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Estimating the Determinants of Remittances Originating from U.S. Households using CPS Data

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ABSTRACT

Estimating the Determinants of Remittances Originating from U.S. Households using CPS Data*

The U.S. is the largest source country of remittances with an outflow of more than $70 billion estimated for 2016 (according to data from the World Bank). This paper is the first to use Current Population Survey (CPS) data to estimate the determinants of remittances originating from the United States for a diverse set of approximately 3,800 households with at least one foreign-born worker. We employ a gravity model examining the role of various push, pull, and distance factors. Most notably, higher household earnings push monetary transfers abroad: We estimate an average earnings elasticity in the range of 0.20-0.30. Remittances are more responsive to earnings in households with more adult women relative to men.

JEL Classification: F24, J61

Keywords: immigration, remittances

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1 Introduction

Since 1970, there have been dramatic increases in remittance outflows originating in the U.S. as data collection processes improved and the costs of transmitting funds abroad decreased. While there is a vast literature analyzing remittance determinants and motivations, most studies focus on immigrants in the U.S. from a specific country or region (e.g., Mexico or Latin America), or on a specific set of immigrants (e.g., new immigrants).[1] Prior to 2008, there was no federally-sponsored, nationally representative survey in the United States that captured detailed migration and remittance behavior for native and foreign-born households. This paper adds to the literature by being the first (to our knowledge) to use Current Population Survey (CPS) data to estimate the determinants of remittances originating from the United States for a diverse set of households.

In 2008, the CPS administrated a one-time Migration Supplement asking detailed remittance questions such as "In the last 12 months, did anyone in this household give or send money to relatives or friends living outside the U.S.?" This survey also contains details about migration experience and can be linked to other CPS samples so as to incorporate additional characteristics. Our sample includes approximately 3,800 households in the U.S. that had at least one foreign-born, employed, wage-earning, adult not enrolled in school. We use these data in a gravity model of remittances[2] to examine push, pull, and distance factors – including household composition, details of the migration experience, countries of origin, local residence, and macroeconomic factors – that might be associated with monetary transfers originating from the U.S. We pay special attention to estimating the household earnings elasticity of remittances.

This exercise is important for several reasons. Given the magnitude of annual remittance outflows, remittances could significantly impact recipients abroad, particularly in developing countries. Better understanding of remittance motivations and amounts among U.S. house-

[1] See, for example, Durand et al. (1996), Glytsos (2001), Amuedo-Dorantes, Bansak, and Pozo (2005), Yang (2008), and Fairchild and Simpson (2008).

[2] See McCracken et al. (2017) for a similar approach.

holds could also improve economists' understanding of the local impacts of migration in the host country. Our use of a dataset covering remittances from a single large country to a wide array of destination countries can help provide more systematic evidence for factors influencing remittance decisions. Finally, policy-makers wishing to facilitate or reduce international remittances might have an interest in better understanding the underlying factors driving those flows.

Our main results are three-fold. First, we estimate an average household earnings elasticity of remittances ranging from about 0.20-0.30. This value is at the lower to middle range of the considerably varied estimates produced by previous literature. Second, the earnings elasticity varies across households: Remittances are much more responsive to earnings as the difference between the number of adult women and men in the household grows. Third, we identify various push, pull, and distance factors that affect the remittance decision. Positive and negative push factors include educational attainment, the presence of a married household member, and the number of women, children, and labor force participants in the U.S. household. Low levels of per capita GDP in the origin county pull remittances away from the U.S. Physical distance plays a role in a household's dichotomous decision of whether or not to remit. The presence of likely-unauthorized immigrants in the household – a signal of cultural distance – increases remittance flows.

2 Related Literature

2.1 Theoretical Literature

There are several reasons behind the decision to send remittances abroad, including altruism, self-interest, consumption smoothing, target saving, insurance, and loan repayment. Models of remittance behavior involve a utility-maximizing migrant or household that chooses to send remittances when the net benefits outweigh the costs or when doing so increases expected utility. Therefore, the underlying reason for migrating is to increase one's earnings

abroad and to relax the budget constraint for the family members back home.

One of the most widely cited reasons for sending funds is for altruistic reasons with the goal of remaining linked to one's family in the origin country (Stark, 1991). Altruism in this context is often measured by estimating how remittances respond to the increases in income that occur due to migration. McCracken et al. (2017) develop a simple two-period model of remittance behavior and decompose remittances into altruistic and self-interest components. Their theoretical model suggests that a higher level of income in the destination country allows for a higher level of remittances. However, a lower level of income in the origin country has ambiguous effects on remittances and depend on whether the altruistic or self-interest motive dominates. Lower income levels in the origin country will increase the need for remittances if individuals are sufficiently altruistic but will decrease remittances if they are self-interested.

Another popular explanation for remittances is that people will migrate to smooth household consumption and diversify income sources (Rosenzweig and Stark, 1989). As with the altruism model, consumption smoothing models suggest that more funds will be transferred when the economy worsens in the source country. This complements work by Mandelman and Zlate (2012) who find that remittance flows are responsive to business cycles in the source and destination countries. Beti et al. (2008) and Amuedo-Dorantes and Pozo (2011) consider if remittances are used as a mechanism to cope with adverse economic shocks across countries.

Some households send migrants abroad to accumulate funds to help pay for a specific investment or large purchase in the source country. Investments can take many forms, from educational or health expenditures to purchasing a new home or land. The migrant usually plans to live and work in the host country temporarily and will return home once the funds have been accumulated. But the outcomes of migration are uncertain in terms of finding a job, earnings, and the possibility of being deported (for undocumented immigrants). Therefore, remittances may serve as a type of insurance in case the migration experience

did not turn out as expected. In addition, migrants may build precautionary savings via remittances. Amuedo-Dorantes and Pozo (2005, 2006) provide models of insurance and precautionary saving in this context. Remittances will be larger for those facing greater uncertainty in the host country and for recent migrants. Those who have developed deep roots in the receiving country and have not suffered a negative shock upon arrival may be less inclined to send remittances over time. We consider the insurance motive in our analysis by including the number of household members by U.S. entry cohort in our models.

Remittances may also be used to repay loans, particularly those to cover the costs associated with the migration and housing/job search. In the case of illegal border crossings, such costs could include substantial payments to a smuggler or to obtain fake documentation. Models analyzing migration typically include geographic distance and the legal status of the immigrant to proxy for migration costs.

Remittance decisions are complicated by demographic, geographic, cultural, religious, and economic conditions that vary between the host and source country. Given the complexity of remittance motivations and the diversity of the countries relying upon remittances, the various motives for remitting are not mutually exclusive. A particular migrant will often have a combination of reasons to remit, and motives vary across migrants and over time. Our analysis below will address many of these factors.

2.2 Empirical Literature

A relatively large number of papers empirically estimate remittance determinants, most of which focus on a single migrant group to a single destination country. An obvious point of interest lies in the income (or earnings) elasticity of remittances, but estimates for this value vary tremendously.

Studies using U.S. data often analyze remittances to Latin American countries. For example, Durand et al. (1996), Sana (2005) and Fairchild and Simpson (2008) use data from the Mexican Migration Project (MMP) in which most respondents are surveyed in Mexico

well-after the migration experience. All three studies find a positive relationship between U.S. monthly earnings and remittance levels among household heads. For example, Durand et al. (1996) find that an additional $1,000 of monthly U.S. earnings increases the amount repatriated by nearly 17 percent. Sana (2005) estimates that monthly remittances increase by $5 for a $100 increase in monthly wages.[3]

Yang (2011) documents the extent to which remittances represent a substantial fraction of migrants' earnings around the world. There is significant variation across source and destination countries. MMP data reveal that Mexican immigrants to the U.S. surveyed at home after their migration experience report remitting 31 percent of their earnings while they were abroad. Similarly, immigrants from El Salvador remit 37 percent of their earnings. In contrast, New Immigrant Survey data on newly-admitted immigrants with permanent residence in the U.S. reveals that Indian immigrants remit less than two percent of their income, while new Filipino immigrants remit nearly 6 percent of their earnings.

