# When Do Remittances Facilitate Asset Accumulation?
## The Importance of Remittance Income Uncertainty

Catalina Amuedo-Dorantes
Professor of Economics
Department of Economics
San Diego State University
San Diego, CA 92182
USA
camuedod@mail.sdsu.edu

Susan Pozo
Professor of Economics
Department of Economics
Western Michigan University
Kalamazoo, MI 49008
USA
susan.pozo@wmich.edu

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## Abstract

A sizable literature has concluded that remittances impact the expenditure patterns of households in developing economies. We explore how the *uncertainty* of remittance income inflows affects the accumulation of human, physical and financial assets, while accounting for the *level* of transfers from family abroad. We find that both the level and the uncertainty of remittance inflows raise asset accumulation among remittance-receiving households in Mexico. Specifically, as predicted by the permanent income hypothesis and precautionary saving theories, a one standard deviation increase in the uncertainty of remittance income raises the likelihood of household spending on asset accumulation by 3 percentage points and the share of household expenditures on this category by 1.5 percent. Hence, both the level and the predictability of remittance income should be given full consideration in the analysis of household expenditure patterns and in the design of policies to leverage the most out of remittance inflows into developing economies.

## A. Introduction

A sizable literature has concluded that remittances, like migration, impact the expenditure patterns of households. Using the *Mexican National Rural Household Survey*, Taylor and Mora (2006) conclude that households affected by international migration modify their expenditure patterns by increasing the share of expenditures on investment at the expense of consumption. Likewise, Adams (2005) finds that remittance-receiving households in Guatemala spend less on consumption (defined as food, consumer goods and durables), and more on education, health and real estate relative to non-remittance receiving households. Similar findings are also reported by Zarate-Hoyos (2004), who finds evidence of greater investments by remittance-receiving households. Finally, Airola (2007) reports that remittance-receiving households spend relatively more on durable goods, on health and on housing, but less on food relative to households that do not receive remittances. In this study, we explore an additional factor that shapes household expenditure patterns by examining how the uncertainty of remittance income affects the accumulation of human, physical and financial assets.

While it is important to understand how the *level* of transfers from family abroad affects household spending, it is also useful to ascertain how the *predictability* of such money inflows influences household spending. Some households receive remittances on a regular and predictable basis month after month. Other households receive these funds irregularly –when emigrants return home, when they have accumulated a sufficient sum to send to family members in the home country, or at their whim (from the perspective of the researcher). Consequently, while some remittance-receiving households are able to forecast with reasonable precision the timing and amounts of future remittance inflows, other recipient households are unable to do so. Consider one household who receives $200 each and every month from January to May, while

another household receives the identical $1000 over the same five-month period but on a seemingly random and irregular basis, *e.g.* $100 in January, $600 in February and $300 in May. The first household has a reason to expect a consistent and uniform inflow of remittances, whereas the second household will likely have more trouble forecasting future remittance inflows. We argue that the expenditure patterns of these two households are also likely to differ. In this study, we hypothesize that households with regular and predictable remittance inflows are more likely to use those funds to meet ordinary, perhaps scheduled, consumption needs. In contrast, households that receive remittances on an irregular and less predictable basis are more likely to use those funds toward the accumulation of assets. This hypothesized behavior follows from the life-cycle permanent income hypothesis (LCPIH), according to which regular and permanent increases in income will most likely be consumed as individuals can expect to enjoy those income increments over the long term. The expectation of an increase in income for the long-run allows for an upward adjustment of consumption over the lifecycle. In contrast, irregular increases in income are less likely to be viewed as permanent. Because households cannot count on them for the longer-run, they are more likely to be saved.[1]

The idea that less regular income is more likely to be saved is further supported by the precautionary saving motive (Leland 1968). When households find it more difficult to predict future income flows, they tend to save more –as a precaution against future income shortfalls. We hypothesize those remittance-receiving households with more volatile remittance inflows will save more by engaging in more asset accumulation.

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[1] See, for example, Friedman (1957), Ando and Modigliani (1957), Modigliani and Brumberg (1954). This idea is articulated and tested in a study by Adams (1998), where he finds that remittance income (in contrast to regular income) is more likely to be spent on farming investments in rural Pakistan. Remittances are viewed as temporary income relative to other sources of income earned by the rural household and, hence, they were regarded as less suitable for financing recurring consumption expenditures. Our hypothesis differs in that we distinguish regular and predictable remittance income from irregular and less predictable remittance income. Households with regular/predictable remittance inflows will likely engage in more consumption, while households with less regular/unpredictable remittance income are likely to engage in more asset accumulation, all other things equal.

Concern about the economic and social implications of remittances in the receiving countries has permeated much of the debate on remittances. In particular, considerable controversy regarding the desirability of remittance inflows has emerged following studies that conclude that remittances may have detrimental impacts on recipient households and/or on the economy at large (Glytsos 1993, Durand *et al*. 1996). At the household level, it has been claimed that remittances are used in ways that breed "dependency" instead of promoting longer term capital accumulation and economic growth. According to this thesis (see Keely and Tran (1989) for a review), remittances are mainly used to finance household consumption, reducing labor force participation of family members in the home country and diminishing the household's longer-term ability to prosper on its own.

We do not subscribe to the view that expenditures on consumption are undesirable as the use of remittances to purchase food and to pay for other consumption expenditures can significantly raise the quality of life of recipient households. Yet, human, physical and financial investments are also highly desirable as they facilitate entrepreneurial investments and the accumulation of back-up savings for consumption-smoothing over the lifecycle. Consequently, a better understanding of the factors influencing the channeling of remittances by households towards the accumulation of human, financial and physical assets can inform on policies that may help harness the most out of remittance inflows.

### B.     Data

We use data from the more recent and harmonized 2000, 2002, 2004, 2005, 2006 and 2008 waves of the Mexican *Encuesta Nacional de Ingresos y Gastos de los Hogares* (ENIGH), a nationally representative survey carried out by the Mexican Statistical Institute (Instituto Nacional de Estadística, Geografía e Informática – INEGI at http://www.inegi.gob.mx) with the

purpose of providing information on the size, structure, and distribution of Mexican households' income and expenditures. The survey was first administered in 1983-1984 and periodically thereafter. The ENIGH is designed to be representative at the (a) national, (b) urban (localities with 2,500 inhabitants or more), and (c) rural (localities with less than 2,500 inhabitants) levels via appropriate household level weighting. Its population coverage includes national and foreign households living in private dwellings in Mexico. The sampling frame is the one used by the INEGI for multiple purposes and is derived from demographic and geographic information obtained from the 1995 national census (*Conteo de Población y Vivienda*).

