17). Overall, a positive and statistically significant coefficient on the variables proxying for income risk is now indicative of remittances being used to purchase "family-provided insurance," as equation (7) stated, or "self-insurance" (precautionary saving), as indicated by equation (8) in our theoretical model.

V. Remittances as Insurance: The Decision to Remit and How Much

In order to assess whether insurance constitutes a motive for immigrants' remitting behavior, we examine how the percentage of their earnings being remitted to Mexico varies with immigrants' borne income risk. The latter is proxied using the immigrant's legal status, labor force attachment, receipt of fringe benefits, industry of employment, and educational attainment.

However, before estimating our proportions data model, we need to correct for the sample selection resulting from focusing on working individuals as well as on those individuals sending a positive proportion of their earnings back home. Table B contains the results from estimating the bivariate probit with censoring in equation (16). The selection equation for working in the U.S. is identified by the exclusion of two significant variables – *household head* and *social networks* – from the equation modeling the likelihood that the migrant remits any positive sum home. A household head dummy is included in the work selection equation given household heads' greater propensity to work. Similarly, a dummy variable indicative of whether the migrant has any friends or family in the city where she migrated to is included because these networks often help migrants find employment. Both of these variables are excluded from the likelihood that the migrant remits home since they are not statistically different from zero when

included as determinants of the migrant's decision to remit. The results of this estimation suggest that immigrants *who hold jobs* are more likely to be in possession of proper immigration documentation, and they are likely to be younger, male, and household heads. Immigrants with jobs also appear to have social networks (friends and family) in the host city and less education.

The top of Table B also shows the estimation results for the likelihood that the migrant remits any money home conditional on working for pay in the U.S. As with the likelihood that the migrant works in the U.S., the equation modeling the likelihood that the migrant remits any money home is identified by the inclusion of the following statistically significant regressors, all of which are excluded from the regression modeling the percentage of earnings remitted home: a dummy variable indicating whether the migrant came alone but has family in Mexico, the proportion of family members working for pay, and the migrant's time in the U.S. The first two variables address the demand side of remittance flows and how they might affect the migrant's need to remit money home. The latter variable captures the observed decline in the likelihood to remit among migrants who have been in the U.S. longer. Overall, we observe that undocumented migrants are approximately 7 percent more likely to remit money home, as previously hypothesized. Additionally, older migrants, as well as male migrants, appear more likely to remit money home than their younger and female counterparts. The decision to remit is also linked to our proxy for family economic need captured by the proportion of family members working for pay. Similarly, migrants who migrated alone leaving family members back in Mexico are 7.5 percent more likely to remit relative to those who migrated with their families or have no family left in Mexico. Finally, as we also hypothesized, the likelihood of remitting is inversely related to the migrant's educational attainment and, as noted in the earlier literature, seems to decline with the duration of the migrant's stay in the United States.

Table 3 displays the results from estimating equation (17) in order to assess how different proxies of income risk and control variables affect the *fraction* of earnings remitted by migrants to Mexico. Undocumented migrants are not only more likely to send money back home but, in addition, the fraction of their earnings remitted back home is 42 percent higher than that of documented migrants. The percentage of earnings sent to Mexico appears to be lower among older and male migrants relative to younger and female migrants. As with the case of the migrant's likelihood to remit, the fraction of earnings remitted home increases proportionally with the size of the migrant's family in Mexico, suggesting that the needs of the family back home are important to the migrant and that the migrant is behaving in an altruistic manner. With respect to education, migrants with the equivalent of a high school education seem to remit a greater fraction of their earnings to Mexico when compared with migrants possessing less than a high school education. However, the most educated migrants (those with more than a high school education) remit up to 17 percent less of their monthly earnings than their least educated counterparts.