The remittance literature is not confined to the U.S. experience, of course. Unheim and Rowlands (2012) study recent immigrants in Canada, focusing on the role of demographic characteristics in affecting remittance levels for new immigrants. They find that remittances increase in age, and decrease for those with more educational attainment, larger households, and for married individuals. They also find that remittances increase with household income but at a declining rate. Chowdhury and Das (2016) study the remittance behavior of Chinese and Indian immigrants in Canada using panel data and find a positive relationship between household income and the amount remitted (though income is reported in groupings so elasticities are not estimated).

Merkle and Zimmerman (1992) and Sinning (2011) use the German Socioeconomic Panel to analyze the determinants of savings and remittances of foreign-born adults in West Germany. Both studies consider a large set of demographic and socioeconomic factors in sorting

[3]Note that many of these studies report average remittance levels as a share of income, not proportional changes in remittances due to percentage increases in income. Therefore, coefficients from these studies cannot be directly interpreted as elasticities.

out the primary determinants of remittance behavior. Merkle and Zimmerman (1992) find a large, significant, and positive relationship between household monthly income and the amount of transfers sent abroad. In contrast, Sinning (2011) does not find a significant income effect on transfers, but does uncover significant income effects on savings abroad with an estimated elasticity of 0.08.

Evidence from other countries also results in a wide range of estimates for the income elasticity of remittances. Lucas and Stark (1985) use Botswana data and estimate an elasticity of 0.25 for migrants with relatively low income and an elasticity of 0.73 for migrants with high income. Markova and Reilly (2007) estimate a value of 0.84 for Bulgarian immigrants in Madrid. Arun and Ulku (2011) find values between 0.60 and 0.78 for South Asian immigrants in Manchester. Havolli (2011) reports elasticities between 0.42 and 0.46 for migrants from Kosovo.

While the work discussed above focuses on income (or earnings) and other microeconomic determinants of remittances, a smaller strand of literature considers macroeconomic causes. Buch and Kuckulenz (2009) study a large cross-section of countries between 1970 and 2000. Using a panel fixed effects model, they find that per capita GDP in the migrant source country is negatively correlated with remittances. However, they find no significant effects from other macroeconomic factors such as GDP growth or inflation.

Recently, researchers have used gravity models to estimate the micro- and macroeconomic determinants of remittances. For example, McCracken et al. (2017) construct a theoretical model for the motivation of remittances and estimate the macroeconomic factors behind bilateral remittance flows to Latin American and Caribbean (LAC) countries. They find that remittances to LAC countries are motivated by altruism and self-interest. But unlike Buch and Kuckulenz (2009), they find that both source and destination GDP positively affect remittance flows.

We add to the existing literature by using a gravity model in the spirit of McCracken et al. (2017) to analyze remittance flows from the U.S. to approximately 140 countries. Our

analysis is more representative than studies exploring a single bilateral flow of funds. We also consider both microeconomic and macroeconomic factors simultaneously.

3 Estimation Strategy

We analyze the potential determinants of remittance flows using the basic intuition of a gravity model. First, we consider push factors that encourage migrant households to send money abroad. These include resources available to the household and state of residence, as well as demographic features that might be correlated with a household's willingness to financially contribute to the origin country. Second, we consider a limited set of pull factors that might attract remittances back to the home country. Finally, we consider a set of broadly-defined distance features. This includes variables capturing the degree of assimilation for the household and typical gravity model controls.

Although some of our variables do not fit perfectly into a discrete push/pull/distance trichotomy, Table 1 places explanatory variables into these groupings and notes whether the data varies across households, destination states, and/or origin countries. Our examination of the various push, pull, and distance determinants of remittance flows begins with the following specification and variables:

$$R_{j,k,s} = \beta_0 + \beta_1 X_{j,s} + \beta_2 Y_k + \beta_3 Z_{j,k,s} + \beta_4 FE_k + \beta_5 FE_s + u_{j,k,s} \tag{1}$$

where:

- $R_{j,k,s}$ is the annual remittance behavior of household j with members from birth country k living in U.S. state s.

- $X_{j,s}$ is a set of push factors that could encourage households to send money home. This includes the natural log of total household weekly earnings; average years of educational attainment of employed household members; the total number of females in the household; the marital status of household members; the age distribution of the household; the employment

status of adults in the household; and natural log per capita Gross State Product (GSP).

- Y_k is a set of pull factors that may attract remittances back to the home country including the number of household members with a spouse living outside of the household and the natural logarithm of average per capita GDP in the foreign-born household members' birth countries.[4]

- $Z_{j,k,s}$ is a set of distance features and geographic controls including counts of how many household members are U.S.-born or likely undocumented; counts of the number of household members by cohort of U.S. entry; the natural log of the average distance between the birth countries of foreign-born household members and the U.S. state of residence; and dummy variables identifying whether any household members were born in Mexico and Canada.[5]

- FE_k are indicators for whether any household member was born in country k, while FE_s represents fixed effects for whether the household is located in U.S. state s.

- $u_{j,k,s}$ is the error term. All regressions cluster standard errors at the state level, but main results hold in regressions that forgo clustering in favor of simple heteroskedasticy-robust standard errors.[6]

We seek to estimate effects of push, pull, and distance factors on the proportional size of remittance flows. The obvious approach for doing so would simply measure the dependent variable $R_{j,k,s}$ as the natural log of total household remittances. This presents an estimation problem, however, since approximately 70 percent of our observed households report that they have remitted nothing to their home countries, which implies that many log-remittance values would be undefined.

[4]Few households originate from a single country. Two-thirds of the households in our sample include some members born in a foreign country and others born in the U.S., while 11 percent of the remaining observations have members born in multiple foreign countries. Therefore, we account for origin-country economic conditions with a single variable measuring the average GDP of all foreign-born household members' birth countries.

[5]Birthplace diversity forces us to use average distance to members' origin countries just as with the average GDP calculation. Country indicators, in contrast, measure whether any member was born in Mexico or Canada.

[6]Within-household birthplace diversity prevents clustering at the country level. Moreover, evidence in Abadie et al. (2017) suggests that geographic clustering may be inappropriate in this setting – and might lead to standard errors that are too conservative – since there is no apparent design problem in the data for clustering to correct.

We address this limitation by pursuing four alternative estimation strategies. Our first model measures $R_{j,k,s}$ by adding one dollar to all observations before performing the log-transformation. Though this solution is standard in the literature, it is problematic in that there is little motivation to add one as opposed to some other small value.

Our second strategy adopts a transformation – similarly used in Sinning (2011) and Clemens and Hunt (2017) – that calculates the inverse hyperbolic sine of remittances. The advantage of this alternative is twofold: It is defined at zero and therefore does not require the addition of an arbitrarily-chosen dollar amount for calculation; and – as with log functions – changes in the inverse hyperbolic sine approximate percentage changes in remittances. Regression coefficients with this transformation can be interpreted identically to those using the log transformation.

Third, we use a two-part model to better consider how selection into the remittance decision could bias our baseline results. In the first part, we examine the household's dichotomous choice of whether or not to remit anything abroad. In the second part, we estimate the determinants of remittance flows only among households that choose to remit.

Finally, we employ a Heckman model to further address selection concerns. Note that this methodology requires that at least one of the explanatory variables included in the selection model must be excluded from the main model of interest. Motivated by results from the two-part model, we choose the distance variable to fulfill this role since it is a significant predictor of whether or not a household remits but not for how much they remit.[7]

As a final note of caution, our sample of interest consists of U.S. households that have at least one foreign-born, employed, wage-earning adult who is not enrolled in school. The results may not be generalizable to other households. Our estimates could, of course, be biased if our covariates are correlated with unobserved factors. For example, our cross-section sample of U.S. households does not include foreign-born individuals who have already returned to their home country since all interviews occur in the U.S. Thus, there may be

[7] A detailed discussion of the two-part and Heckman models in an immigration context in which the dependent variable frequently takes on zero values can be found in Simpson and Sparber (2013).

selection bias in our estimates due to return migration. We cannot account for this possibility. On the other hand, selection into migration and/or employment should not confound our main results.