The ENIGH covers all household expenditures, including expenditures on education, health, durable assets, micro-enterprise investments, financial asset accumulation, real estate, food, transportation and personal care expenditures. Our approach is to group these expenditures into two categories, which we label as "ordinary consumption" and "asset accumulation." We define asset accumulation in a broad sense to include spending on human capital accumulation (education and health), on the accumulation of physical assets (durable assets plus businesses and micro-enterprises plus real estate assets), and financial capital accumulation (the sum of bank deposits, loans to others, stocks, bonds, and other financial market investment instruments). Our definition of "asset accumulation" is intended to get at saving. While this approach to measuring saving may appear unusual, in a country like Mexico, much of the population has limited avenues for accumulating financial assets owing to their unbanked status, mistrust of financial institutions and relative shallowness of the financial system. This is especially true among rural households, a population of primary interest in the analysis of remittances as they

receive most of Mexico's remittance inflows.  Therefore, the purchase of durable assets,[2] spending on human capital, and improvements in existing housing structures can account for much of the household's asset accumulation.[3]

In addition to detailed data on expenditures, the ENIGH contains information on general socio-demographic and economic characteristics of all household members.[4]  Of particular interest to us is the thorough information on all income received by the household in each of the past six months.  The detailed six-month income history is indeed unique to the ENIGH and allows us to learn about the impact of the volatility in remittance inflows over the past 6 months on the household's share of expenditures on asset accumulation in the prior quarter.[5]  By asking respondents about their receipt of remittances in each of the six months prior to the interview, we are able to construct a measure of the volatility of this time series of income inflows and use it as a proxy for remittance income uncertainty.

Our measure of remittance income variability is the coefficient of variation, which is computed as the standard deviation of inflows for the household over the six-month period divided by the average monthly inflow.[6]  There are several advantages to using the coefficient of variation.  First, it is unit-less or scale invariant.  This allows us to measure the variability of

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[2] Fernández-Villaverde and Krueger (2005) make a case for including durable asset accumulation when studying life-cycle saving in the U.S.  They suggest that, especially early in the life-cycle, households use durable assets to insure against income shocks.

[3] See Table A in the appendix for details on variable definitions.

[4] For instance, the survey collects information on respondents' age, gender, relationship to the household head, marital status, as well as educational attainment and employment.  Additionally, the survey gathers detailed information on the housing unit and living conditions of the household and income inflows.

[5] Other Mexican surveys containing nationally representative information on household income and expenditures, such as the Mexican Life Family Survey, do not allow us to: (1) Distinguish between national and international remittance transfers, and (2) Do not contain detailed month to month income information required to construct measures of remittance income uncertainty.  Similarly, the Mexican census only reports last month's receipts.

[6] This measure is thus derived from retrospective data in that the respondent is asked to recall remittance inflows in each of the past six months.  One might question the accuracy of retrospective data on remittance inflows due to the possibility of recall bias.  But, since our objective is to measure the spending patterns of households conditioned on their expectations of future remittance inflows, the respondent's recollection of the pattern will likely incorporate those expectations—the variable we are interested in using for our analysis.

receipts regardless of the overall level of receipts. Second, it is a straight-forward statistic to compute. One could, however, argue that it captures expected plus unexpected volatility in remittance receipts. Therefore, it does not entirely fit with the theory, which suggests that uncertainty or unexpected volatility is what really drives changes in saving behavior. Nonetheless, without additional information –such as respondents' own assessment of the uncertainty surrounding future remittance receipts or a much longer time series of receipts from which a more sophisticated model of uncertainty can be derived, it is not feasible to construct a variable that exclusively measures the uncertainty in remittance receipts. Therefore, we use the volatility of remittance receipts, derived from the respondent's recollection of the series, as a proxy for the (perceived) uncertainty of future remittance inflows.

Before proceeding any further, it is important to note some limitations of our data, such as the fact that we only have information on remittance receipts over the past six months. In some instances, households may be receiving remittances only once a year. If that happens to be during the six months for which we lack data of remittance receipts, we will be categorizing these households as non-recipients. This is a problem that exists for any dataset with information on remittances. For example, the 2000 Mexican census asked households about their remittance receipts over the past month. Consequently, any study that estimates the impact of remittances on Mexican households using the census will suffer from the same bias, as there will be a group of household who did not receive remittances in the previous month, but did in prior months. Despite the possibility of misclassifying some households as non-recipients when, in fact, they receive remittances, the bias due to this omission is likely to be small given what we know about the time pattern of remittances. In other surveys of remittances, very few remitters claim to

remit at frequencies lower than twice a year.[7]  Nevertheless, as we shall note in what follows, we

also use instrumental variable methods as a way to address this measurement error bias.


**C.     Some Descriptive Evidence**

Table 1 provides a brief description of households in our initial sample.  There are

approximately 123,000 households, of which over 20 percent are female-headed.  The average

household has 4 members, of whom 0.6 are children six years of age or younger (*i.e.* about 15

percent of household members) and 0.25 individuals are adults 65 years of age and older (*i.e.*

about 6 percent of household members).  Approximately half the members in an average

household have low educational attainment.  An additional 1.3 individuals (or 33 percent of

household members) have a middle school education.  On average, only 0.5 individuals or 13

percent of household members have a high school degree or a higher level of educational

attainment.  Finally, about 1.7 individuals or 43 percent of household members are working and,

geographically, a little more than a quarter of total households are located in rural areas.

What can we say about the spending patterns of households in our sample?  Table 2

reports on the percentage of households with expenditures in the different categories of interest.[8]

By far, after ordinary consumption expenditures, health expenditures are the most common

expenditures with 62 percent of households spending in this category during the past quarter.

Table 2 also reports on the last quarter's average expenditure in each of the categories of interest

conditional on spending in that category.  After ordinary consumption expenditures, the largest

household expenditure is on financial investments.  Conditional on spending on financial assets,

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[7] For instance, simple tabulations using the recent Spanish survey of immigrants (*Encuesta Nacional de Inmigrantes*) carried out by Spain's *Instituto Nacional de Estadistica* reveal that up to 74 percent of immigrants remit money home more than twice a year.

[8] Table A in the appendix includes a description of the various expenditure categories being examined as well as of the remaining variables of interest to this study.

the average expenditure in this category amounts to approximately 5,375 pesos during the past quarter.  To complement these figures, we also display the density plots of the shares of spending on asset accumulation, as opposed to spending on ordinary expenditures, in Figures 1 and 2.  All levels of expenditure are represented in the plots, with most households spending relatively large shares on ordinary expenditures and relatively small shares on asset accumulation.

What are the remittance receiving patterns of households in our sample?  Table 3 addresses this question.  About 6 percent of the approximately 123,000 households in our sample receive remittances.  Slightly more than half of these households (3.4 percent of all households in the sample) receive remittances each month.  The other remittance-receiving households receive international transfers on a more irregular basis.  How large are these remittance inflows? Conditional on residing in a remittance-receiving household (*i.e.* for 7,296 households), total household remittance receipts average 10,128 pesos over a six-month period (approximately 1,688 pesos or 160 U.S. dollars per month).[9]  These figures compare to 42,141 pesos of income (excluding remittances) over a six-month period (*i.e.* 7,024 pesos or 665 U.S. dollars per month). Therefore, remittances (on average) account for almost one fourth of household income in remittance-receiving households and, as such, have the potential to significantly impact their expenditure patterns.