The proportion of monthly earnings remitted back home is highly related to many other income risk proxies, including work experience in the United States, the receipt of fringe benefits, the type of job held, and the industry of employment. In particular, as we hypothesized, the fraction of monthly earnings remitted is inversely related to the migrant's work experience, receipt of fringe benefits, and employment in industries less seasonal than agriculture. Additionally, remittance payments are 7 percent larger among migrants with less stable jobs, as is often the case with migrants with specific task work contracts, relative to migrants employed as wage and salaried workers. We also find that self-employed migrants remit smaller sums than wage and salary migrants. This seems counter to our hypothesis since we normally consider the self-employed to have higher earnings risks. However it is reasonable to expect that the self-

employed maintain part of an "insurance fund" in the form of physical capital (a form of saving) at their current work locations. Therefore, upon further reflection, it is not surprising to find the remittance payments of the self-employed to be lower than those of wage and salaried workers.

Overall, our findings appear to be consistent with the hypothesis that immigrants are risk-averse individuals who, in the face of greater income rise -- as captured by their immigration status, educational attainment, work experience, fringe benefits received, type and industry of employment -- insure themselves by remitting more. Finally, it is also worth noting how the fraction of earned income sent home has been decreasing at an increasing rate over the second half of the 1990s.

VI. Alternative Forms of Insurance: Family-Provided Insurance Versus Self-Insurance

We now turn to examine two alternative avenues by which immigrants may insure themselves against income risks using migrants' information regarding the end use of the remittances; in particular, whether remittances are intended for current family consumption or, rather, to accumulate assets. In the former case, when remittances increase with income risk and they are intended for current family consumption, we argue that remittances are purchasing "family-provided insurance," helping support the family today with the expectation that should the need arise, the immigrant will be able to secure a place back home. By contrast, when remittances appear to increase with income risk but they are sent home to purchase assets, we argue that the immigrant is self-insuring via the accumulation of precautionary saving. The immigrant, upon returning home, will have the opportunity to draw upon his or her accumulated assets should she experience a decrease in her opportunities to work in the United States.

To distinguish between these two avenues of insurance, we follow a similar methodology to the one used in the previous section. In particular, we first correct for the sample selection

biases incurred when focusing on respondents who worked while in the United States and remitted a fraction of their monthly earnings to Mexico for family-insurance or to accumulate precautionary saving. Tables C and D in the appendix display the estimated coefficients from estimating the bivariate probits with censoring of the likelihood that the migrants sent part of their monthly labor earnings home to cover family consumption needs or to accumulate assets.[13]

We find that the determinants of remitting for family-provided insurance and for saving differ. Interestingly, undocumented migrants are approximately 3 percent more likely to remit for family-provided insurance purposes, while documentation does not appear to affect the propensity to remit for saving. Additionally, younger migrants, male migrants, migrants with a smaller proportion of their family members working for pay, migrants who migrated alone, and migrants with lesser educational attainment are more likely to remit to cover consumption needs. In contrast, older migrants, female migrants, migrants with a greater fraction of family members working for pay, migrants who came accompanied by friends/family to the U.S., and migrants with greater levels of education are more likely to remit for asset accumulation purposes.

Overall, economic need and greater income risk appear to be strongly associated with the decision to send money home for consumption purposes. In contrast, individuals further along in the life cycle and individuals with fewer family responsibilities appear to be engaging in relatively greater amounts of saving. This result seems to be further confirmed by the observation that the decision to send money home to cover basic consumption needs is inversely

[13] As in the previous case, the equations modeling the likelihood of working in the U.S. are identified by the inclusion of *social networks* and *household head* as factors influencing the likelihood that the migrants works in the U.S. Both regressors continue to significantly increase the likelihood that the migrant works, but do not seem to significantly affect the likelihood that the migrant remits money home when included as determinants of the migrant's decision to remit. Thus, they are excluded from the remaining equations in the models. Similarly, the equations modeling the likelihood of remitting a positive sum to Mexico are identified by the inclusion of three statistically significant regressors capturing the demand side of remittance flows and migrant's remitting patterns over time, all of which are excluded from the equations modeling the percentage of earnings remitted home for either purpose. The identifying regressors are a dummy variable indicating whether the migrant came alone but has family in Mexico, the proportion of family members working for pay, and the migrant's time in the U.S.

