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THE TIME PATTERN OF REMITTANCES: EVIDENCE FROM MEXICAN MIGRANTS*

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Abstract

We explore the time pattern of remittances using data on return migrants from the Mexican Migration Project. Some of these return migrants have settled in the U.S. and are returning to Mexico to visit family and friends, whereas others are temporary migrants returning home after a working spell in the U.S. We find that the dollar amount remitted first increases with time spent in the U.S. to later on decline after five and a half years of U.S. experience, lending support to the existence of an inverted “U” time pattern in migrant remittances. Furthermore, as expected, remittance decay occurs at a faster rate for migrants maintaining weaker ties to Mexico and up to three years later for their counterparts with spouses back in their origin communities.

— Key words: remittance decay, return migrants, temporary migrants, Mexico, Mexican Migration Project.
Classification JEL: F22, D13, O19.

Introduction

It is often claimed that the remittances sent home by migrants decay with the duration of their migratory spells. Remittance decay is thought to take place because migrants’ attachments to their home communities are presumed to weaken with time, reducing their need and desire to remit money home. Despite the broad acceptance of this view, there is very little empirical evidence in support of remittance decay. In this paper, we consider this proposition and empirically explore whether the time pattern of remittances is consistent with the notion of remittance decay.

It is likely that when migrants first move away from home, they either do not remit or they remit only modest amounts of money. The first order of business for the new community member

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is to settle into the new surroundings, secure a job, save to obtain lodgings, and even learn about the various options available to remit money home. Relocation and start-up costs are likely to leave the immigrant with few resources to share with family members back home during the initial stages of migration. Eventually, however, these relocation costs fall, enhancing migrants' ability to remit money home.

However, as migrants' residencies in the host country lengthen, it is likely that migrants' attachments to their home communities weaken for a variety of reasons. For instance, family reunification may eliminate migrants' need to remit money home. Alternatively, migrants may form new families and acquire new responsibilities that compete with older and less pressing responsibilities in the origin communities. Yet another possibility is that, with the passage of time, the initial economic need prompting migration wanes. For example, a younger sibling might eventually enter the home community labor market and assume the financial responsibilities of the absent household member. This may free the migrant from continuing to support the family. In all these instances, migrants' attachments and responsibilities to their home communities are weakened, which may lead to reductions in remittances as their U.S. experiences lengthen. It is this eventual reduction in remittance outflows that we attempt to capture and explore herein.

Whether remittance-decay¹ takes place is of interest for a number of reasons. Policy makers counting on remittances as a source of income for developing economies have an interest in learning about the persistence of these foreign exchange inflows. Suppose that national policy converts temporary migrants into permanent migrants. Since, temporary migrants are more likely to stay more closely attached to the home community, they are less likely to reduce their remittance flows. Hence, the conversion of temporary into permanent migrants will diminish the monetary resources that can be expected to derive from emigration. Some researchers (e.g. Orrenius 1999; Massey, Durand and Malone, 2002) have noted that the average U.S. trip duration for Mexican emigrants has lengthened following tougher border patrol measures implemented at the Mexico-U.S. border. If this is a reflection of the conversion of temporary migration into more permanent migration, many Mexican communities with high levels of migration may experience a decline in remittance inflows as border enforcement policies continue to become more stringent and U.S. residencies for those emigrants become more permanent.

Another policy that could impact on the permanency of migration is an expansion and reconfiguration of a Mexican guest-worker program. Proposed legislation envisions providing a large number of currently unauthorized Mexicans with work visas. But these visas would be renewable only if the guest worker returns to Mexico to apply for an extension. By continually sending the guest worker home, interruption of the assimilation process may take place, thereby slowing down remittance-decay. Likewise, recent Dominican Republic policies that facilitate the participation of up to the second generation of emigrants in the political and social processes of

¹ It is important to note that the term "remittance-decay" has also been used in an alternative context to signify how remittances respond to variations in the levels of income of the home family (Hunte 2004). When home families establish a minimal living standard, Hunte argues that the migrant reduces the level of support in the form of remittances. Diminishing marginal utility of income and paternalistic behavior to stem erosion of the work ethic are two explanations that Hunte provides for the negative impact of home community income on remittance. This is an unconventional use of the term of remittance decay.

the island (e.g. Bernstein 2004) may also interrupt the waning of ties with the home community and slow down remittance-decay.