Do remittance-receiving households display a different spending pattern than their non-remittance receiving counterparts?  And, if they do, does the uncertainty of remittance income affect how much they spend on human, physical and financial assets?  Table 4 and Table 5 provide some insight into these questions.  At a mere descriptive level, the share of spending on human, physical and financial assets of remittance-receiving households is almost 15 percent,

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[9] Peso figures are deflated using the Mexican CPI with 1999-2000 as the base year (International Financial Statistics database, International Monetary Fund). We used the average exchange rate (10.56 pesos per dollar) over the time period under consideration (2000-2008) to convert pesos into U.S. dollars.

that is 2.3 percentage points more than for non-remittance receiving households (see Table 4).[10] Such a finding is consistent with the notion that increases in remittances are spent differently than increases in ordinary income. As we distinguish by expenditure category, remittance-receiving households appear to spend a greater share on health, durable assets, financial and business assets. In each case, the difference in the share of spending is statistically significant at the 5 percent level or better.

The results for Table 4 indicate that remittance-receiving households appear to spend less on education when compared to their non-remittance receiving counterparts. This finding could support Kandel and Kao's (2001) finding that investments on children's education in Mexican households are lower for households with emigrant family members. Given that Mexican education is not valued in the U.S., there may exist less of an incentive to invest in education for households expecting to migrate to the U.S. Alternatively, the difference in educational expenditures may be a by-product of differences in household demographics of recipient and non-recipient households. Finally, the descriptive statistics also indicate that households receiving remittances spend a greater share on real estate—but the difference is not statistically significant.

To gain further insights into the impacts of remittance inflows on household spending patterns we now turn to examining remittance-receiving households exclusively. Table 5 reports expenditure shares on asset accumulation according to the uncertainty of remittance inflows. We separate households into two categories. The first category consists of remittance-receiving

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[10] How reasonable are these "saving rates"? While conventional personal saving rates estimated by the Bureau of Economic Analysis for U.S. consumers were recently estimated to be about zero percent (for an example, go to: http://www.bea.gov/newsreleases/national/gdp/gdpnewsrelease.htm), Formaini and McKenzie (1999) argue that it makes sense to augment traditional saving definitions with spending on education, durable assets, and undistributed corporate profits. If one does so, the U.S. personal saving rate rises from about 0 to 10 percent using data that they work with for 1999.

households enduring high uncertainty in their remittance inflows as reflected by a high level of variability in remittance income, which, in turn, is captured by the coefficient of variation of remittance income falling in the upper two quartiles of the distribution. The second category is composed of remittance-receiving households with less volatile remittance inflows as reflected by a coefficient of variation for remittance income that falls within the lower two quartiles of the distribution. The results indicate that higher uncertainty in the receipt of remittance inflows favors asset accumulation by approximately 2 additional percentage points. By asset category, more volatile remittance income results in a statistically higher share of asset accumulation in health, real estate and financial investments and a lower share with respect to spending on education. For durable assets and for business investments there appears to be no differences in spending by uncertainty levels. Yet, these figures do not take into account other household characteristics possibly correlated with their spending and remittance-receiving patterns, such as the level or magnitude of their remittance receipts. We address this limitation in the next sections in order to more fully understand how uncertainty in remittance receipts affects spending on assets.

**D.      Methods**

Our purpose is to examine the role that the uncertainty of remittance income has on the spending patterns of remittance-receiving households and, in particular, on their human, physical and financial asset accumulation patterns once we account for the dollar amount received. To this end, we start by first estimating the following benchmark model:

(1)          $Y_i^* = \alpha_0 + \alpha_1 R_i + \alpha_2 RV_i + X_i \beta + \varepsilon_i$, $\varepsilon_i \sim Normal\left(0, \sigma^2\right)$ and $Y_i = \max\left(0, Y_i^*\right)$,

for i=1, …, n remittance-receiving households.[11] Our dependent variable, $Y$, measures the share of spending on asset (human, physical and financial) accumulation over the past quarter. $R$ captures the magnitude or level of remittance inflows during the past six-months and $RV$ is our measure of remittance-income volatility over the same time period.[12] Finally, $X$ is a vector of exogenous explanatory household level characteristics, including the level and uncertainty of other sources of household income, information on household size and composition, and whether the household is located in an urban or rural area.

A few econometric issues arise in the estimation of equation (1). First, the outcome of interest has many zeros as a significant share of remittance-receiving households does not engage in any asset accumulation. Indeed, this is the case for approximately 13 percent of remittance-receiving households in our sample.[13] Hence, the estimation of equation (1) by OLS would yield biased and inconsistent estimates of the impact of remittance income uncertainty on the share of household level expenditures on asset accumulation. Second, remittance income and remittance income uncertainty may be correlated with the error term in equation (1). As such, both regressors may be endogenous and their coefficient estimates biased. There are two potential sources of endogeneity. Unobserved heterogeneity and omitted variable bias may exist if remittance income and its uncertainty are related to unobserved household characteristics which, in turn, influence how much the household chooses to spend on asset accumulation.[14]

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[11] Note that the question of whether remittance uncertainty affects household spending patterns is a relevant question among remittance receiving households for whom we can effectively measure uncertainty in the receipt of these monetary flows.

[12] Our measure of remittance income volatility is intended to proxy for predicted remittance income uncertainty. Therefore, we use the terms volatility and uncertainty interchangeably throughout the study.

[13] This percentage is slightly higher for all 123,000 households, in which case we observe that 16 percent engage in no asset accumulation over the time period studied.

[14] The ENIGH is a cross-sectional dataset; therefore, we are unable to account for household level heterogeneity. Unfortunately, this is a fairly common problem with income and expenditure surveys in most countries. Yet, as with the Census, we are still able to account for crucial characteristics and rely on a large enough and representative sample to infer important information. Furthermore, the lack of longitudinal information or, for that matter,

Additionally, there is the potential of reverse causality as household expenditure patterns may influence emigrants' decision to send remittances home as well as the pattern with which they make such transfers. Finally, remittance income and its uncertainty may be subject to the classical errors-in-variables (CEV) problem as a result of the six-month time period for which we have information on remittance receipts. The CEV problem is likely to cause an attenuation bias, thus underestimating the impact of remittance income and its uncertainty on the spending patterns of remittance-receiving households (Wooldridge 2003). Although we do not expect large measurement problems based on the remitting patterns reported in other surveys,[15] we acknowledge this possibility.

To address these challenges: (i) the zero inflated nature of our dependent variable, (ii) the endogeneity of remittance income and its uncertainty, and (iii) the CEV problem in measuring remittance income and its uncertainty, we use Amemiya Generalized Least Squares (AGLS) estimator for the Tobit with endogenous regressors described in Newey (1985, eq. 5.6) – henceforth IV-Tobit– to estimate equation (1).[16] We instrument remittance income and its uncertainty using information on the level of unemployment, on the level of wages, and on the volatility of the wage rate series in U.S. states that are the likely destinations of Mexican emigrants. A detailed explanation of the construction of these instruments is provided in the appendix. In essence, the construction involves using information from the Mexican Migration

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information on household migrants, creates the potential for an omitted variable bias on the coefficient of interest – an issue that can be addressed by appropriately instrumenting for remittance income uncertainty as we propose doing in the present study.