4 Data

The CPS interviewed 54,282 households in the August 2008 CPS Migration Supplement. Of those, 7,560 households had at least one foreign-born member age 18 or older. Households were asked about the amount of money sent to or received from family and friends living outside the United States. We focus on funds that households sent to family and friends abroad and refer to them as remittances. We limit our sample to households who had at least one foreign-born, employed, wage-earning, adult who is not enrolled in school (including those who report zero remittances). We merged the August Supplement to the September-November Merged Outgoing Rotation Groups CPS data in order to record earnings data for all households remaining in the sample.[8] After applying our selection criteria, our sample consists of 3,861 households. Approximately 29 percent of households reported a positive amount of remittances. Average annual remittances per household is $721 in the whole sample and $2,477 for households with positive remittances.

In addition to total annual remittances, our household-level data includes variables measuring household size and composition, the employment status of household members, and other demographic characteristics. We also attach macroeconomic variables to each observation including average per capita GDP of the foreign-born household members' birth countries, GSP of the current state of residence in the U.S., and average distance between birth country and U.S. state of residence.

One limitation of the 2008 CPS Migration Supplement dataset documented by Grieco et al. (2009) and de la Cruz et al. (2013) is that it under-counts remittances. CPS interviewers

[8] We also drop three observations with average weekly household earnings that are more than 10 standard deviations away from the mean.

reported that respondents were hesitant to give details about the amount of monetary transfers sent abroad and were not always willing to answer the questions related to transfers. This was especially prevalent in regions of the U.S. where immigration enforcement actions had recently occurred. Aggregate remittance flows from the dataset totaled approximately $12 billion. This is much lower than what other sources report. For example, the U.S. Bureau of Economic Analysis (BEA) reports approximately $38.5 billion in remittances in 2008 (see Bai and Hoang, 2010), while the World Bank estimates a value of $55 billion.

Grieco et al. (2009) discuss several possible reasons for the differences in aggregate remittance estimates. Larger estimates might arise in datasets using a broader measure of personal transfers. This includes in-kind transfers such as remittances of jewelry, clothes, and other consumer goods as well as transfers through informal channels such as cash or goods carried by friends or family members. In-kind transfers can range from 10 to 50 percent of total remittances for some countries, but they often do not appear in official statistics (Straubhar and Vadean, 2005). In addition, countries change how they report non-cash transfers over time. Other reasons for variation across data sources include differences in the methodologies used to capture remittances; under- or overestimation of the amount reportedly sent; and differences in the distribution of households across surveys. Still, even with the under-measurement of aggregate remittances in the CPS Migration Supplement, the CPS is a well-known nationally-representative sample of U.S. households. We believe that it is a useful dataset for analyzing household-level remittance behavior across U.S. states and migrant groups.

Table 1 reports the summary statistics. Average weekly household earnings equals $1,319 and the average educational attainment of employed adults is 13 years. Approximately 73 percent of households have at least one member that is married, and households have an average of 1.5 married members. Nearly six percent of households have at least one member with a spouse living outside of the household.

The average household size is 3.34 people, with approximately one-third of households

comprised of children (age 0-17 years) and another 3 percent represented by individuals over age 65. Thus, approximately two-thirds of the composition of households consists of working age adults (ages between 19 and 65). Our dataset includes a large number of both foreign-born male and female workers, with each household averaging 0.62 foreign-born employed women and 0.82 foreign-born employed men – an important advantage over studies focusing almost exclusively on male foreign-born workers.

Recall that all households in our sample have at least one foreign-born worker. Nearly 66 percent of households have at least one U.S.-born member as well – approximately 1.33 members of each household that are native-born. More than 40 percent of households have at least one member who is likely undocumented, with an average of 0.87 members likely lacking legal status.[9] Table 2 illustrates that there is a fairly uniform distribution of households based on the first year of entry for household members. On average, households have 0.31 members whose first migration experience was in the last 5 years and another 0.33 members whose first experience was more than 30 years ago. Thus, our sample includes many households with recent migration experience in addition to many households with individuals who first migrated to the U.S. decades ago.

Table 2 also reports the distribution of households in our sample by U.S. region of residence. The Pacific region of the U.S. is the largest host region with just under 27 percent of households in the sample.[10] The U.S. Northeast and U.S. Southeast regions each contain approximately 20 percent of the sample, followed by the Midwest (13 percent), Mountain (nearly 10 percent), and South Central (9 percent) regions.

Table 3 reports the top 20 foreign birth countries ordered by frequency of observation in the sample. Nearly 30 percent of households have a member born in Mexico. Other prominent birth countries include the Philippines (5.5 percent), India (5.4 percent), and

[9]We follow the approach motivated by Borjas (2017) to define likely undocumented immigrants using CPS data. They include all non-naturalized foreign-born workers that entered the U.S. since 1980, do not work in the military or the government, are not from Cuba, are not a college student, and are not a spouse of a legal resident.

[10]U.S. regions are defined in Fairchild and Simpson (2008).

China (4.1 percent). Some of our empirical specifications control for average per capita GDP in foreign-born household members' birth countries. Occasionally, the reported birth country in the CPS is vague (e.g, Americas) or unknown. In other cases, per capita GDP was not available from the World Development Indicators for 2008 (e.g., Cuba, Taiwan, Somalia). Data availability reduces our original sample of 3,861 households to 3,677 observations with the inclusion of average per capita GDP and 3,816 observations with the inclusion of birth country indicator variables.

Overall, we are confident that our dataset provides a representative snapshot of migrant populations in the U.S. One source of confidence is that when comparing foreign-born individuals in our 2008 CPS Migration Supplement with individuals in the 2008 American Community Survey (ACS), we find that the distributions of immigrants by country of origin, state of residence, and age are quite similar. An important difference between the two surveys is that ACS collects information about the last year of immigration, while the CPS asks for the first year of immigration. Still, the distribution of immigrants based on time of U.S. entry are comparable across the two samples. Thus, the CPS seems to be a representative, albeit smaller, sample of the foreign-born population in the U.S.[11]

5 Results

5.1 Baseline results

We use equation 1 to estimate whether various push, pull, and distance factors are associated with the amount of money remitted abroad. The unit of observation is the household. Regressions are weighted using household weights and standard errors are clustered at the state level. Table 4 reports the estimated coefficients from baseline models. Columns (1)-(2) report results using the natural log of one plus total annual household remittances as the

[11] We do not display the comparison of the CPS with the ACS since our analysis is at the household level. Details are available from the authors upon request.

dependent variable. Columns (3)-(4) report the results when using the inverse hyperbolic sine transformation for remittance levels. Even-numbered columns include a full set of destination state and birth country indicators and therefore exclude any state- or country-specific variables.

As described in section 3, we include a large set of household-level control variables in our regressions. Many of these variables are either dummy variables (e.g., an indicator for households that have at least one married member) or count variables (e.g., the number of household members that are married). Note that the sum of variables capturing the number of immigrants by entry cohort and the number of native-born individuals living in a household equals the household size. This limits what we can do with other collections of count variables. For example, we include the counts of household members by age group in our list of push variables (including one group for people 18 and younger), but we have to omit one reference group (people over age 65) to avoid perfect collinearity. Thus, an increase in the number of youths – holding household size constant – would need to be offset by a decrease in people over the age of 65. It is important to control for these household characteristics, but we must also recognize that the choice of which groups to omit as reference groups is an arbitrary one. Importantly, this choice will not altar the estimates for non-count variables (such as earnings or education). However, it will affect the coefficients (and significance) of remaining count variables. As a result, coefficient interpretation needs to be done carefully since many represent magnitudes relative to a comparison group. In our discussion below, we will be careful to point out when such issues arise.