related to the migrant's time in the United States, while the decision to send money home to accumulate saving varies positively with the migrant's time in the United States. That is, migrants appear more likely to purchase family-provided insurance when they first arrive in the United States, but they seem to substitute away from family-provided insurance and towards a form of self-insurance over time. A story consistent with this pattern of remittances would be that migrants choose to remit for saving purposes only after they surpass a certain income threshold and cover their own and their family's basic needs.

To assess whether the latter is the case, we re-estimate the bivariate probit model for the likelihood of remitting money for saving purposes, but this time allowing for different behavior among "high-income" immigrants relative to "low-income" immigrants. In particular, we construct a *High Income* dummy variable (defined as Mexican migrants earning in excess of $1200 during their last month in the U.S.; that is, Mexican migrants in the upper monthly earnings quartile) and interact it with *Undocumented Migrant* one of our independent variables indicative of the migrant's income risk. Table E in the appendix shows the results from re-estimating the model. Indeed, the undocumented do, all other things equal, remit more for saving, should they be among this group that experiences relatively high earnings.[14]

Table 4 displays the estimated coefficients from estimating equation (17) for the proportion of earnings sent home to cover family consumption needs as well as for the proportion of earnings sent home to accumulate assets. In both cases, the proportion of monthly earnings remitted home significantly increases among undocumented migrants, typically exposed to greater income risks. Similarly, the fraction of earnings sent home for family-provided insurance and the proportion of earnings sent for precautionary saving are 6 percent and 14 percent higher with every additional family member left back home, respectively. Additionally,

migrants exposed to greater income risk–as indicated by their shorter work experience in the United States, lack of fringe benefits, and employment in seasonal industries like agriculture–remit more whether they are remitting for insurance or for saving. Some differences in the determinants of the fraction of earnings sent home for the two purposes are also found. In particular, more highly educated migrants and the self-employed remit a smaller fraction of their monthly earnings home for consumption purposes relative to their least educated, wage and salary counterparts. Nevertheless, younger migrants, female migrants, more educated migrants and wage and salaried workers seem to remit a greater percentage of their monthly earnings for saving purposes relative to older, male, least educated, and specific task workers. Finally, the proportion of earnings remitted for family-provided insurance and for saving appear to have significantly increased after 1998 relative to 1993.

VII. Conclusions

Stories abound in the popular press about the large volume of international remittances that immigrants send to their families back home. Most discussion of these transfers presumes that they represent altruistic payments to remaining family in the immigrant's country of origin. While we do acknowledge that migrants do behave altruistically with respect to family members, we argue that immigrants are also likely to behave as risk-averse economic agents who "purchase" insurance in the face of economic uncertainty. As such, we argue that remittances provide a way for immigrant workers to purchase insurance to cover their risky ventures away from home.

In particular, we examine the case of the Mexican migrant in the United States. The level of income uncertainty faced by Mexican migrants in the United States is especially high given that few receive fringe benefits through their jobs. Furthermore, unlike native-born workers,

[14] A similar result regarding permanent income saving was found by Paulson and Singer (2001).

immigrants are less likely to be eligible for U.S. income maintenance programs. Hence, Mexican migrants need to pursue other avenues to insure themselves against potential income risks. To demonstrate the existence of a link between income risk and migrants' remitting behavior, we estimate the impact of different risk variables on the likelihood of sending remittances and on the proportion of monthly earnings remitted. We find that risk variables do significantly affect remittances as measured by the propensity and the proportion of labor earnings sent home. For example, undocumented migrants appear to send 42 percent more. In contrast, immigrants with fringe benefits and those with longer work histories in the United States (proxying greater labor force attachment and U.S.-specific human capital) remit less. These results are supportive of the hypothesis that migrants are using remittances to insure against risky labor earnings.