[15] According to other surveys of remittances, very few remitters claim to remit at frequencies lower than twice a year. As noted earlier, the more recent Spanish survey of immigrants reveals that up to 74 percent of immigrants send money home more often than twice a year. Additionally, according to a survey of immigrants in San Diego County (the *SDSU San Diego Area Study: Immigrants and Immigration Issues* from October 2005), only 1.8 percent of those who claim to send remittances to Mexico remit at frequencies of once a year or less. And, according to the August 2008 CPS migration supplement, 70 percent of U.S. immigrants who send monetary transfers home, remit at frequencies greater than twice a year (Grieco *et al*., 2010).

[16] As it is often done in the literature (Wooldridge 2003), the use of instrumental variable techniques can serve as a means to address CEV biases.

Project (MMP118) to identify the likely U.S. location of Mexican emigrants from each Mexican state. We pair that with information in the MORG extracts of the Current Population Survey (CPS) to construct a weighted average (specific to the emigrants of each Mexican state) of the average unemployment rate and of earnings of Mexican emigrant, as well as of the volatility of that earnings stream in the U.S. The instruments are found to be jointly significant in predicting remittance flows and remittance income uncertainty. Additionally, we confirm that they are exogenous according to the over-identification test proposed by Wooldridge (2003).

Nevertheless, we discuss some potential shortcomings we foresee in our choice of instruments. For example, one threat is that our instruments may be related to omitted household characteristics that affect household asset accumulation back in Mexico. For instance, wealthier households may have been historically more likely to place migrants in economically more attractive states in the U.S. To address this concern, we control for as many household characteristics as we possibly can, including information on household income excluding remittances.

A second possible threat to the validity of our instruments could come from the fact that Mexican migrants from different Mexican states may traditionally send migrants to specific U.S. states. In that case, the instruments could be simply capturing regional differences across Mexican communities, such as differences in per capita income levels and unemployment rates. To account for any state-level differences resulting in distinct migratory patterns, we include a set of Mexican state dummies. Additionally, we include a rural dummy to address differences in infrastructure possibly affecting remittance-receiving patterns, as well as year dummies to capture changes in macroeconomic conditions driving asset accumulation patterns, as is the case of a country-wide recession.

### E.    Findings

Our primary aim is to acertain the impact of remittance income uncertainty on the spending patterns of remittance-receiving households once we take into account the magnitude of their remittance inflows.  Does it matter if remittances are forthcoming on a regular basis?  Do households adjust their spending patterns to the certainty with which they receive inflows from abroad?  Table 6 sheds some light on these questions by displaying the results from a benchmark Tobit model of the fraction of total household expenditures on asset (human, physical or financial) purchases by remittance-receiving households.  A couple of facts regarding our model specification are worth noting before proceeding any further.  First, our dependent variable refers to last quarter's household expenditure on human, physical and financial assets (as a share of total household expenditures).  Specifically, the numerator incorporates household expenditures on education, health, durable assets, real estate, business investments and financial assets— meant to capture total asset accumulation or contributions toward saving.[17]  Second, in addition to accounting for the level of remittance income inflows, we control for the level of household income (excluding remittances) and its uncertainty as additional determinants of household spending patterns.

What are the key findings from Table 6?  First, remittances, just as other household income, raise asset accumulation.  A 1,000 peso increase (about USD 100) in remittance income over the past six months raises the likelihood of engaging in asset accumulation by seven-tenths of a percentage point and the share of household expenditures in this category by a third of one percent.[18]  To put these values into perspective, suppose that remittance inflows were to increase by USD 50 (or 500 pesos) per month.  In that case, the USD 300 (or 3,000 peso) increase in

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[17] Please refer to Table A in the appendix for additional details.

[18] Note that remittance income in the regression equation is measured in thousands of pesos (see Table A).

remittances over a six-month period would raise the likelihood of asset accumulation by 2 percentage points and the share of household expenditures in asset accumulation by approxiately 1 percent. These values are substantially larger than the ones found for similar increments in non-remittance income, for which a similar 3,000 peso increment would raise the likelihood of engaging in asset accumulation by three-tenths of a percentage point and the the saving rate by a negligible 0.18 percent.

Secondly, the certainty with which remittances are received also affects household spending shares on human, physical and financial assets. As hypothesized earlier, households with more variable remittance inflows –as captured by the coefficient of variation of household remittance income– have larger expenditure shares on human, physical and financial assets. A one standard deviation increase in the uncertainty of remittance income raises the likelihood of asset accumulation by approximately 5 percentage points (0.885*0.0521) and the share of household expenditures in this category by a little less than 2 percent (0.885*0.0237).[19] Furthermore, it seems that spending on human, physical and financial assets by Mexican households is less sensitive to fluctuations in the uncertainty of non-remittance income than to fluctuations in the uncertainty of remittance income. A one standard deviation increase in the uncertainty of other sources of household income raises the likelihood of asset accumulation by a approximately 2 percentage points and household expenditure shares by about 1 percent.[20] In sum, both remittance income and its uncertainty induce asset accumulation. In addition, both

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[19] The standard deviation of the coefficient of variation of remittance income uncertainty is 0.885. An example of what such an increase is remittance income uncertainty represents would be given by a household switching from receiving a steady monthly inflow of 2,233 pesos/month during a six-month period, to receiving the following inflow over the same time span: 5,000 pesos in the first month, 0 pesos in the second month, 0 pesos in the third month, 2,000 pesos in the fourth month, 3,200 pesos in the fifth month and 3,200 in the sixth month.
[20] The standard deviation of the coefficient of variation of household income excluding remittances is 0.583.

appear to play a more important role in inducing household asset accumulation than the level and uncertainty of ordinary income.

Other findings from Table 6 include the fact that asset accumulation by remittance-receiving households is lower when there are more educated household members. Why would this be the case? Perhaps better educated remittance-receiving households benefit from having better job placements and rely less on savings. Indeed, we find that households with a larger number of employed household members are less likely to save. This finding is not surprising given the lack of information on household wealth in the survey. It is well-accepted that the employment incidence is lower among individuals in wealthier households (owing to the existence of a higher reservation wage) which, in turn, engage in more asset accumulation. As a result, asset accumulation is inversely related to the number of employed household members. Finally, we also find that asset accumulation appears higher among rural households. Owing to a range of rural characteristics ranging from poor banking infrastructure to the predominance of informal work arrangements, rural households face greater liquidity constraints than their urban counterparts. As such, they may have to rely more on various forms of asset accumulation.