5.1.1 Push factors

We first consider the impacts of various push factors on the amount remitted. Our primary interest is in the relationship between household weekly earnings in the U.S. and remittances. We identify positive and significant elasticites with magnitudes that are very similar across specifications. Our results in column (1) indicate an elasticity of approximately 0.288, sug-

gesting that a 1 percent increase in household income leads to a 0.288 percent increase in remittances. When we include state and country indicators (in column 2), the elasticity falls only slightly to 0.272. We find similar magnitudes (0.314 and 0.298) when using the inverse hyperbolic sine transformation in columns 3 and 4.

As noted above, estimates for the income elasticity of remittances exhibit tremendous variation in the literature. Our results are larger than what is reported in Sinning (2011) using German data, but lower than what Arun and Ulku (2011) and Markova and Reilly (2007) report for immigrants South Asian immigrants in the U.K. and Bulgarian immigrants in Spain, respectively. In addition, most other studies of U.S. immigrants do not explicitly estimate elasticities, but instead find a positive relationship between U.S. income and remittance levels; examples include Durand et al. (1996), Sana (2005), and Fairchild and Simpson (2008) that all study Mexican immigrants in the U.S. We believe that our larger and more diverse sample of U.S. households provides reliable estimates for the earnings elasticity of remittances. It is possible that our estimates may even be applicable in other developed countries with large immigrant populations and remittance outflows.

Several other push variables are significant determinants of remittance flows as well. We find a negative but relatively small coefficient on the average educational attainment of adults in the household. This finding is consistent with Sana (2005) who suggests that migrants with less education are more likely to prefer belonging to a larger part of the transnational community than those with more education and are therefore more likely to remit. In addition, Unheim and Rowlands (2012) document a negative relationship between education and remittances and suggest that well-educated recent migrants may choose to first focus on establishing themselves in the local community before sending remittances home. However, there is significant debate in the literature about the relationship between educational attainment and remittances (see Niimi et al. 2010 for a summary), and it is also possible for average education to be be correlated with omitted variables – such as household health – that cannot be measured but could play a role in determining remittance amounts.

The gender composition of the household is an important demographic determinant of remittances. An additional female (of any age) in the household – holding household size and other variables constant – lowers the amount remitted by about 18 percent. This negative relationship is consistent with Amuedo-Dorantes and Pozo (2006) who argue that men remit at higher rates than women since men more frequently leave immediate family in their home countries. Sinning (2011) suggests that immigrant women may be less active in the labor market than foreign-born men and less likely to remit. In Section 5.3 we perform a more detailed analysis of the relationship between remittance behavior and the gender composition of the household.

Households with at least one married member send 60 to 76 percent more remittances abroad, all else equal, relative to households with no married members. There is no remittance effect of adding additional married members to the household.

The inclusion of the household age distribution variables allows us to account for important life-cycle effects within the household. Coefficients can be interpreted in multiple ways. As reported, the 0.250 coefficient on youths in Column 1 is positive and significant. It indicates that remittances will increase by 25 percent, holding household size constant, if a one person increase in young household members is offset by an equal decrease in members older than 65. An alternative interpretation might instead focus on relative values. For example, this youth coefficient will be 0.288 larger than the one on 18-24 year olds regardless of which of the other groups serves as the reference. This focus on relativity is interesting for noting that, ordinally, the coefficient on youth has the largest and most positive relationship with remittances in all four specifications in Table 4. The coefficient on members age 46-65 are always the most negative. The statistical significance (or lack-thereof) of these variables is an artifact of the chosen reference group.

The models in Table 4 allow adult household members to fall into one of six mutually-exclusive work status groupings: military; enrolled in school and employed; enrolled in school and not employed; employed (but not in school); unemployed (but not in school); and idle

(i.e., those not working, searching for employment, or enrolled in school). Since these six groups when added to the number of youths variable described above also sum to household size, we again need to omit one to serve as a reference. The results in Table 4 use idle adults as the reference.

The regressions reveal that the number of labor force participants in the household is a significant push factor for monetary transfers abroad. Holding household size constant, an additional employed adult in the household is equivalent to having one fewer idle adult and results in a roughly 50 percent increase in the remittance amount. With additional working members, the household can more easily manage fluctuations in income to cover local expenses and is therefore more likely to send remittances. A similar behavior appears for unemployed adults who are actively searching for employment at the time of the survey. The positive and significant coefficient on this variable implies that a household with an additional unemployed worker remits 30 percent more than one with an additional idle adult, ceteris paribus.

Per capita income in the state of residence of the household is not a robust predictor of remittances when it is included in the regression (columns 1 and 3). A one percent increase in state income raises remittance levels by 0.52 to 0.57 percent – insignificant estimates that are nonetheless larger in magnitude than the elasticity of household earnings. The lack of significance leads us to believe that household earnings is a more reliable predictor of remittances than local income is.

5.1.2 Pull Factors

Our specification includes two broad factors that might pull remittances from U.S. immigrant households. The first set pertains to household structure: Recall that 6.2 percent of households in our sample report having at least one spouse that lives outside of the household.[12] We suspect that a household with one or more spouses residing in another location

[12]Sinning (2011) documents how the relationship between household size and remittances depends on whether family members are in the destination or source country. The CPS does not ask detailed information

might remit more. We explore this by including a dichotomous variable measuring whether anyone in the household has a spouse living elsewhere, plus a second variable measuring the number of household members with a spouse living in another home. Although Sana (2005) finds that Mexican migrants with the partner living in the home community remit at higher levels and rates than those with partners living in the U.S., our baseline specifications do not find a significant remittance effect from either of our variables capturing the existence of spouses outside the home.

The average per capita GDP in the foreign-born household members' birth countries is another possible pull factor for remittances originating in the U.S. As discussed above, the empirical literature has developed conflicting conclusions on this issue. Buch and Kuckulenz (2009) find that households with members from wealthier countries remit significantly less than those with members from poorer countries. This is consistent with altruism and consumption smoothing motives: Migrants may be more inclined to send remittances when their home countries are suffering from permanently or temporarily low income levels. This contrasts with the findings of McCracken et al. (2017) who study a sample of Latin American and Caribbean countries and find a positive relationship between GDP in the birth country and bilateral remittance flows. This suggests that the investment motive is dominating their sample of migrants. Our results are more in line with Buch and Kuckulenz (2009). We find that households with members from wealthier countries remit significantly less than those with members from poor countries: A one percent increase in average per capita GDP in the birth country is associated with a 0.76-0.84 percent decrease in remittances (columns 1 and 3).

5.1.3 Distance and Geographic Factors

We next consider a set of distance variables capturing the degree of a household's assimilation into the U.S. in addition to typical gravity controls such as physical distance between birth

about other family members in the home country so we have to focus on household members in the U.S.

countries and the U.S. state of residence, as well as border dummies for Canada and Mexico.

While all households in our sample have at least one foreign-born member, there is tremendous variation in the number, birthplace, and presumed legal status of household members across observations. Recall, for example, that more than 40 percent of households in our sample have at least one member that is likely undocumented and more than 65 percent have at least one native-born member. To examine these factors, we include indicator variables measuring whether any household member is native-born or likely-undocumented, as well as the number of members falling into each group. We find that the presence of native-born members is insignificantly related to remittance levels while an increase in the number of native-born household members is somewhat negatively related to remittances, but this effect is at most only marginally significant. Conversely, we find that households with undocumented migrants remit between 43 and 49 percent more than households who do not have any undocumented migrants. This is consistent with Sana (2005) and Fairchild and Simpson (2008) and is robust across all specifications. Households with undocumented migrants are more likely to stay connected to families in their home country since their likelihood of returning home is high. The number of likely undocumented household members, however, is insignificantly related to remittances.