In this study, we attempt to gain a better understanding of the overall time pattern of remittances by examining how remittances vary with the length of time that migrants from Mexico spend in the US. We hypothesize that migrants' remittances exhibit a hump-shaped time pattern according to which remittances first rise as some start-up costs to remitting are covered to eventually fall as migrants' U.S. experiences surpass a certain threshold and migrants' ties with their home communities weaken for one reason or another.

1. Literature Review

In what follows we summarize a variety of findings regarding the time profile of emigrants' remitting patterns. Few articles have focused on this question. In most instances, analyses regarding the time pattern of migrant remittances are limited to a discussion of the sign on the coefficient indicative of the time spent by migrants away from home in empirical studies focusing on other aspects of migrants' remitting behavior.

A few studies in the literature have reported a positive impact of time on emigrants' remittances to the homeland. As noted earlier, this direct impact may be due to the existence of "start up costs" to remitting money home. In this vein, De la Brière *et al.* (2002) find that the coefficient on the length of migrants' stays in the host country is positive and statistically different from zero when examining the likelihood to remit and the amount sent home by Dominican emigrants. Likewise, Agarwal and Horowitz (2002) find that a dummy variable indicative of whether migrants left home more than a year ago is positive and statistically different from zero. In their often cited paper, Lucas and Stark (1985) find that the duration of migrants' stays in the host country are tied to higher remittance volumes.

In contrast to the studies that find remitting probabilities increasing with time, most analyses appear unable to find a statistically different from zero impact of the time spent by emigrants in the host country on the amount remitted home. Studies of the behavior of Tuvaluans in New Zealand, (Simati and Gibson 2001) and of Tongan and Western Samoan migrants (Brown 1997) detect no systematic variation in their remittances and the time spent away from home. Likewise, using data from the Mexican Migration Project, Durand *et al.* (1996) reject the hypothesis of declining remittances as the duration of migrants' stays in the U.S. lengthens.

The only empirical study we could find that supports remittance-decay is by Menjívar *et al.* (1998). When examining the remittance behavior of Salvadorian and Filipino immigrants in the U.S., the authors find that the probability to remit declines with the length of migrants' trips to the U.S. However, Menjívar *et al.* (1998) still fail to observe declines in the amounts remitted as time in the host community lengthens.

A number of studies, while not directly addressing the time pattern of remittances, hint at the existence of a link between remittances and the permanency of migration. Duraisamy and Narasimhan (2000), in a study of rural to urban migration in India, find that the coefficient on time spent in the host community does not affect the decision to remit or the amount remitted home by migrants. However, the authors report that the intent to return home is positively related to emigrants'

remittances. In other words, those who consider themselves temporary migrants are more apt to remit and they remit more. Similarly, in a study of immigrants in Germany, Merkle and Zimmermann (1992) find that when including years of residency in the host community and the planned duration of their German residency, only the latter impacts remittances. Specifically, migrants with longer planned stays in Germany remit less. These studies suggest that the intent to return plays an important role in migrants' remitting patterns. If one intends to return home and is thus migrating only on a temporary basis, it is important to maintain a presence in the community and to build up assets (saving) that can be tapped upon return. Indeed, the entire point of migrating in this case may be to accumulate for a particular project, such as purchasing housing or land. In this vein, Glytsos (1997) finds that temporary Greek migrants in Germany and Australia are more likely to remit than their more permanent counterparts.