The estimates in Table 6 assume that the level and uncertainty of remittance income inflows are exogenous. However, as discussed earlier on, one can easily argue otherwise. Hence, in Table 7, we address the potential endogeneity of the level and uncertainty of remittance income inflows by estimating a Tobit model using instrumental variable methods. As noted earlier, we instrument the level and uncertainty of remittance income inflows using three instruments that gather information on the economic conditions in the U.S. states from where

remittances are likely to originate.   These are the level and uncertainty in wages and unemployment rates in those specific U.S. states.[21]

We inspect our instrumental variables to ascertain their validity from an econometric standpoint.  We first confirm that they are jointly significant in explaining remittance income and its uncertainty –the endogenous regressors being instrumented.  The estimation results displayed in Table B in the appendix suggest they are.  Higher U.S. unemployment rates lower the level of remittance inflows sent home, whereas higher U.S. weekly earnings increase the level of remittance flows sent home.  In both instances, remittances may be responding to changes in migrants' discretionary incomes.  The higher their incomes are, due to lower unemployment rates or higher weekly earnings in the U.S., the larger their remittance flows will be.  We also find that remittance income uncertainty is directly related to unemployment rates in the U.S. and inversely linked to the volatility in U.S. weekly earnings.  Higher unemployment rates in the U.S. may be linked to losses in discretionary income for some immigrants, and possibly, more infrequent remitting, thus increasing remittance income volatility at home.  In contrast, higher volatility in U.S. weekly earnings may induce Mexican migrants to send money home in a more regular and predictable manner, possibly as a self-insurance mechanism, thus reducing remittance income uncertainty.  While some of the instruments are not statistically different from zero in the remittance income and remittance income uncertainty regressions, we keep them in the instrumenting procedure because they still add to the identification at higher levels of statistical significance.  Furthermore, they are jointly significant in predicting remittance income and its uncertainty at the 1 percent significance level; including all three instruments allows us to perform over-identification tests; and, most importantly, our results are robust to the use of various combinations of these instruments in the first-stage regressions.  Results from the Wald

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[21] Please refer to the appendix for specific details on the construction of the three instruments.

test (see: Wooldridge 2003, p. 505) are displayed at the bottom of Table 7 and suggest that our instruments are exogenous.

Once we address the endogeneity of our key regressors, do the *level* and the *uncertainty* of remittance income continue to significantly shape household asset accumulation patterns? According to the figures in Table 7, the answer is yes. A 1,000 peso increase in remittance income raises the likelihood of asset accumulation by approximately 8 percentage points and the share of expenditures on this category by approximately 4 percent. Therefore, if the household experiences a USD 50 (500 peso) increase in remittances per month over the past six-months, its likelihood of engaging in asset accumulation would increase by about 24 percentage points and its share of expenditures on asset accumulation would go up by 12 percent. This suggests that the Tobit estimate of the impact of remittance income on household asset accumulation in Table 6 is biased downwards. This is plausible if, for example, wealthier families receive fewer remittance inflows, yet engage in more asset accumulation than poorer households.[22]

We also find that the uncertainty of remittance income continues to impact household asset accumulation. Specifically, a one standard deviation increase in the uncertainty of remittance income[23] appears to raise the likelihood of household spending on asset accumulation by approximately 3.3 percentage points (0.034*0.981) and the share of household expenditures in this category by approximately 1.5 percent (0.034*0.449). These estimates are slightly smaller than the non-instrumented estimates,[24] suggesting that the Tobit estimates of the impact of remittance income uncertainty on household asset accumulation in Table 6 are upward-biased.

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[22] As noted earlier, the ENIGH does not contain information on household wealth to account for this possibility.
[23] The standard deviation of the coefficient of variation of the instrumented remittance income uncertainty is 0.034.
[24] The non-instrumented estimates are equal to 5 percentage points and 2 percent, correspondingly.

This could occur if, for example, household wealth is positively correlated to both remittance income uncertainty[25] and household asset accumulation.

It is also worth noting that both the level and uncertainty in ordinary income continue to impact asset accumulation. Specifically, a 1,000 peso increase (about USD 100) in ordinary income over the past six months raises the probability that recipients engage in asset accumulation by 0.1 percentage points and increases asset accumulation by 0.06 percent. Hence, using the same figures from earlier, if the household experiences a USD 50 (500 peso) increase in remittances per month over the past six-months, its likelihood of engaging in asset accumulation would increase by about 0.3 percentage points and its share of expenditures on asset accumulation would go up by 0.06 percent. Additionally, a one standard deviation increase in ordinary income uncertainty[26] increases the likelihood of asset accumulation by 2.7 percentage points and its share in overall household expenditures by 1.3 percent. As such, the effect of increases in the level of ordinary income on asset accumulation is significantly smaller than the effect of similar increases in the level of remittance income, whereas the impact of income uncertainty appears to be rather similar for remittances and ordinary income.

In sum, regardless of whether or not we instrument for it, both the *level* and *uncertainty* in remittance income appear to shape the asset accumulation patterns of remittance-receiving households.

Finally, the figures in Table 7 also indicate that households with a larger number of elderly members are less likely to engage in asset accumulation. This is in keeping with traditional life-cycle saving models. Elderly members are more likely to consume their

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[25] Perhaps wealthier households, to the extent that they do not rely on remittance income inflows to pay for day-to-day expenses, have less predictable remittance inflows than poorer households who rely on such money flows to cover their daily needs.

[26] The standard deviation of ordinary income uncertainty is 0.6.

accumulated wealth as opposed to accumulate more wealth. We also continue to find that households with a larger number of employed members engage in less asset accumulation. As noted earlier, we know that wealthier households are more likely to have fewer working members owing to their higher reservation wages. If wealthier households are also more likely to engage in greater asset accumulation, the number of working members and asset accumulation should be inversely related. To conclude, asset accumulation remains greater among rural households, which owing to liquidity constraints resulting from informal work arrangements and lack of a good financial infrastructure may have to rely to a greater extent on various forms of saving.

## F.    Summary and Conclusions

Because of the large magnitude of remittance inflows in many developing economies, governments and international organizations have been particularly interested in findings ways in which they can maintain or increase the size of these monetary transfers. Additionally, policymakers and researchers have expressed interest in learning about conditions under which remittance-receiving households will use these inflows for "productive" purposes with the intent of developing policies that may help stimulate asset accumulation.

As predicted by the permanent income hypothesis and precautionary saving theories, we find that the uncertainty surrounding remittance income inflows is a key determinant of asset accumulation in remittance-receiving households. Specifically, a one standard deviation increase in the uncertainty of remittance income raises the likelihood of household spending on asset accumulation by approximately 3 percentage points, or from an average of 15 percent to approximately 18 percent of remittance-receiving households. Additionally, such an increase in

remittance income uncertainty raises the share of household expenditures on human, physical and financial assets by about 1.5 percent.