We also control for the number of foreign-born individuals in the household by entry cohort measured in five-year groupings. These cohort values, when added to the number of native-born household members, sum to equal household size.[13] In general, we do not find statistically significant point estimates for different entry cohorts of immigrants within households. However, the relative magnitude of the coefficients suggests that the amount of time spent in the U.S. is likely to be negatively related to remittance amounts, aligning with results in Sana (2005) and Fairchild and Simpson (2008). Migrants with less U.S. experience tend to be more connected to their home country and remit more; coefficient point estimates for the number of household members that first entered the U.S. in the previous five years

[13]For this reason, other collections of variables summing to household size – such as the push factors discussed above – must omit one reference group to avoid perfect collinearity.

are larger than those for the number of members who first entered more than 5 years ago. The point estimates for the number of members who first immigrated more than 25 years ago are negative (but still insignificant).

It is common for gravity models to use border indicators and geographic distance as proxies for remittance costs (Lueth and Ruiz-Arranz, 2008; Frankel, 2011; McCracken et al., 2017). We find that remittance amounts are more than 50 percent higher for households who have at least one member who was born in Mexico. We find no significant effect for Canadian household members. The physical distance elasticity is negative and significant, indicating that a higher cost of remitting reduces remittances flows. Not surprising, this variable is insignificant when accounting for state and country fixed effects (in columns 2 and 4). We add two notes of caution about our estimates, however. First, distance in our case measures the average distance between the household's state and the origin countries of its foreign-born members since regressions exploit variation across households, not individuals. Second, we will see in the next section that physical distance as a proxy for remittance cost serves to influence the dichotomous remittance decision, but not the remittance level.

5.2 Selection results

Section 3 noted a concern about possible selection bias since roughly 70 percent of our sample of households do not remit. To examine this issue, we consider both a two-part model and a Heckman selection model. The results are reported in Table 5. Column 1 represents the first stage of the two-part model: A Probit estimation of whether households remit with coefficients representing the marginal probability effects evaluated at the means of the explanatory variables. Column 2 displays the second stage of the two-part model with the natural log of remittance levels as the dependent variable. Column 3 reports the second stage Heckman-corrected coefficients. As before, standard errors are clustered at the state level.

Note that the Heckman model requires that at least one explanatory variable used in

the selection regression must be excluded from the second-stage regression of the remittance amount. Results from the two-step estimation in columns (1) and (2) provide guidance for choosing such a variable. There are several variables that are significant determinants of the dichotomous remittance decision but not the truncated log-amount. However, some of these variables (e.g., the indicator variable for the presence of a married household member) are linked to other variables in the model (e.g., the number of married people in the household), so we wish to retain them in all of our regressions. The physical distance variable is a notable exception in that it does not have a strong conceptual link to other explanatory variables. More critically, a ten percent increase in distance reduces the remittance probability by a highly-significant 4.7 percentage points, but it is not statistically related to the remittance amount. Thus, we choose to omit distance from the second-stage of our Heckman selection model.

The most important results of Table 5 pertain to household earnings. Earnings continue to be a positive and significant predictor of household remittances in these alternative methodologies but with lower elasticity estimates (in columns 2 and 3) than before. Values range between 0.155 in the two-part model and 0.220 in the Heckman model compared to estimates between 0.272 and 0.314 in the baseline models. Qualitative results are therefore robust across specifications.

Other interesting findings also emerge. First, whether a household has a married member or not matters more for the remittance decision (i.e., whether or not to remit) but not for the amount remitted. Similarly, the number of employed and unemployed household members (relative to idle members) are important positive predictors of the probability of remitting but not for remittance levels. This suggests that increasing the number of household members in the workforce provides households the flexibility to remit, which could be motivated by insurance and precautionary saving mechanisms.

Conversely, we find that a few variables – such as the number of household members with a spouse elsewhere and whether the household has any native born members – affect

how much households remit but not the probability of remitting. Altruism may be at play here: having a spouse elsewhere may motivate more remittances, while having native-born members reduces the connection to families back home, resulting in fewer remittances.

5.3 Gender results

It is somewhat rare in the immigration literature to have a representative sample of women large enough to fully analyze gender and remittance behavior. One advantage of our dataset is that there is an average of over one adult woman and 0.62 employed foreign-born women in each household. Our specifications above finds that the presence of more female household members reduces remittance amounts. In this section, we further explore the interplay between gender composition and remittance behavior with a particular focus on the household earnings elasticity of remittances.

First, we recognize that our single variable measuring the number of female household members used in our baseline and selection models above takes a somewhat limited view of how gender composition might affect remittances. Thus, we replace this variable with an extensive set of indicator variables that control for the number of men and women, male and female employees, male and female children, and male and female adults in the household. The limitation of this alternative is that these controls are collinear with other variables in the model, thus making interpretation quite cumbersome. Fortunately, our key coefficient of interest – the earnings elasticity – remains straightforward to interpret. Estimates from models analogous to those in Table 4 are comparable to baseline results, ranging from 0.272 to 0.323.[14]

Second, and more interestingly, we allow the earnings elasticity estimate to vary by the number of adult men and women in the household. Figure 1 presents the point estimates from a regression using the inverse hyperbolic sine transformation as the dependent variable and without country and state indicator variables (a model similar to column 3 of Table 4).

[14]For brevity, we do not include the full set of regression results but they are available upon request from the authors.

Coefficients significant at the five percent level are marked by an 'X'.

Several new insights emerge from this exercise. First, we find that the responsiveness of remittances to earnings grows as the number of adult women in the household increases: the earnings elasticity of remittances is higher in households with more adult women holding the number of adult men constant. In a household with one man, the earnings elasticity ranges from an insignificant -0.06 in a household with no women, to 0.35 with one woman, and 0.69 with two or more women in the household. The same pattern in coefficients exists in households with no men and in households with two or more men.

Second, elasticities are insensitive to whether the household includes 0 or 1 adult man. In Figure 1, notice that in a household with one woman, the elasticity (0.35) remains practically unchanged in households with 0 or 1 man. However, elasticities fall in households with 2 or more men. The same holds true within households of 2 or more women (but with an elasticity near 0.70). This simple analysis suggests that the gender composition of adults in the household generates interesting differences in the responsiveness of remittances to changes in household earnings.

Figure 2 provides further insight. This graph displays the same elasticity results on the vertical axis but with the horizontal axis instead representing the (approximate) *difference* between the number of women and men in the household. Notice that the elasticity is highest in households with a disproportionate number of adult women.[15] It is interesting to compare and contrast this result with the coefficients on number of female household members in Tables 4 and 5. Those regressions consistently found that an increase in the number of female household members was associated with reduced remittances. However, we now see a more complex relationship such that remittances are more responsive to income in households with a disproportionate number of women. We speculate that this could be

[15]Note that the horizontal axis is not the strict difference between women and men in the household since, for example, a household with more than two men and more than two women would record a difference value of zero regardless of how many men and women actually reside in the home. A similar if less dramatic story emerges if we instead calculate separate elasticities according to the number of *employed* women and men in the household.

related to differences in migration motives and decision-making that vary across household structure, including the possibility that men are more inclined to remit a fixed amount, whereas women have a higher propensity to remit more as incomes rise. Household structure and decision-making might also be affected by the number of dependents residing in the home country. Unfortunately, the CPS dataset does not record information about family members abroad, nor does it provide individual-level data on remittance decisions. Such information would improve the understanding of the interplay between gender, family and household dynamics, and remittance behavior.

Not apparent in these models is the variation in the number of households in each grouping. More than half of the sample (54 percent) consists of one man and one woman. About 3 percent of households have two or more men but no women, and an equal percentage has two or more women but no men. Overall, however, our results suggest that the earnings elasticity of remittances varies for households with different gender compositions: remittances from households with a relatively large number of women relative to men tend to be more responsive to changes in household income. This result has not been documented in the literature to our knowledge.