In sum, some studies suggest that remittances increase with time spent away from home, others suggest that they decrease over such a period of time, and still others make the claim that the decision to remit and the amount remitted are correlated with whether an individual is a temporary or a permanent immigrant. In this study, we reconcile these various reports on the time pattern of remittances. We hypothesize that remittances initially rise with time spent in the host country as migration costs are recovered and better employment secured. As a result, some immigrants gain more financial flexibility and are able to remit larger amounts home. However, with the passage of time, migrants' attachment to their home communities weakens and so do their gifts. Hence, remittances display an inverted "U" pattern; first rising to eventually fall as migrants' U.S. experiences lengthen beyond a given threshold. In what follows, we test this hypothesis regarding the hump-shaped time-pattern of migrant remittances.

2. Data and Some Descriptive Evidence

To explore whether remittances respond to time spent away from home, we use data from the Mexican Migration Project (MMP107). The MMP107 database is the result of a multidisciplinary study of Mexican migration to the U.S. Currently, the MMP107 database includes detailed social, demographic, and economic information from approximately 18,000 households in 107 representative communities in 17 Mexican states.² The MMP107 survey has been carried out annually in the winter months of 1982-1983 and 1987-2004. The MMP107 collects information from households randomly selected in a variety of Mexican communities. For each household, a complete life history is gathered for the household head, which includes detailed information on past migration experiences in the United States. After gathering detailed information on these households, interviewers travel to the destination areas in the U.S. to administer identical questionnaires to households from the same communities in Mexico who have settled in the U.S. and no longer return home. Altogether, the MMP107 provides reasonably representative data on Mexican immigrants in the U.S. (Amuedo-Dorantes, Bansak, and Pozo 2005, Massey and Zenteno 2000, Munshi 2003).

² As of the MMP107, the sample covers communities in the states of Aguascalientes, Baja California Norte, Chihuahua, Colima, Durango, Guanajuato, Guerrero, Hidalgo, Jalisco, Michoacán, Nayarit, Nuevo León, Oaxaca, Puebla, San Luis Potosí, Sinaloa, and Zacatecas.

In this study, we use the information collected from a group of Mexican immigrants upon their return home during the winter months. Some of these immigrants may have traveled back to Mexico with the intention of never migrating again to the U.S. Others may have simply returned to their origin community for a visit. Within this last group, some may plan to permanently return to Mexico at some future date, while others may intend to periodically return to Mexico with the exclusive purpose of visiting family and friends. The MMP107 does not allow us to distinguish these various groups of immigrants. Therefore, all we are able to confirm is that our inferences regarding the time pattern of remittances are restricted to return migrants. As frequently noted in the literature on Mexican migration (Cornelius 1976, 1978; Massey 1985; Massey et al. 1987; Ranney and Kossoudji 1983), a large fraction of these migrants are “circular migrants” who travel back and forth between Mexico and the U.S. multiple times as conveyed by the fact that the average number of trips to the U.S. for our sample of migrants is four. Is the analysis of return migrants of any interest? Yes, it is to the extent that returnees constitute the vast majority of Mexican immigrants to the U.S., possibly owing to the proximity of the two countries (e.g. Lowell 1992, Lindstrom 1996, Bean 2001). Finally, in an effort to minimize recall bias and ensure greater accuracy of responses, we restrict our sample to those whose last trip to the U.S. occurred after 1970.³

In addition to information on the duration of migrants’ U.S. experiences and monthly earnings remitted home during their last U.S. trip, we include a variety of migrant *personal*, *family*, *community* and *time-related* variables possibly affecting their remitting patterns. Specifically, among immigrants’ *personal* characteristics, we include their age, gender, educational attainment, ability to speak English, and legal status. We also include *family* related variables to account for the economic needs of immigrants’ families back in Mexico as captured by the presence of a spouse in Mexico and the percent of non-working age household members in Mexico. Finally, the analysis also controls for *community* and *time-related* factors possibly affecting immigrants’ money transferring behavior. The latter include the population density of immigrants’ communities of origin, a set of dichotomous variables indicative of migrants’ states of origin, and the decade when immigrants’ last crossed over into the U.S. A detailed description of the variables used in our analysis, their means and standard deviations are included in Table A in the appendix.