We take our analysis one step further by considering two separate forms of insurance: 1) *Family-provided insurance* obtained by remitting periodic payments used to defray the migrant's family's living expenses in Mexico, with these payments assuring her a place in her family, and 2) *self-insurance* via the accumulation of precautionary saving in Mexico. In our empirical analysis, we find that the decision to purchase insurance via the family versus via precautionary saving appears to be governed by different economic variables. Undocumented, younger, male, migrants with a smaller proportion of their family members working for pay, migrants who migrated alone, and migrants with lesser educational attainment are more likely to remit money home to cover consumption needs. In contrast, older migrants, female migrants, migrants with a greater fraction of family members working for pay, migrants who came accompanied by friends/family to the United States, and migrants with greater educational attainment are more likely to remit for asset accumulation purposes. Additionally, migrants' decision to send money home to purchase family-provided insurance appears to be inversely

related to the migrant's time in the United States, while the decision to insure via asset accumulation is positively related to the migrant's time in the United States.

The broad conclusions regarding the impact of risk on remitting behavior are reconfirmed once we analyze the results of the proportion data models conditional on remitting for family-provided insurance and for precautionary saving. Earnings risk variables are shown to not only explain the likelihood of remitting, but also the fraction of earnings remitted for family-provided insurance and for precautionary saving. Variables that explain the percentage of earning remitted for these two purposes include the migrant's documented status, her U.S. work experience, lack or presence of fringe benefits, and industry of employment.

In the so-called "new economics of migration" approach, it is argued that immigrants, in making their migration decisions, are highly motivated by portfolio variables (Stark and Bloom, 1985). By the same token, in this paper we find that host country risk variables play an important role in determining migrants' remitting behavior. In particular, we show that the riskiness of earnings and employment explain both the probability and the proportion of earnings that migrants remit home.

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Table 1: Proportion Of Migrants Sending Remittances By Selected Categories Of Income Risk

Variables	Proportion	Standard Error	Dif in means [a]	t-statistic
Undocumented Migrant	0.510	0.008	-	-
Documented Migrant	0.457	0.005	0.053	5.51***
				-
Less than High School	0.491	0.005	-	
High School	0.396	0.011	0.095	7.63***
More than High School	0.388	0.020	0.104	5.13***
Agriculture and Mining	0.560	0.008	-	-
Industry	0.432	0.012	0.128	8.73***
Construction	0.514	0.010	0.047	3.57***
Commerce	0.361	0.016	0.199	11.22***
Services	0.417	0.008	0.143	12.52***

Notes: [a] Difference in proportion relative to the first category in the grouping; e.g. $\hat{p}$ for undocumented migrant - $\hat{p}$ for documented migrant = 0.053. *** Signifies statistically different from zero at the 1% level or better, **signifies statistically different from zero at the 5% level or better and *signifies statistically different from zero at the 10% level or better.

Table 2: Average Proportion Of Earnings Remitted By Selected Categories Of Income Risk

Variables	Proportion	Standard Error	Dif in means [a]	t-statistic
Undocumented Migrant	0.498	0.005	-	
Documented Migrant	0.439	0.004	0.059	9.49***
Lack of Fringe Benefits	0.486	0.004	-	
Fringe Benefits on the Job	0.411	0.005	0.075	11.77***
Agriculture and Mining	0.514	0.005	-	-
Industry	0.415	0.009	0.099	9.76***
Construction	0.457	0.006	0.057	7.06***
Commerce	0.401	0.012	0.113	8.42***
Services	0.429	0.006	0.085	11.28***

Notes: [a] Differences in mean relative to the first category in the grouping. *** Signifies statistically different from zero at the 1% level or better, **signifies statistically different from zero at the 5% level or better and *signifies statistically different from zero at the 10% level or better.