6 Conclusion

This paper is the first to use the 2008 CPS Migration supplement to analyze various factors that affect remittance flows for a cross-section of U.S. households. In our sample, remittances originating in the U.S. are sent to 141 different source countries. We employ a gravity model to consider how various push, pull, and distance factors affect the flow of monetary transfers abroad while controlling for observed differences in households and macroeconomic conditions in the U.S. and abroad.

Our findings indicate that various push mechanisms are at play. We find a positive and robust estimate for the earnings elasticity of remittances, indicating that a one percent

increase in household earnings corresponds to a 0.20-0.30 percent increase in remittances. This is a sizable effect in the range of estimates that others have found in the literature using different samples of immigrants. Importantly, our analysis highlights differences in this elasticity across household structure. Although remittances are lower among households with more women, ceteris paribus, the responsiveness of remittance outflows to household earnings is higher for households with a disproportionate number of adult women. Very few studies to date have been able to analyze the remittance behavior of immigrant women (mostly due to data limitations), so we hope that our results can be informative for policies that may impact female immigrants differently from male immigrants.

We also identify other push and pull factors affecting remittances. For example, poorer countries (as measured by per capita GDP) attract more remittances from migrant households in the U.S. than relatively rich countries. This supports the notion that remittances are used to help households smooth consumption by sending workers abroad. In addition, the negative relationship between source country GDP and remittance levels also supports the altruistic motive - altruistic households send remittances to destinations where they are more desperately needed. Household characteristics matter as well, consistent with what others have found in the literature. Remittances are lower for more educated households, households with more female members, and households with at least one married person. In addition, households with more undocumented migrants and fewer native-born members send more remittances. Finally, geography is important such that remittances decrease as the distance birth countries and the U.S. state of residence increases.

We address the potential selection bias that may arise with remittance decisions that result in many observed remittance values equal to zero. Two-part and Heckman models lead to a somewhat reduced magnitude of our estimated earnings elasticity of remittances, but the qualitative results remain unchanged.

While our earnings elasticity estimate pertains to the U.S., it is possible that similar mechanisms are at play in other developed countries – such as Canada or Australia. Our

results may therefore be of value to global policymakers interested in better-understanding the determinants of remittance flows. Our analysis suggests that push, pull, and distance variables all affect remittances, as does the composition of households. More research on flows originating in other developed countries would add valuable insight into the generalizability of our results.

References

[1] Abadie, Alberto, Susan Athey, Guido W. Imbens, and Jeffrey Wooldridge. 2017. "When Should You Adjust Standard Errors for Clustering?," *NBER Working Paper* 24003.

[2] Amuedo-Dorantes, C., C. Bansak, and S. Pozo. 2005. "On the Remitting Patterns of Immigrants: Evidence from Mexican Survey Data," *Economic Review*, 90(1): 37-58.

[3] Amuedo-Dorantes, C. and S. Pozo. 2005. "On the Use of Differing Money Transmission Methods by Mexican Immigrants," *International Migration Review* 39(3): 554-576.

[4] Amuedo-Dorantes, C. and S. Pozo. 2006. "Remittances and insurance: evidence from Mexican migrants." *Journal of Population Economics*, 19 (2), 227-254.

[5] Amuedo-Dorantes, C. and S. Pozo. 2011. "Remittances and Income Smoothing," *American Economic Review* 101 (3), 582-87.

[6] Arun, T., and Ulku, H. 2011. "Determinants of remittances: The case of the South Asian community in Manchester." *Journal of Development Studies*, 47(6), 894-912.

[7] Bai, H. and M. Hoang. 2010. "Annual Revision of the U.S. International Transactions Accounts," *Survey of Current Business*, 90:36-50.

[8] Beti, A., Calero, C. and R. Sparrow. 2008. "Remittances, Liquidity Constraints and Human Capital Investments in Ecuador," World Development 37(6), 1143-1154.

[9] Borjas, G. 2017. "The labor supply of undocumented immigrants." *Labour Economics* 46, 1-13.

[10] Buch, C. M., and Kuckulenz, A. 2009. "Worker remittances and capital flows to developing countries." *International Migration*, 48(5), 89-117.

[11] Chowdhury, M., and A. Das. 2016. "Remittance Behaviour of Chinese and Indian Immigrants in Canada," *Review of Economics*, 67(2), 185-208.

[12] Clemens, M. A., and Hunt, J. 2017. "The labor market effects of refugee waves: reconciling conflicting results." *ILR Review*, 0019793918824597.

[13] de la Cruz, G. and C. Logan. 2013. "2008 CPS Immigration/Emigration Supplement Debriefing Report." Population Division Working Paper No. 99, U.S. Census Bureau, Washington, D.C. 20233. April.

[14] Durand, J., W. Kandel, E. A. Parrado, and D. S. Massey. 1996. "International Migration and Development in Mexican Communities." *Demography*, 33, 249-64.

[15] Fairchild, S. and N. Simpson. 2008. "Comparison of Mexican Migrant Remittances across U.S. Regions," *Contemporary Economic Policy* 26(3), 360-379.

[16] Frankel, J. A. 2011. "Are bilateral remittances countercyclical?" *Open Economies Review*, 22, 1-16.

[17] Grieco, E. M., de la Cruz, P., Cortes, R., and Larsen, L. 2009. "Who in the United States sends and receives remittances? An initial analysis of the monetary transfers data from the August 2008 CPS Migration Supplement."Population Division, Working Paper No. 87.

[18] Glytsos, N. 2001. "Determinants and effects of migrant remittances: A survey,"pp. 250-268 in S. Djajic (ed.), *International Migration: Trends, Policies, and Economic Impact*. London: Routledge.

[19] Havolli, S. 2011."Determinants of Migrants Earnings and Remittances: Evidence from Kosovo."Available at SSRN: https://ssrn.com/abstract=1829998.

[20] Lucas, R., and O. Stark. 1985. "Motivations to remit: evidence from Botswana," *Journal of Political Economy*, 93(5): 901-918.

[21] Lueth, E., and Ruiz-Arranz, M. (2008). "Determinants of bilateral remittance flows."*Journal of Macroeconomics*, 8, 1-21.

[22] Mandelman, Federico S. and Andrei Zlate. 2012. "Immigration, Remittances and Business Cycles,"*Journal of Monetary Economics* 59, no. 2: 196-213.

[23] Markova, E., and Reilly, B. 2007. "Bulgarian migrant remittances and legal status: Some micro-level evidence from Madrid."*South-Eastern Europe Journal of Economics*, 5(1).

[24] Merkle, L., and K. Zimmermann. 1992. "Savings, remittances and return migration,"*Economic Letters* 38, 77-81.

[25] McCracken, S., Ramlogan-Dobson, C., and Stack, M. M. (2017). "A gravity model of remittance determinants: evidence from Latin America and the Caribbean."*Regional Studies*, 51(5), 737-749.

[26] National Bureau of Economic Research (NBER). 2018. NBER CPS Supplements. Available at: https://www.nber.org/data/current-population-survey-data.html. Accessed January 10, 2019.

[27] Niimi, Y., Ozden, C., and Schiff, M. 2010. "Remittances and the brain drain: skilled migrants do remit less."*Annals of Economics and Statistics/Annales dconomie et de Statistique*, 123-141.

[28] Rosenzweig, M. R., and Stark, O. 1989. "Consumption smoothing, migration, and marriage: Evidence from rural India."*Journal of political Economy*, 97(4), 905-926.

[29] Sana, M. 2005. "Buying Membership in the Transnational Community: Migrant Remittances, Social Status, and Assimilation."*Population Research and Policy Review*, 24, 231-61.

[30] Simpson, N. B., and Sparber, C. 2013. "The Shortand LongRun Determinants of LessEducated Immigrant Flows into US States."*Southern Economic Journal*, 80(2), 414-438.

[31] Sinning, M. G. 2011. "Determinants of savings and remittances: empirical evidence from immigrants to Germany." *Review of Economics of the Household*, 9(1), 45-67.