To familiarize ourselves with the data, Figure 1 displays a histogram of the duration of migrants’ U.S. experiences. Shorter U.S. experiences are more frequent than longer U.S. experiences. This is not surprising considering the continued growth of Mexican immigration. Figure 2 further allows us to better identify the most frequent migration spells, i.e. 6 months, 12 months, 2 years, 3 years, and 3 years plus.

What are some of the characteristics of migrants in our sample? The figures in Table 1 address this question with a description of some of the personal and family characteristics of migrants with various lengths of U.S. experience. In some cases, migrants’ characteristics appear to vary with the length of their overall migration experience, whereas, in other instances, we find no clear relationship between the two. For example, at a mere descriptive level, the figures in Table 1 suggest that migrants with longer U.S. experiences are also older. Likewise, immigrants’ legal status seems to be correlated with the length of their migration. Immigrants with longer U.S.

³ Approximately eighty percent of those in the MMP107 sample who migrated to the U.S. did so between 1970 and 2002.

Figure 1
Histogram of Months of U.S. Experience

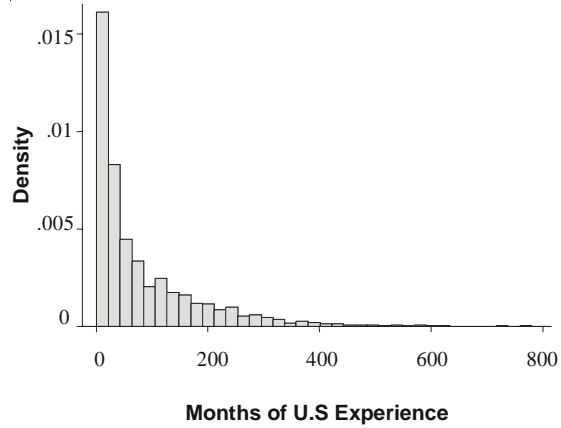


Figure 2
Histogram of Months of U.S. Experience
(Restricted to Experiences Lasting Less than 43 Months)

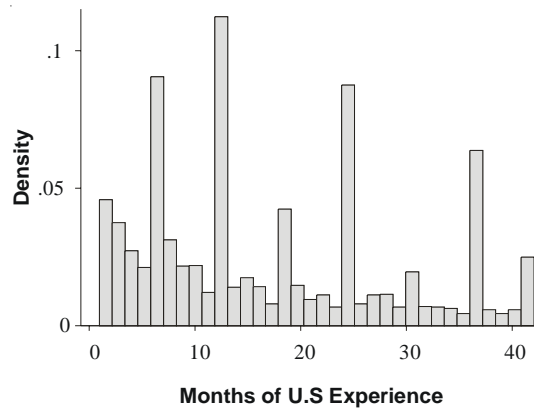


Table 1
Migrants' Characteristics According to Total U.S. Migration Experience

U.S. Migration Experience (Months)	N	Age	Years of Education	Percent Undocumented
0-6	633	41.94	5.87	78.10
6-12	670	41.63	5.57	86.17
12-24	722	41.01	5.60	80.56
24-36	470	39.64	5.60	82.73
36+	2652	43.25	5.76	47.01

U.S. Migration Experience (Months)	Percent Who Speak English	Percent with a Spouse in Mexico	Percent of Non-working Age Members in Mexico
0-6	14.22	92.58	63.85
6-12	13.43	93.88	65.07
12-24	17.45	92.11	65.06
24-36	20.21	85.11	64.24
36+	44.80	60.22	60.75