Table 3: Proportion Data Model For Earnings Remitted

Variables	**Coefficients**	**Robust S.E.**
Undocumented Migrant	0.4189***	0.0503
Age	-0.0036*	1.92e-03
Male	-0.1265*	0.0903
Family Size in Mexico	0.0556***	8.98e-03
High School	0.1114**	0.0573
More than High School	-0.1667**	0.0898
Days Worked in the U.S.	-0.0002***	2.87e-05
Fringe Benefits	-0.1782***	0.0389
Self Employed/Family Worker	-0.2425***	0.0967
Specific Task Worker	0.0715**	0.0409
Construction	-0.2612***	0.0516
Commerce	-0.5378***	0.0756
Industry	-0.3662***	0.0598
Services	-0.3509***	0.0474
1994	0.0505	0.1029
1995	-0.0508	0.0582
1996	-0.0100	0.0674
1997	-0.2322***	0.0899
1998	-0.2560***	0.0827
1999	-0.6240***	0.0787
2000	-0.9335***	0.1335
λ	0.0078	0.2543
Constant	0.5740**	0.2847
N	5830	
F (23, 5807)	16.60	
Prob > F	0.0000	
R^2	0.0496	

Notes: *** Signifies statistically different from zero at the 1% level or better, **signifies statistically different from zero at the 5% level or better and *signifies statistically different from zero at the 10% level or better. Omitted categories: Less than High School, Wage and Salary Worker, Agriculture and Mining, 1993.

Table 4: Proportion Data Model For Earnings Remitted for Consumption and Saving

Purpose for Remittances	**For Consumption**		**For Saving**	
Variables	**Coefficients**	**Robust S.E.**	**Coefficients**	**Robust S.E.**
Undocumented Migrant	0.3185***	0.0473	0.7195***	0.0630
Age	-0.0038	3.04e-03	-0.0251***	4.32e-03
Male	-0.0076	0.1312	-0.3750***	0.1433
Family Size in Mexico	0.0550***	0.0122	0.1366***	0.0184
High School	0.1247*	0.0770	0.1440*	0.1004
More than High School	-0.2728**	0.1209	0.3786***	0.1629
Days Worked in the U.S.	-0.0002***	2.42e-05	-0.0002***	2.84e-05
Fringe Benefits	-0.1149***	0.0431	-0.4791***	0.0542
Self Employed/Family Worker	-0.1822**	0.1061	-0.0881	0.1268
Specific Task Worker	0.0455	0.0450	-0.3021***	0.0561
Construction	-0.1705***	0.0562	-0.4428***	0.0739
Commerce	-0.5235***	0.0833	-1.0220***	0.1027
Industry	-0.3587***	0.0645	-0.6058***	0.0830
Services	-0.2951***	0.0516	-0.4467***	0.0679
1994	0.1174*	0.0839	-0.2734**	0.1131
1995	-0.0995**	0.0584	-0.0671	0.0821
1996	0.1009*	0.0733	-0.5315***	0.1005
1997	-0.1529***	0.0668	-0.3350***	0.0982
1998	2.4123***	0.1901	1.6092***	0.1804
1999	2.3647***	0.1393	0.7398***	0.1145
2000	2.6096***	0.3073	0.2108**	0.1104
λ	-0.0083	0.3600	-1.4409***	0.3872
Constant	0.3924*	0.2433	3.5906***	0.5080
N	4785		1612	
F-statistic	F (23, 4762) = 22.47		F (23, 1589) = 6.24	
Prob > F	0.0000		0.0000	
R^2	0.0685		0.0624	

Notes: *** Signifies statistically different from zero at the 1% level or better, **signifies statistically different from zero at the 5% level or better and *signifies statistically different from zero at the 10% level or better. Omitted categories: Less than High School, Wage and Salary Worker, Agriculture and Mining.