We believe that our findings are important because they provide us with a better understanding of household spending patterns crucial for policy-making in developing migrant-sending economies that rely heavily on remittance inflows. Take, for instance, policies regarding remittances from the U.S. to poor countries. Thus far, these policies have been primarily focused on: i) lowering transactions fees, and ii) integrating immigrant populations into the formal financial (banking) sector with the expectation that cheaper and more secure money transfer mechanisms will increase remittance flows. Yet, to date, we know little about the optimal design of these policies. Would we do best encouraging and facilitating large lump-sum transfers? How about smaller, evenly spaced, periodic transfers[27]? Will remittance-receiving households respond in one way to transfers that are predictable and in another way to transfers that are less predictable? And, if so, does this help us understand the expenditure patterns of remittance inflows in various emigrant-sending economies? Our intent has been to learn about the conditions under which remittances are more likely to promote asset accumulation. We believe that our findings suggest that the predictability of remittance income should be given full consideration in order to better comprehend how households spend remittances and, accordingly, in the design of policies that leverage the most out of remittance inflows into developing economies.

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[27] For example, preliminary reports from a field experiment by Aycinena *et al.* (2009) suggest that lowering remittance fees induce Salvadorian emigrants to send a larger annual amount, but also to send remittances more frequently, for example, every month instead of quarterly. This might translate into a more predictable flow for the recipients even though the authors do not specifically test whether that is the case.

**Figure 1**
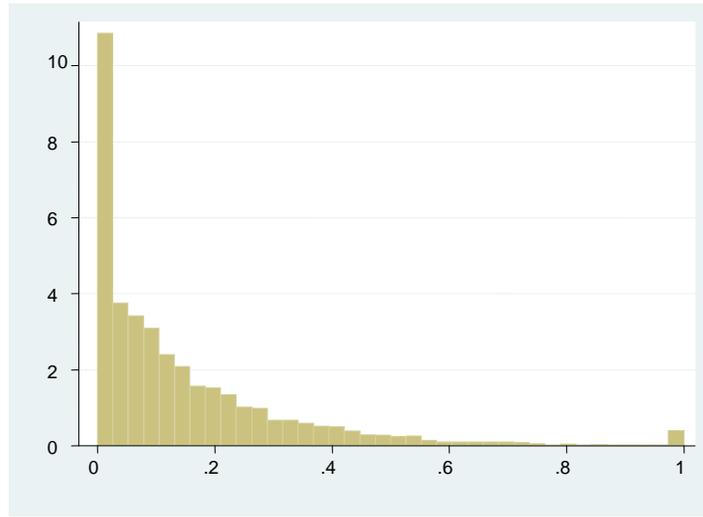**Density of the Share of Spending on Asset Accumulation**



**Figure 2**
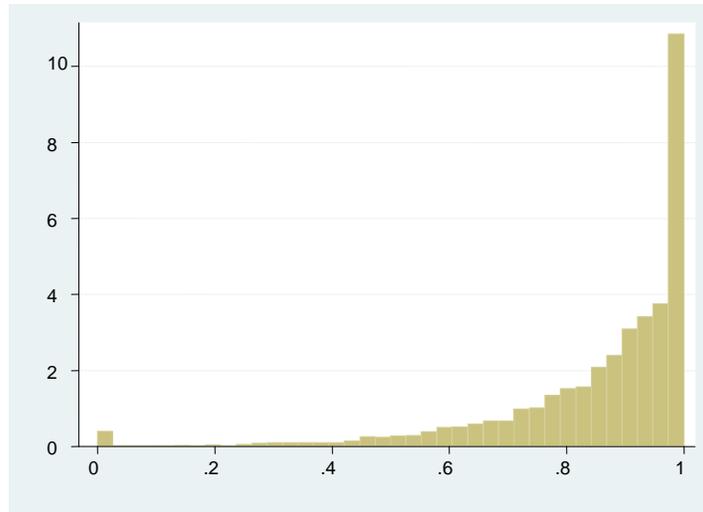**Density of the Share of Spending on Ordinary Expenditures**

**Table 1**
**Household Level Descriptive Statistics**

| Variables | Observations | Mean | S.D. | Min | Max |
|---|---|---|---|---|---|
| Female headed household | 123,142 | 0.229 | 0.420 | 0 | 1 |
| Household Size | 123,142 | 4.070 | 2.035 | 1 | 43 |
| Number of Young Children in HH | 123,142 | 0.571 | 0.845 | 0 | 10 |
| Number of Elderly Members in HH | 123,142 | 0.251 | 0.556 | 0 | 5 |
| Number of HH Members with Primary Education or Less | 123,142 | 2.088 | 1.782 | 0 | 20 |
| Number of HH Members with Middle School | 123,142 | 1.258 | 1.244 | 0 | 24 |
| Number of HH Members with High School or More | 123,142 | 0.477 | 0.858 | 0 | 9 |
| Number of HH Members Employed | 123,142 | 1.705 | 1.134 | 0 | 15 |
| Lives in a Rural Area | 123,142 | 0.260 | 0.439 | 0 | 1 |

**Table 2**
**Average Household Expenditures over the Past Quarter**

| Variables | Percent of HH Reporting this Expenditure | Average Peso Expenditure if Reported |
|---|---|---|
| Educational Investments | 43 | 2,513 |
| Health Investments | 62 | 853 |
| Real Estate Investments (*e.g.* housing, land, etc.) | 16 | 3,703 |
| Business Investments (*e.g.* micro-enterprises) | 3 | 3,591 |
| Financial Investments (*e.g.* bank deposits, stock, etc.) | 29 | 5,375 |
| Purchase of Durable Assets | 25 | 649 |
| Ordinary Expenditures (*e.g.* food, clothing, transportation, etc.) | 100 | 19,922 |
| Total Average Spending | 100 | 23,491 |

**Table 3**
**Remittance and Other Income Descriptive Statistics over the Past Six Months**

| Variables | Observations | Mean | S.D. |
|---|---|---|---|
| Remittance Receiving Household | 123,142 | 0.059 | 0.236 |
| Households Receiving Remittance Each Month | 123,142 | 0.034 | 0.180 |
| Households Receiving Remittances 1 to 5 Times in Six Months | 123,142 | 0.026 | 0.158 |
| Household Remittance Income (pesos) (six-months) | 7,296 | 10,128 | 9,703 |
| Household Income Excluding Remittances (pesos) (six-months) | 123,142 | 42,141 | 71,871 |