experiences (up to 3 years) appear more likely to be undocumented. This is expected given the greater costs and uncertainty of subsequent trips to the U.S. endured by returning undocumented migrants. However, the incidence of documentation rises among immigrants with U.S. experiences lasting in excess of 3 years. This statistic may be reflecting the fact that immigrants adjust their status over time or, alternatively, that legal immigrants are more likely to stay beyond 3-years time. The figures in Table 1 also corroborate the expectation that English proficiency increases with the time spent in the U.S., which could be indicative of the job market successes of those fluent in English and/or of immigrants' acquisition of U.S. specific human capital, such as language skills, over time. Additionally, we find that the duration of migrants' U.S. experiences seems to be a good predictor of the existence of a spouse or partner in Mexico as immigrants with spouses back home have shorter U.S. experiences on average. Yet, the length of migrants' U.S. experience does not appear to be correlated to the percent of household members in Mexico that are of non-working age nor with migrants' educational attainment. In sum, long-term migrants tend to be older, English proficient, and less likely to have a spouse or partner back home. These characteristics are consistent with those exhibited by more assimilated migrants.

In what follows, we discuss our strategy for examining how remittance levels vary with time ever spent in the U.S. In devising our strategy, we take into consideration the characteristics of our sample of Mexican migrants and the controls needed to net out the impact of immigrant characteristics that may, alternatively, explain variations in migrants' remittances over time.

3. Methodology

Our intent is to examine how the dollar amount remitted home by migrants during their last U.S. trip varies on account of the time ever spent in the U.S. Note that, while the vast majority of migrants in our sample worked while in the U.S. (approximately 94 percent of our sample), a large share of immigrants (slightly above 25 percent of migrants in our sample) did not send money home. Therefore, the distribution that applies to the sample data is a mixture of discrete and continuous distributions, rendering the use of OLS inappropriate. Following the literature (e.g. Brown 1997, Ravallion and Dearden 1998, Schrieder and Knerr 2000), we estimate a Tobit model that takes into account the censored nature of the distribution of immigrants' money transfers by modeling the likelihood of remitting and the amounts ultimately transferred as a function of the same covariates.

A potential disadvantage of the Tobit model is that a change in any regressor will have the same overall effect (that is the same sign) on both the probability of remitting money back home and on the amount finally transferred. Hence, a two-part model could improve on the estimation by allowing for the possibility that variables affecting the decision to remit may impact the amount sent home differently. Nonetheless, recognizing: i) the difficulty of conceiving appropriate identifiers that affect the decision to remit back home without influencing the amount transferred home by immigrants, and ii) the sensitivity of the findings to the choice of identifiers inherent in the estimation of two-part selection models, we view the estimation via a Tobit model as preferable.⁴

As such, we propose the following Tobit model for examining remitting behavior over time in immigrants' money transfers to Mexico:

$$R_{ifc} = \alpha t_{ifc} + \beta t_{ifc}^2 + X'_{ifc} \phi + \varepsilon_{ifc}, \text{ with } R_{ifc} = \max(0, R_{ifc}^*) \quad (1)$$

and where: $\varepsilon_{ifc} \sim N(0, \sigma^2)$, i = migrating household head, f = family in Mexico, and c = community in Mexico. The vector R_{ifc} refers to the dollar amount remitted home by migrants. The time ever spent by migrants in the U.S. is captured by t_{ifc} . We also include a squared term, t_{ifc}^2 , to allow for a non-linear pattern in migrants' remittance sending patterns. If, as hypothesized earlier, the pattern of migrants' remittances over time is hump-shaped, the coefficient on t would be positive and that of t^2 negative.

The model also accounts for a variety of immigrants' *personal, family, community* of origin, and *time-related* characteristics (included in vector X_{ifc} and discussed below) possibly affecting their remitting practices. As noted earlier, among immigrants' personal characteristics we include their gender and age. Controlling for migrants' gender and age is important since men of working

⁴ A second potential disadvantage of the Tobit and two-part selection models is their reliance on normality and homoscedasticity in the latent variables. However, as noted by Wooldridge (2003), neither conditional normality nor heteroskedasticity affect the unbiasedness or consistency of the OLS estimates and, as a result, for reasonable deviations from these assumptions, the Tobit model still provides good estimates.