Appendix

Table A: Description of Variables Used in the Analysis

Variables	Definition	Mean	S.D.
Dependent variables:			
Worked in the U.S.	Worked during last stay in the U.S.	0.792	0.406
Sent Remittances	Proportion of migrants remitting earnings from last month of work in the U.S.	0.473	0.499
Proportion Earnings Sent as Remittances	For those remitting, the percentage of earnings they remitted	0.459	0.233
Sent Remittances for Consumption	For those remitting, the proportion remitting for consumption	0.728	0.445
Proportion Earnings Remitted for Consumption	For those remitting for consumption, the percentage of earnings remitted	0.467	0.227
Sent Remittances for Saving	For those remitting, the proportion remitting to purchase physical, financial assets, etceteras.	0.247	0.431
Proportion of Earnings Remitted for Saving	For those remitting to accumulate assets and save, the percentage of earnings remitted	0.440	0.248
Independent variables:			
Personal and Family Characteristics:			
Undocumented Migrant	Lack proper documentation at time of last entry	0.318	0.466
High Income	Last month's income in the upper quartile (>$1200)	0.286	0.452
Age	Age of respondent	34.81	12.230
Male	Gender dummy	0.860	0.347
Household Head	Respondent is the household head	0.693	0.461
Migrated Alone	No family in the U.S.	0.372	0.483
Family Members Working	Fraction of family members working for pay	0.412	0.232
Family Size In Mexico	Family size in Mexico	1.820	2.680
Social Networks	Friends in host city in the U.S.	0.82	0.38
Less Than High School	Less than a HS education	0.789	0.408
High School	Complemented HS but no college	0.152	0.359
More than High School	More than a HS education	0.060	0.237
Work- related Characteristics:			
Days Worked in the U.S.	Days worked in the U.S. on last visit	535	1152
Fringe Benefits	Worker received fringe benefits	0.355	0.479
Wage and Salary Worker	Wage and salary worker	0.709	0.454
Self Employed/Family Worker	Self employed or family worker	0.040	0.195
Specific Task Worker	Worker with a specific task contract	0.244	0.429
Agriculture and Mining	Industry dummy	0.271	0.445
Industry	Industry dummy	0.133	0.340
Construction	Industry dummy	0.195	0.396
Commerce	Industry dummy	0.076	0.265
Services	Industry dummy	0.324	0.468

Table A – Continued

Variable	Definition	Mean	S.D.
Time Controls:			
Days Residing in the U.S.	Number of days in the U.S. last visit	497	1181
1993	Year dummy	0.150	0.357
1994	Year dummy	0.044	0.205
1995	Year dummy	0.213	0.410
1996	Year dummy	0.101	0.301
1997	Year dummy	0.098	0.297
1998	Year dummy	0.082	0.274
1999	Year dummy	0.220	0.415
2000	Year dummy	0.092	0.289

Notes: Sample sizes for the variables in the table differ depending on whether they were defined for a certain group of individuals, e.g. working migrants.

Table B: Probit Model for Sending Remittances with Sample Selection for Working in the U.S.

Dependent Variables	Independent Variables	Coefficient	Robust S.E.	Marginal Effect
Sent Remittances				
	Undocumented Migrant	0.1800***	0.0287	0.0714
	Age	0.0030**	0.0013	0.0012
	Male	0.3044***	0.0702	0.1186
	Family Members Working	-0.3249***	0.0524	-0.1291
	Migrated Alone	0.1892***	0.0253	0.0752
	High School	-0.1181***	0.0356	-0.0467
	More than High School	-0.1308**	0.0590	-0.0516
	Days Residing in the U.S.	-0.0001***	0.0000	-4.3e-05
	1994	-0.2786***	0.0631	-0.1082
	1995	-0.0945**	0.0374	-0.0374
	1996	0.0568	0.04367	0.0226
	1997	-0.3565***	0.0459	-0.1377
	1998	-0.2280***	0.0502	-0.0892
	1999	-0.3213***	0.0396	-0.1254
	2000	-0.6103***	0.0544	-0.2265
	Constant	-0.1746***	0.0895	-
Worked in the U.S.				
	Undocumented Migrant	-0.1339***	0.0280	-
	Age	-0.0209***	0.0011	-
	Male	0.8607***	0.0329	-
	Household Head	0.6731***	0.0286	-
	Social Networks	0.3775***	0.0298	-
	High School	-0.2443***	0.0324	-
	More than High School	-0.4822***	0.0465	-
	1994	-0.3797***	0.0605	-
	1995	-0.1717***	0.0395	-
	1996	0.0948*	0.0502	-
	1997	-0.1438***	0.0477	-
	1998	-0.1852***	0.0504	-
	1999	-0.2530***	0.0395	-
	2000	-0.4252***	0.0477	-
	Constant	0.3139***	0.0622	-
N		16022		
Censored observations		3774		
Wald Chi-Square (15)		501.84		
Prob > Chi-Square		0.0000		