[32] Stark, Oded. 1991. The Migration of Labour. Oxford: Basil Blackwell.

[33] Straubhar, T., Vadean, F.P., 2005. "Introduction: International migrant remittances and their role in development."In: OECD (Ed.), Migration, remittances and development. OECD Publishing, Paris, 1333.

[34] Unheim, P., and Rowlands, D. 2012. "MicroLevel Determinants of Remittances from Recent Migrants to Canada." *International Migration*, 50(4), 124-139.

[35] World Bank. 2018. Migration and Remittances Data. Available at: http://www.worldbank.org/en/topic/ migrationremittancesdiasporaissues/brief/migration-remittances-data. Accessed January 2018.

[36] Yang, D. 2008. "International Migration, Remittances, and Household Investment: Evidence from Philippine Migrants Exchange Rate Shocks." *Economic Journal*, 118(528): 591-630.

[37] Yang, D. 2011. "Migrant Remittances." *Journal of Economic Perspectives* 25(2), 129-52.

Table 1. Summary Statistics

Variables	Mean	Standard Deviation	Min	Max	Sample size	Source of Variation
Dependent variables:						
Annual household remittances ($)	721.00	2,961.38	0	27,199	3,861	Household
Percent of households that send remittances	29.1%	45.4%	0	1	3,861	Household
Push:						
Household weekly earnings ($)	1,319.37	993.31	4	7,047	3,861	Household
Average years of educational attainment (for employed household members)	13.03	3.83	1	21	3,861	Household
Total number of females in household	1.63	1.06	0	7	3,861	Household
Percent of households with at least one married member	72.9%	44.5%	0	1	3,861	Household
Number of married people in household	1.49	1.00	0	6	3,861	Household
Number of household members age 0-18 years	1.07	1.23	0	9	3,861	Household
Number of household members age 19-24 years	0.28	0.61	0	6	3,861	Household
Number of household members age 25-45 years	1.20	0.91	0	5	3,861	Household
Number of household members age 46-65 years	0.67	0.82	0	4	3,861	Household
Number of household members age over 65 years	0.11	0.38	0	3	3,861	Household
Number of household members in the military	0.01	0.08	0	2	3,861	Household
Number of household members enrolled in school and employed	0.04	0.21	0	3	3,861	Household
Number of household members enrolled in school and not employed	0.04	0.22	0	3	3,861	Household
Number of employed household members (and not in school)	1.72	0.81	1	7	3,861	Household
Number of unemployed household members (and not in school)	0.07	0.29	0	4	3,861	Household
Number of idle household members (and not in school)	0.39	0.59	0	4	3,861	Household
Per capita GSP ($)	52,608	18,156	33,020	168,262	3,861	Destination
Pull:						
Percent of households that have a spouse that lives outside of household	6.2%	24.1%	0	1	3,861	Household
Number of household members with a spouse that lives outside of household	0.08	0.33	0	4	3,861	Household
Per capita GDP in birth country ($)	15,440	11,071	648	89,951	3,677	Origin
Distance:						
Percent of households with at least one native born member	65.5%	47.5%	0	1	3,861	Household
Percent of households with at least one member with likely undocumented status	40.3%	49.1%	0	1	3,861	Household
Number of household members that are native born	1.33	1.34	0	9	3,861	Household
Number of household members that are likely undocumented	0.87	1.30	0	10	3,861	Household
Number of household members that first entered US in previous 0-5 years	0.32	0.86	0	7	3,861	Household
Number of household members that first entered US in previous 6-10 years	0.47	0.94	0	7	3,861	Household
Number of household members that first entered US in previous 11-15 years	0.24	0.68	0	8	3,861	Household
Number of household members that first entered US in previous 16-20 years	0.34	0.71	0	8	3,861	Household
Number of household members that first entered US in previous 21-25 years	0.16	0.46	0	5	3,861	Household
Number of household members that first entered US in previous 26-30 years	0.15	0.44	0	4	3,861	Household
Number of household members that first entered US more than 30 years ago	0.33	0.62	0	4	3,861	Household
Distance (in miles) between US state of residence & birth country	3,882	2,560	173	10,479	3,816	Destination*Origin
Percent of households in which any household member was born in Canada	3.1%	17.4%	0	1	3,861	Origin
Percent of households in which any household member was born in Mexico	29.7%	45.7%	0	1	3,861	Origin

Table 2. Distribution of households in CPS Sample

First U.S. entry of any household member:	
Households with first US entry in previous 0-5 years	8.6%
Households with first entry in previous 6-10 years	18.1%
Households with first entry in previous 11-15 years	10.9%
Households with first entry in previous 16-20 years	17.5%
Households with first entry in previous 21-25 years	9.9%
Households with first entry in previous 26-30 years	9.8%
Households with first entry more than 30 years ago	25.2%
U.S. region of residence of household:	
US Pacific	26.7%
US Northeast	20.9%
US Southeast	20.5%
US Midwest	13.1%
US Mountain	9.8%
US South Central	9.0%

* Percent of households with at least one foreign born worker

Table 3. Top 20 Foreign Birth Countries in CPS Sample*

Birthplace	Percent
Mexico	29.7%
Phillipines	5.5%
India	5.4%
China	4.1%
El Salvador	3.6%
Canada	3.1%
England	3.1%
Cuba	2.8%
Vietnam	2.8%
Korea	2.2%
Colombia	2.1%
Guatamala	2.1%
Germany	2.0%
Dominican Republic	1.8%
Jamaica	1.6%
Brazil	1.5%
Poland	1.4%
Honduras	1.4%
Japan	1.3%
Taiwan	1.3%