age are still more likely to be the main breadwinners and, as such, are more likely to remit and to remit larger sums back home than, for example, non-working age female immigrants. Likewise, we include information on immigrants' legal status, educational attainment, ability to speak English, and monthly earnings during their last U.S. trip. All these characteristics are closely tied to immigrants' ability to send money to their families given their links to the employability and earnings capability of migrants. Immigrants' remitting patterns are also likely to be affected by their families' characteristics back in Mexico, such as family's economic needs. We include two variables to serve as proxies for immigrants' family needs back in Mexico: (a) a dichotomous variable indicative of whether an immigrant's spouse remained in Mexico and (b) the percent of non-working age family members in Mexico. Finally, we include a variety of geographic and time-related characteristics proxying for general macroeconomic conditions that may affect immigrants' money transferring behavior. These characteristics include the population density of immigrants' communities of origin as well as a set of state dummies. The population density captures the rural versus urban nature of immigrants' origin communities, whereas the state dummies, indicative of immigrants' state of origin, are intended to account for state-level economic differences and banking infrastructure possibly shaping migrants' remitting patterns. Additionally, we include a set of dummy variables to account for the decade when immigrants' last came to the U.S. as migrants' remittances reported in the survey pertain to those moneys sent during their last U.S. trip. These dummy variables are expected to capture a variety of macroeconomic conditions possibly affecting migrants' income and remitting practices.

While remittances are expected to rise with time for all new migrants (perhaps after local relocation costs are covered), these monetary transfers are likely to eventually decline as migrants' ties to their home communities weaken. Remittance decay is likely to be most prominent among migrants who have permanently settled in the U.S. and never return to Mexico as their attachment to their communities of origin is likely to weaken over time. Yet, remittance decay may still occur, although to a lesser extent, among other groups of migrants. For instance, remittances are likely to decline over time for migrants who settle in the U.S. but return to Mexico every now and then to visit family and friends during their festivities in the winter months.⁵ These migrants, despite being returnees, may have formed new families in the U.S. and assumed new responsibilities limiting their ability to remit. After all, average U.S. experience in our sample exceeds 7 years, a long enough period of time for migrants—including migrants returning to Mexico to visit family members periodically—to form new attachments and acquire new responsibilities in the host country. In addition, the immediate economic needs which often motivate the initial out-migration may diminish over time as the primary needs are covered with initial remittance transfers and/or as younger siblings enter the labor market and assume the financial responsibilities of the absent household member. As such, while our results are likely to be understated (on account of the absence of Mexican emigrants who have permanently settled but never return to Mexico), remittance decay may still be observed in our sample of return migrants.

To best understand the time pattern of remittances, it would be ideal to map out the impact of time on all categories of immigrants: i) those who have permanently settled in the U.S. and never return to Mexico, ii) those who have permanently settled in the U.S. and return to Mexico periodically

⁵ In fact, the MMP methodology is based on this migration pattern (see <http://mmp.opr.princeton.edu/databases/studydesign-en.aspx>).

to visit family and friends, and iii) those who migrate to the U.S. but consider Mexico “home” and their migration spell a temporary event. Unfortunately, this is not feasible. In fact, distinguishing these three migrant groups becomes an ambitious task in the case of Mexican migration given its circular nature. As noted by others in the literature (Cornelius 1976, 1978; Massey 1985; Massey et al. 1987; Ranney and Kossoudji 1983), the only permanent thing about Mexican migration is the fact that most of it is repetitive. Are returnees permanent migrants who settle in the U.S. and simply return for a visit on a periodic basis? Or are they migrants who come and go between the U.S. and Mexico on a need basis and, as such, are better characterized as temporary migrants? Given the cross-sectional nature of the MMP107, we are unable to unambiguously differentiate permanent from temporary migrants. Instead, we rely on observed characteristics, specifically the fact of having left a spouse or partner back home, to conjecture about the temporary nature of out-migration. Subsequently, we compare the remitting behavior of these two sub-samples of migrants and assess whether remittance decay exists in both instances and, if so, whether their remittance decay patterns significantly differ.