Notes: *** Signifies statistically different from zero at the 1% level or better, **signifies statistically different from zero at the 5% level or better and *signifies statistically different from zero at the 10% level or better. Omitted categories: Less than High School, 1993.

Table C: Probit Model for Sending Remittances Used for Consumption with Sample Selection for Working in the U.S.

Dependent Variables	Independent Variables	Coefficient	Robust S.E.	Marginal Effect
Sent Remittances for Consumption				
	Undocumented Migrant	0.0808**	0.0497	0.0303
	Age	-0.0116***	0.0017	-0.0044
	Male	0.4365***	0.1010	0.1699
	Family Members Working	-0.2561***	0.0719	-0.0968
	Migrated Alone	0.3029***	0.0348	0.1128
	High School	-0.2371***	0.0524	-0.0915
	More than High School	-0.3561***	0.0856	-0.1392
	Days Residing in the U.S.	-0.0001***	0.0000	-0.0000
	1994	0.0262	0.1056	0.0099
	1995	-0.1584***	0.0546	-0.0606
	1996	-0.2251***	0.0613	-0.0871
	1997	0.1274*	0.0763	0.0472
	1998	-0.2038***	0.0669	-0.0788
	1999	-0.2077***	0.0536	-0.0797
	2000	-0.2620***	0.0780	-0.1017
	Constant	0.5470***	0.1404	-
Worked in the U.S.				
	Undocumented Migrant	-0.0770**	0.0328	-
	Age	-0.0216***	0.0012	-
	Male	1.0677***	0.0422	-
	Household Head	0.7602***	0.0349	-
	Social Networks	0.4195***	0.0343	-
	High School	-0.3541***	0.0397	-
	More than High School	-0.6308***	0.0587	-
	1994	-0.5558***	0.0729	-
	1995	-.2052***	0.0460	-
	1996	0.1172**	0.0572	-
	1997	-0.2626***	0.0579	-
	1998	-.1152**	0.0570	-
	1999	-0.1974***	0.0452	-
	2000	-0.5417***	0.0575	-
	Constant	-0.2905***	0.0725	-
N		10357		
Censored observations		3774		
Wald Chi-Square (15)		269.10		
Prob > Chi-Square		0.0000		

Notes: *** Signifies statistically different from zero at the 1% level or better, **signifies statistically different from zero at the 5% level or better and *signifies statistically different from zero at the 10% level or better. Omitted categories: Less than High School, 1993.

Table D: Probit Model for Sending Remittances for Saving with Sample Selection for Working in the U.S.