**Table 4**
**Share of Household Expenditures over the Past Quarter According to Remittance Receipt**

| Type of Expenditure | N | Share of HH Expenditures | Difference | t-statistic |
|---|---|---|---|---|
| *Overall Asset Accumulation* | | | | |
| Receiving Remittances | 7,296 | 0.147 | | |
| Not Receiving Remittances | 115,846 | 0.124 | 0.023*** | 10.58 |
| *Educational Investments* | | | | |
| Receiving Remittances | 7,296 | 0.031 | | |
| Not Receiving Remittances | 115,846 | 0.039 | -0.008** | -9.56 |
| *Health Investments* | | | | |
| Receiving Remittances | 7,296 | 0.038 | | |
| Not Receiving Remittances | 115,846 | 0.025 | 0.013*** | 10.54 |
| *Purchase of Durable Assets* | | | | |
| Receiving Remittances | 7,296 | 0.008 | | |
| Not Receiving Remittances | 115,846 | 0.007 | 0.001*** | 2.54 |
| *Real Estate Investments* | | | | |
| Receiving Remittances | 7,296 | 0.020 | | |
| Not Receiving Remittances | 115,846 | 0.019 | 0.001 | 0.56 |
| *Financial Investments* | | | | |
| Receiving Remittances | 7,296 | 0.062 | | |
| Not Receiving Remittances | 115,846 | 0.050 | 0.012** | 2.15 |
| *Business Investments* | | | | |
| Receiving Remittances | 7,296 | 0.006 | | |
| Not Receiving Remittances | 115,846 | 0.003 | 0.003*** | 3.04 |
| *Ordinary Expenditures* | | | | |
| Receiving Remittances | 7,296 | 0.853 | | |
| Not Receiving Remittances | 115,846 | 0.876 | -0.023*** | -10.58 |

**Notes**: ***Significant at the 1% level or better, **significant at the 5% level or better.

**Table 5**
**Share of Household Expenditures over the Past Quarter According to Remittance Income Uncertainty**

| Type of Expenditure | N | Share of HH Expenditures | Difference | t-statistic |
|---|---|---|---|---|
| *Overall Asset Accumulation* | | | | |
| High Uncertainty | 3,646 | 0.158 | | |
| Low Uncertainty | 3,650 | 0.137 | 0.021*** | 4.87 |
| *Educational Investments* | | | | |
| High Uncertainty | 3,646 | 0.030 | | |
| Low Uncertainty | 3,650 | 0.032 | -0.002* | -1.54 |
| *Health Investments* | | | | |
| High Uncertainty | 3,646 | 0.042 | | |
| Low Uncertainty | 3,650 | 0.034 | 0.008*** | 3.39 |
| *Purchase of Durable Assets* | | | | |
| High Uncertainty | 3,646 | 0.008 | | |
| Low Uncertainty | 3,650 | 0.007 | 0.001 | 1.05 |
| *Real Estate Investments* | | | | |
| High Uncertainty | 3,646 | 0.025 | | |
| Low Uncertainty | 3,650 | 0.016 | 0.009*** | 2.43 |
| *Financial Investments* | | | | |
| High Uncertainty | 3,646 | 0.072 | | |
| Low Uncertainty | 3,650 | 0.052 | 0.019*** | 2.26 |
| *Business Investments* | | | | |
| High Uncertainty | 3,646 | 0.006 | | |
| Low Uncertainty | 3,650 | 0.005 | 0.001 | 0.84 |
| *Ordinary Expenditures* | | | | |
| High Uncertainty | 3,646 | 0.842 | | |
| Low Uncertainty | 3,650 | 0.863 | -0.021*** | -4.87 |

**Notes**: *Significant at the 10% level or better, **significant at the 5% level or better, ***significant at the 1% level or better.

**Table 6**
**Tobit Model of the Share of Remittance-Receiving Households' Expenditures on**
**Human, Physical and Financial Assets**

| Independent Variables | Coefficient | S.E. | M.E. on Prob (Y>0) | M.E. on E(Y\|Y>0) |
|---|---|---|---|---|
| **Remittance Income (in 1,000 pesos)** | **0.0044*** | **0.0003** | **0.0072** | **0.0033** |
| **Uncertainty of Remittance Income** | **0.0317*** | **0.0031** | **0.0521** | **0.0237** |
| HH Income Excluding Remittances (in 1,000 pesos) | 0.0007*** | 0.0001 | 0.0012 | 0.0005 |
| Uncertainty of HH Income Excluding Remittances | 0.0233*** | 0.0042 | 0.0384 | 0.0175 |
| Female Headed HH | -0.0038 | 0.0051 | -0.0062 | -0.0028 |
| Number of Young Children in the HH | 0.0035 | 0.0034 | 0.0058 | 0.0026 |
| Number of Elderly HH Members | -0.0060 | 0.0037 | -0.0098 | -0.0045 |
| Number of HH Members with High School or Above | -0.0087** | 0.0045 | -0.0143 | -0.0065 |
| Number of HH Members with Middle School | 0.0001 | 0.0025 | 0.0002 | 0.0001 |
| Number of HH Members Employed | -0.0046* | 0.0025 | -0.0076 | -0.0034 |
| Household Size | -0.0013 | 0.0018 | -0.0022 | -0.0010 |
| Rural Household | 0.0175*** | 0.0051 | 0.0288 | 0.0131 |

| | |
|---|---|
| Number of Observations: | 7,296 |
| Uncensored Observations | 6,259 |
| Log Likelihood | 443.7307 |

**Notes:** ***Significant at the 1 percent level or better, **significant at 5 percent level or better and *significant at the 10 percent level or better. The regression also includes a constant term, as well as year and Mexican state dummies.

**Table 7**
**IV Tobit of the Share of Remittance-Receiving Households' Expenditures**
**on Human, Physical and Financial Assets**

| Independent Variables | Coefficient | S.E. | M.E. on Prob (Y>0) | M.E. on E(Y\|Y>0) |
|---|---|---|---|---|
| **Remittance Income (in 1,000 pesos)** | **0.0514\*\*** | **0.0220** | **0.0838** | **0.0383** |
| **Uncertainty of Remittance Income** | **0.6020\*\*\*** | **0.1806** | **0.9807** | **0.4485** |
| HH Income Excluding Remittances (in 1,000 pesos) | 0.0008\*\*\* | 0.0001 | 0.0014 | 0.0006 |
| Uncertainty of HH Income Excluding Remittances | 0.0290\*\*\* | 0.0047 | 0.0473 | 0.0216 |
| Female Headed HH | -0.0018 | 0.0057 | -0.0029 | -0.0013 |
| Number of Young Children in the HH | 0.0053 | 0.0041 | 0.0087 | 0.0040 |
| Number of Elderly HH Members | -0.0086\*\* | 0.0043 | -0.0141 | -0.0064 |
| Number of HH Members with High School or Above | -0.0045 | 0.0051 | -0.0074 | -0.0034 |
| Number of HH Members with Middle School | 0.0028 | 0.0022 | 0.0046 | 0.0021 |
| Number of HH Members Employed | -0.0089\*\*\* | 0.0025 | -0.0146 | -0.0067 |
| Household Size | -0.0011 | 0.0023 | -0.0018 | -0.0008 |
| Rural Household | 0.0173\*\*\* | 0.0072 | 0.0282 | 0.0129 |

*Regression Fit Statistics:*

| | |
|---|---|
| Number of Observations: | 7,296 |
| Uncensored Observations | 6,259 |
| Log Likelihood | 326.9580 |
| IV Exogeneity Test[a] | $0 < \chi^2_{2,5\%} = 5.99$ |

**Notes:** \*\*\*Significant at the 1 percent level or better, \*\*significant at 5 percent level or better and \*significant at the 10 percent level or better. The regression also includes a constant term, as well as year and Mexican state dummies. [a] The exogeneity test is carried out multiplying the number of observations (N=7,296) and the R-squared obtained from regressing the residuals from an intial instrumental variable regression of the share of household expenditures on asset accumulation on all the system's exogenous variables and the instrumental variables (R-squared=0.000). As in Wooldridge, the test is carried out using a linear specification (see Wooldridge 2003, p. 508).