4. Findings

Table 2 displays the results from estimating the Tobit model in equation (1) using our sample of return migrants—a mixture of returnees who have settled in the U.S. and traveled back to Mexico only to visit family and friends along with returnees who envision their migratory spells as temporary. While, on average, we expect remittances to initially rise with time for both sets of migrants, decay is likely to be more pronounced among return migrants settled in the U.S. According to the figures in Table 2, the coefficient on U.S. experience is not significantly different from zero. However, it would be wrong to conclude that migrants’ remittances do not change with the duration of their U.S. experiences from this coefficient alone. Instead, we need to take into account the coefficient on U.S. experience as well as its square term, which are jointly significant at the 1 percent level.⁶ When doing so, we find evidence that remittances initially rise but later decay as migrants’ U.S. experiences exceed 66 months or approximately 5.5 years.

On an immediate basis, other personal, community and time-related factors appear to be exerting a greater impact on migrants’ remitting practices. For instance, we find that male Mexican migrants are approximately 25 percentage points more likely to remit than their female counterparts. Furthermore, they typically remit about 74 dollars more per month than similar Mexican women. In addition to gender, the figures in Table 2 indicate the importance of human capital for understanding migrants’ remitting practices. In this regard, we observe that, once we account for earnings, more educated and English proficient Mexican migrants remit less than their less educated and less English proficient counterparts. Finally, Mexican migrants’ remitting patterns appear sensitive to the characteristics of their home communities as well as to the timing of their last U.S. visit. Specifically, as noted by the literature at large, remittances appear to be primarily headed to rural areas with smaller population densities. Additionally, Mexican migrants who last came to the U.S. in the 1970s or after 1999 seem to remit more than their counterparts who last came in the 1990s (our reference category).

⁶ Specifically, the F-statistic is given by: $F(2,3315)=21.35$, with $\text{Prob}>F=0.0000$.

These patterns could be reflecting a variety of trends, including less favorable economic conditions for rural Mexicans on account of NAFTA and the growing availability of means by which migrants are able to send money back home to their families in recent years.

While interesting, our sample of analysis in Table 2 includes both returnees who have settled in the U.S. and traveled back to Mexico only to visit family and friends as well as returnees who envision their migratory spells as temporary. Remittance decay is expected to occur faster for migrants who settle in the U.S and return to Mexico only to visit family and friends relative to their migrant counterparts who consider their migratory work spell as temporary and plan to go back “home” to Mexico. To better assess the varying degrees of remittance decay according to the permanency of their migration, we divide our sample into two groups. One group consists of migrants with spouses/partners residing in Mexico and who, as such, are more likely to have emigrated to the U.S. temporarily.⁷ Everyone else is included in a second group composed of migrants who did not leave a partner or spouse back in Mexico during their last U.S. spell. Migrants in this second group are, thus, more likely to settle in the U.S. and travel back to Mexico to visit family and friends than their counterparts in group one. We then repeat the analysis using these

Table 2
Tobit Model of Remittances Sent Home by Migrants

Variables	Coefficient	S.E.	Partial Effect on the Probability of Being Uncensored	Partial Effect on the Conditional Expectation
Male	192.8401 ***	28.8557	0.2458	74.1766
Age	0.3738	0.5870	0.0005	0.1689
Undocumented	11.9962	14.1351	0.0146	5.4070
Years of Education	-3.4674 **	1.7357	-0.0042	-1.5672
Speaks English	-24.5252 *	14.4414	-0.0299	-10.9867
Time in the U.S.	0.2922	0.1846	0.0004	0.1321
Time in the U.S. Squared	-0.0021 ***	0.0005	-2.60E-06	-0.0010
Monthly Earnings in the U.S.	0.0060 ***	0.0024	7.26E-06	0.0027
Left Spouse in Mexico	-43.3723	32.7399	0.0538	-18.8728
Dependents in Mexico	36.4713	24.2090	0.0443	16.4839
Population Density in Origin	-0.0001 ***	3.55E-05	-1.45E-07	-0.0001
Last Entered During the 1970s	53.9283 ***	21.0706	0.0637	25.3234
Last Entered During the 1980s	22.3814	14.3154	0.0270	10.2002
Last Entered After 1999	72.7636 **	31.3222	0.0841	35.0166
Number of Observations			3345	
(Left) Censored Observations			968	
LR Chi2 (29)			237.15	
Log Likelihood			-17747.515	