Dependent Variables	Independent Variables	Coefficient	Robust S.E.	Marginal Effect
Sent Remittances for Saving				
	Undocumented Migrant	-0.0417	0.0401	-0.0152
	Age	00122***	0.0018	0.0044
	Male	-0.3438***	0.1049	-0.1301
	Family Members Working	0.2310***	0.0732	0.0842
	Migrated Alone	-0.2982***	0.0355	-0.1068
	High School	0.2165***	0.0534	0.0811
	More than High School	0.2460***	0.0889	0.0931
	Days Residing in the U.S.	6.56e-05***	1.87e-05	2.39e-05
	1994	-0.0038	0.1065	-0.0014
	1995	0.1489***	0.0554	0.0552
	1996	0.2087***	0.0623	0.0784
	1997	-0.1549**	0.0782	-0.0548
	1998	0.1868***	0.0679	0.0701
	1999	0.1764***	0.0545	0.0655
	2000	0.1205	0.0818	0.0448
	Constant	-0.7089***	0.1450	-
Worked in the U.S.				
	Undocumented Migrant	-0.0768	0.0328	-
	Age	-0.0216***	0.0012	-
	Male	1.0666***	0.0422	-
	Household Head	0.7618***	0.0348	-
	Social Networks	0.4173***	0.0343	-
	High School	-0.3536***	0.0397	-
	More than High School	-0.6297***	0.0587	-
	1994	-0.5558***	0.0729	-
	1995	-0.2054	0.0460	-
	1996	0.1154*	0.0572	-
	1997	-0.2631***	0.0580	-
	1998	-0.1165	0.0569	-
	1999	-0.1976***	0.0453	-
	2000	-0.5425***	0.0575	-
	Constant	-0.2871***	0.0726	-
N		10357		
Censored observations		3774		
Wald Chi-Square (15)		221.19		
Prob > Chi-Square		0.0000		

Notes: *** Signifies statistically different from zero at the 1% level or better, **signifies statistically different from zero at the 5% level or better and *signifies statistically different from zero at the 10% level or better. Omitted categories: Less than High School, 1993.

Table E: Probit Model for Sending Remittances for Saving with Sample Selection for Working in the U.S. and Controlling for High Income

Dependent Variables	Independent Variables	Coefficient	Robust S.E.	Marginal Effect
Sent Remittances for Saving				
	Undocumented Migrant	0.0732	0.0491	0.0254
	Undocumented*High Income	-0.1896***	0.0754	-0.0623
	High Income	0.3955***	0.0433	0.1425
	Age	00111***	0.0018	0.0038
	Male	-0.3438***	0.1095	-0.1248
	Family Members Working	0.2063***	0.0753	0.0712
	Migrated Alone	-0.2715***	0.0364	-0.0919
	High School	0.1584***	0.0552	0.0562
	More than High School	0.1362	0.0925	0.0484
	Days Residing in the U.S.	5.08e-05***	1.91e-05	1.75e-05
	1994	-0.0025	0.1089	-0.0009
	1995	0.1304**	0.0568	0.0458
	1996	0.1722***	0.0629	0.0614
	1997	-0.2315***	0.0807	-0.0754
	1998	0.1106	0.0695	0.0391
	1999	0.0741	0.0564	0.0258
	2000	-0.0341	0.0859	-0.0117
	Constant	-0.8299***	0.1517	-
Worked in the U.S.				
	Undocumented Migrant	-0.0779**	0.0328	-
	Age	-0.0216***	0.0012	-
	Male	1.0658***	0.0422	-
	Household Head	0.7639***	0.0346	-
	Social Networks	0.4137***	0.0343	-
	High School	-0.3526***	0.0397	-
	More than High School	-0.6288***	0.0588	-
	1994	-0.5562***	0.0729	-
	1995	-0.2056***	0.0460	-
	1996	0.1158**	0.0572	-
	1997	-0.2623***	0.0580	-
	1998	-0.1162**	0.0569	-
	1999	-0.1970***	0.0453	-
	2000	-0.5426***	0.0575	-
	Constant	-0.2838***	0.0727	-
N	10357	Wald Chi-Square (17)		299.19
Censored observations	3774	Prob > Chi-Square		0.0000

Notes: *** Signifies statistically different from zero at the 1% level or better, **signifies statistically different from zero at the 5% level or better and *signifies statistically different from zero at the 10% level or better. Omitted categories: Less than High School, 1993.