* Percent of households with at least one foreign born worker

Table 4. Regression Results

VARIABLES	(1) log (R+1)	(2) log (R+1)	(3) asinh R	(4) asinh R
Push:				
Log (hh weekly earnings)	0.288***	0.272***	0.314***	0.298***
	(0.094)	(0.099)	(0.104)	(0.108)
Average years of educational attainment in hh	-0.058***	-0.057***	-0.065***	-0.064***
	(0.019)	(0.021)	(0.022)	(0.023)
# of females in hh	-0.178***	-0.180***	-0.189***	-0.192***
	(0.060)	(0.051)	(0.065)	(0.056)
Are any hh members married (1/0)?	0.695***	0.598**	0.761***	0.658**
	(0.253)	(0.256)	(0.277)	(0.279)
# of married people in hh	-0.203	-0.144	-0.222	-0.159
	(0.145)	(0.137)	(0.158)	(0.150)
# of hh members ages 0-18	0.250**	0.132	0.274**	0.140
	(0.095)	(0.112)	(0.104)	(0.124)
# of hh members ages 19-24	-0.038	-0.056	-0.048	-0.072
	(0.224)	(0.230)	(0.244)	(0.251)
# of hh members ages 25-45	-0.056	-0.110	-0.067	-0.129
	(0.155)	(0.196)	(0.168)	(0.213)
# of hh members ages 46-65	-0.120	-0.174	-0.137	-0.198
	(0.157)	(0.204)	(0.172)	(0.223)
# of adult hh members in military	0.966	0.443	1.052	0.485
	(0.785)	(0.746)	(0.859)	(0.821)
# of adult hh members enrolled in school and employed	0.588**	0.466*	0.652**	0.519*
	(0.269)	(0.252)	(0.296)	(0.278)
# of adult hh members enrolled in school and not employed	-0.377	-0.409	-0.421	-0.455
	(0.314)	(0.287)	(0.344)	(0.315)
# of adult hh members employed (and not in school)	0.467***	0.392***	0.512***	0.429***
	(0.110)	(0.108)	(0.120)	(0.119)
# of adult hh members unemployed (and not in school)	0.299**	0.230**	0.333**	0.255**
	(0.120)	(0.112)	(0.132)	(0.126)
ln(per capita GSP)	0.524		0.572	
	(0.370)		(0.403)	
Pull:				
Any hh member with a spouse that lives outside of hh (1/0)?	0.407	0.268	0.472	0.316
	(0.477)	(0.515)	(0.518)	(0.562)
# of hh members with a spouse that lives outside of hh	0.634	0.606	0.652	0.625
	(0.392)	(0.373)	(0.427)	(0.408)
Ln (average per capita GDP in birth country)	-0.763***		-0.836***	
	(0.073)		(0.080)	
Distance:	0	0	0	0
Any native born hh members (1/0)?	-0.109	-0.715	-0.111	-0.742
	(0.184)	(0.773)	(0.202)	(0.856)
Any likely undocumented hh members (1/0)?	0.427**	0.441***	0.468**	0.485***
	(0.212)	(0.163)	(0.231)	(0.177)
# of hh members that are native born	-0.230*	-0.115	-0.254*	-0.123
	(0.132)	(0.153)	(0.144)	(0.168)
# of hh members that are likely undocumented	0.041	-0.003	0.043	-0.004
	(0.110)	(0.079)	(0.120)	(0.087)
# of hh members that first entered US in previous 0-5 years	0.208	0.312*	0.227	0.345*
	(0.176)	(0.171)	(0.191)	(0.188)
# of hh members that first entered US in previous 6-10 years	0.075	0.215	0.085	0.241
	(0.167)	(0.162)	(0.182)	(0.177)
# of hh members that first entered US in previous 11-15 years	0.018	0.167	0.022	0.188
	(0.170)	(0.145)	(0.185)	(0.159)
# of hh members that first entered US in previous 16-20 years	0.046	0.150	0.055	0.172
	(0.156)	(0.137)	(0.170)	(0.150)
# of hh members that first entered US in previous 21-25 years	0.030	0.191	0.039	0.219
	(0.170)	(0.190)	(0.185)	(0.208)
# of hh members that first entered US in previous 26-30 years	-0.252	-0.150	-0.271	-0.156
	(0.154)	(0.179)	(0.169)	(0.197)
# of hh members that first entered US more than 30 years ago	-0.192	-0.124	-0.208	-0.130
	(0.137)	(0.129)	(0.149)	(0.141)
Ln(distance between US state of residence & birth country)	-0.244*	0.079	-0.272*	0.087
	(0.125)	(0.165)	(0.136)	(0.181)
Any hh members born in Canada (1/0)?	0.136		0.154	
	(0.296)		(0.326)	
Any hh members born in Mexico (1/0)?	0.539***		0.585***	
	(0.197)		(0.214)	
Constant	3.190	-0.451	3.595	-0.482
	(4.353)	(1.121)	(4.747)	(1.231)
Fixed effects (U.S. destination and birth country)	No	Yes	No	Yes
Observations	3,677	3,816	3,677	3,816
R-squared	0.131	0.187	0.130	0.186

'hh' stands for household

'asinh' is inverse hyperbolic sine

Robust standard errors in parentheses, clustered at state level

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

Table 5. Selection Results

VARIABLES	(1) Two-part model Remit	(2) Two-part model log R	(3) Heckman log R
Push:			
Log (hh weekly earnings)	0.042**	0.155**	0.220***
	(0.016)	(0.069)	(0.081)
Average years of educational attainment in hh	-0.010***	0.020*	0.009
	(0.003)	(0.011)	(0.018)
# of females in hh	-0.015*	-0.121***	-0.141***
	(0.008)	(0.034)	(0.035)
Are any hh members married (1/0)?	0.097***	0.011	0.156
	(0.035)	(0.265)	(0.308)
# of married people in hh	-0.026	0.040	0.011
	(0.021)	(0.116)	(0.121)
# of hh members ages 0-18	0.036**	0.140	0.188
	(0.018)	(0.162)	(0.159)
# of hh members ages 19-24	-0.015	0.239	0.216
	(0.031)	(0.159)	(0.181)
# of hh members ages 25-45	-0.018	0.206	0.181
	(0.021)	(0.140)	(0.158)
# of hh members ages 46-65	-0.024	0.200	0.170
	(0.025)	(0.122)	(0.139)
# of adult hh members in military	0.137	0.752*	0.927*
	(0.114)	(0.419)	(0.477)
# of adult hh members enrolled in school and employed	0.096**	-0.280	-0.149
	(0.041)	(0.215)	(0.201)
# of adult hh members enrolled in school and not employed	-0.090	0.322*	0.193
	(0.056)	(0.192)	(0.228)
# of adult hh members employed (and not in school)	0.064***	0.015	0.092
	(0.016)	(0.083)	(0.080)
# of adult hh members unemployed (and not in school)	0.052***	-0.138	-0.068
	(0.019)	(0.131)	(0.118)
ln(per capita GSP)	0.084	0.177	0.335
	(0.052)	(0.231)	(0.275)
Pull:			
Any hh member with a spouse that lives outside of hh (1/0)?	0.089	0.121	0.208
	(0.069)	(0.218)	(0.237)
# of hh members with a spouse that lives outside of hh	0.022	0.408**	0.427***
	(0.057)	(0.159)	(0.157)
Ln (average per capita GDP in birth country)	-0.123***	-0.191*	-0.371**
	(0.012)	(0.106)	(0.178)
Distance:			
Any native born hh members (1/0)?	-0.005	-0.251**	-0.267**
	(0.027)	(0.118)	(0.127)
Any likely undocumented hh members (1/0)?	0.074***	0.246*	0.370*
	(0.027)	(0.141)	(0.204)
# of hh members that are native born	-0.038*	-0.090	-0.140
	(0.021)	(0.123)	(0.133)
# of hh members that are likely undocumented	-0.003	-0.023	-0.044
	(0.014)	(0.062)	(0.065)
# of hh members that first entered US in previous 0-5 years	0.026	-0.033	0.011
	(0.022)	(0.143)	(0.164)
# of hh members that first entered US in previous 6-10 years	0.014	-0.128	-0.101
	(0.023)	(0.146)	(0.162)
# of hh members that first entered US in previous 11-15 years	0.006	-0.120	-0.106
	(0.023)	(0.147)	(0.161)
# of hh members that first entered US in previous 16-20 years	0.012	-0.153	-0.127
	(0.022)	(0.137)	(0.155)
# of hh members that first entered US in previous 21-25 years	0.015	-0.288*	-0.265
	(0.025)	(0.166)	(0.183)
# of hh members that first entered US in previous 26-30 years	-0.032	-0.295*	-0.334**
	(0.025)	(0.154)	(0.160)
# of hh members that first entered US more than 30 years ago	-0.029	-0.142	-0.184
	(0.022)	(0.104)	(0.138)
Ln(distance between US state of residence & birth country)	-0.047***	0.133	
	(0.017)	(0.083)	
Any hh members born in Canada (1/0)?	0.048	-0.432	-0.426
	(0.065)	(0.374)	(0.383)
Any hh members born in Mexico (1/0)?	0.087***	0.280**	0.359*
	(0.026)	(0.136)	(0.206)
Constant		4.062	3.839
		(2.620)	(2.931)
Fixed effects (U.S. destination and birth country)	No	No	No
Observations	3,677	1,083	3,677
R-squared		0.135	

'hh' stands for household

Robust standard errors in parentheses, clustered at state level

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

Figure 1

Remittance-Earnings Elasticity
By Number of Adult Men and Women in the Household
Elasticity
-.2
0
.2
.4
.6
.8
0 Men
1 Man
2+ Men
0
1
2+
Number of Women in the Household
Number of Men in Household
0
1
2+
X=Significant at 5%

Figure 2

Remittance-Earnings Elasticity
By Number of Adult Men and Women in the Household
Elasticity
-.2
0
.2
.4
.6
.8
0 Men
1 Man
2+ Men
<=-2
-1
0
1
>=2
Difference between Number of Women & Men in the Household
Number of Men in Household
0
1
2+
X=Significant at 5%