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**Table A**
**Variable Names and Definition**

| Variable Name | Definition |
| --- | --- |
| Educational Investments | Expenditures on primary, secondary and higher education, educational services (tutoring, boarding, transportation to school, etc.), and educational goods (books, school items, repair of school items,…). |
| Health Investments | All health related expenditures, including medicines with and without a prescription, glasses, etc., but excluding health insurance. |
| Real Estate Investments (*i.e.* housing, land, etc.) | Real estate purchases, mortgage payments, and maintenance and repair of property. |
| Business Investments (*i.e.* micro-enterprises) | Business investments and business related purchases, *e.g.* machinery, etc. |
| Financial Investments (*e.g.* bank deposits, stock, etc.) | Deposits in bank accounts; loans to third parties; purchase of foreign currency, jewelry, and art,…; purchase of stock, bonds and financial assets; purchase of brand names, patents, and author rights. |
| Purchase of Durable Assets | Purchase of home related durable assets, such as a washing machine. |
| Share of expenditures on Human, Physical and Financial Assets | Sum of expenditures listed above divided by total household expenditures over the past quarter. |
| *Independent Variables:* | |
| Uncertainty in Remittance Income | Coefficient of variation of remittance income over the past six months |
| Remittance Income (in 1,000 pesos) | Gifts and donations from abroad during the past six months |
| HH Income Excluding Remittances (in 1,000 pesos) | All household income excluding gifts and donations from abroad (*e.g.* income from work, own businesses, coops, rents from real estate and financial assets, income transfers, and other sources of income, such as revenues from selling a car or household goods) during the past six months |
| Uncertainty in HH Income Excluding Remittances | Coefficient of variation of household income excluding remittances over the past six months |
| Female Headed HH | Household head is female |
| Number of Young Children in the HH | Number of household members 6 years old and younger |
| Number of Elderly HH Members | Number of household members 65 years of age and older |
| Number of HH Members with High School or Above | Number of household members with university and higher education (*i.e.* superior and posgrado) |
| Number of HH Members with Middle School | Number of household members with secondary education or vocational training (*i.e.* secundaria, preparatoria, vocacional and normal) |
| Number of HH Members Employed | Number of household members employed |
| Household Size | Household size |
| Rural Household | Household resides in an area with fewer than 2,500 inhabitants |
| U.S. Unemployment Rate | Weighted average of unemployment rates in U.S. states that are destinations for Mexican emigrants (by Mexican state) |
| U.S. Earnings (in 100 dollars) | Weighted average of weekly earnings in U.S. states that are destinations for Mexican emigrants (by Mexican state) |
| U.S. Earnings Volatility | Standard deviation of the above |

## Instruments

To construct the instruments used in our analysis, we used the Mexican Migration Project (MMP118) database to obtain information on emigration patterns for each Mexican state. The MMP118 reveals the U.S. state of residency of return migrants. Using that information, we derive weights for the likely U.S. destinations of current Mexican emigrants from each Mexican state. These are used to construct weighted averages of U.S. unemployment and wages for emigrants from each of the Mexican states in the ENIGH during each survey period. For example, about 31 percent of return migrants in the Mexican state of Durango resided in California, 28 percent resided in Texas, 26 percent in Illinois and 15 percent elsewhere in the United States. Using this information about past emigration patterns, we compute average U.S. earnings for emigrants from Durango in 2000 as follows: $(0.31*\overline{w}_{CA}+0.28*\overline{w}_{TX}+0.26*\overline{w}_{IL}+0.15*\overline{w}_{US})$, where, for instance, $\overline{w}_{CA}$ denotes average earnings in California from the 2000 CPS Merged Outgoing Rotation Groups (commonly known as the MORG extracts). Weighted U.S. unemployment rate averages are also computed in an analogous manner.

To obtain a measure of uncertainty in U.S. earnings in the year 2000, we compute the standard deviation of percentage changes in month-to-month earnings in each U.S. state during 2000. The information on migration networks derived from the MMP118 is then applied to compute a weighted average of the standard deviation of percentage changes in month-to-month U.S. earnings during the year 2000. For example, using the pattern of emigration from the Mexican state of Durango to the U.S. we compute the following weighted average of U.S. earnings uncertainty for emigrants from Durango: $(0.31*S_{CA}+0.28*S_{TX}+0.26*S_{IL}+0.15*S_{US})$ where, for instance, $S_{CA}$ represents the variability of earnings (measured as the standard deviation of percentage changes in month to month earnings) in California during 2000 according to the earnings series from MORG extracts of the CPS. The weighted average of the volatility series proxies the uncertainty of earnings of emigrants from the state of Durango in 2000.

These instruments help predict remittance income and its uncertainty. Yet, we have no a priori reason to believe that these instruments may be correlated to household expenditure patterns in Mexico other than through remittances themselves. Our identifying assumption is that current U.S. labor market conditions do not affect the expenditure patterns of Mexican residents other than through remittances. After all, wages and unemployment rates in Mexican emigrant U.S. destination states are derived from information on state-level migration networks from a different survey and, as such, do not reflect individual household level migration choices.[28] The same can be argued with regards to the uncertainty measure. These weighted U.S. unemployment, weighted earnings and earnings volatility series are used as instruments for the remittance flows received by households in various Mexican states and survey years.

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[28] The ENIGH does not contain information on current emigration. In any event, we would be unable to use such information as it would not be exogenous to household asset accumulation patterns.

**Table B**
**First Stage Regressions Predicting Remittance Income and Remittance Income Uncertainty**

| Model | OLS | | Tobit | |
|---|---|---|---|---|
| | **Remittance Income** | | **Remittance Income Uncertainty** | |
| **Independent Variables** | **Coefficient** | **S.E.** | **Coefficient** | **S.E.** |
| Unemployment Rate | -93.6123*** | 14.6378 | 3.973** | 1.9909 |
| U.S. Earnings | 0.0134*** | 0.0021 | -0.0001 | 0.0003 |
| U.S. Earnings Volatility | 8.3993 | 11.0099 | -6.5968*** | 1.5156 |
| Number of Observations | 7,296 | | 7,296 | |
| Uncensored Observations | 7,296 | | 4,718 | |
| *Joint F-statistic of the IVs:* | | | | |
| F-statistic | 21.21 | | 8.01 | |
| Prob > F | 0.0000 | | 0.0000 | |

**Notes:** ***Significant at the 1 percent level or better, **significant at 5 percent level or better and *significant at the 10 percent level or better. The regressions also include a constant and all other regressors in Table 7.