Notes: *** Signifies statistically different from zero at the 1% level or better, **5% level or better and *10% level or better. The regression includes a constant and a set of dummies indicative of the state of origin of the migrant. The omitted category for the decade of last visit is ‘Last Entered during the 1990s’.

⁷ As always, deciphering whether a migrant with a spouse or partner back in Mexico is temporary or permanent is difficult to assess, as s/he may migrate to return back shortly or s/he may migrate with the intent that her/his spouse or partner will follow.

two sub-samples. Subsequently, we compare our findings for these two immigrant groups to better understand the time pattern of their remitting behavior.

The results from our analysis are displayed in Table 3. The figures in PANEL A report our findings when using the restricted sample of Mexican migrants who left a spouse or partner back in Mexico during their last U.S. spell. As noted earlier, these migrants are likely to have migrated to the U.S. on a more temporary basis. Due to the limited number of migrants in this category, we lose much of the significance we had in our earlier estimates. Of special interest to us is the time pattern of remittances observed in PANEL A relative to PANEL B.

The figures in PANEL A indicate that the dollar amount remitted by Mexican migrants with spouses/partners back home and, therefore, with greater ties to Mexico increases by \$1.70 with each additional month of U.S. experience. This finding is in accordance with the literature identifying a positive relationship between remittances and the duration of migration spells (e.g. Lucas and Stark 1985, Agarwal and Horowitz 2002, De la Brière *et al.* 2002). The increase in remittance receipts as migrants' residencies lengthen supports the view that start up costs exists with respect to remitting money home. These remittances, however, increase at a decreasing rate. As such, there is evidence of remittance decay as migrants' U.S. experiences exceed 104 months or approximately 8.7 years.

The estimates in PANEL B correspond to migrants who did not leave a partner/spouse back in Mexico during their last U.S. spell and who, as such, are more likely to permanently settle in the U.S., returning to Mexico to temporarily visit family and friends. For this group of return migrants, remittances do not necessarily increase with each additional month of U.S. experience. However, as in Table 2, we cannot conclude from the coefficient on U.S. experience that time in the U.S. does not affect their remitting patterns. In fact, when the coefficients on U.S. experience and U.S. experience squared are both taken into consideration, we continue to find evidence of remittances varying with time.⁸ However, unlike their more temporary counterparts, remittances start to decay three years earlier, i.e. after 68 months or 5.7 years of U.S. experience. This faster turn-around in remittances is what we would expect for a sample that is likely to be composed of migrants more likely to be returning to Mexico for a visit. In contrast, remittances decay at a slower rate among immigrants with greater attachments to Mexico.

5. Discussion and Conclusions

While the literature on the time profile of remittances provides empirical support for alternative hypotheses regarding migrants' remitting patterns over time, we are able to empirically reconcile these competing hypotheses and findings. Remittances appear to exhibit a "hump-shaped" or inverse "U" pattern. They first grow as migrants' U.S. experiences lengthen consistent with the notion that, as migrants adapt to their host communities and migration costs are eventually paid off, they are able to remit more back to their families and friends in Mexico. Nonetheless, migrants' remittances eventually weaken with the passage of time, most likely as a by-product of their assimilation to the host country.

⁸ They are jointly significant at the 1 percent level. Their F-statistic is given by: $F(2,3211)=20.91$, with $\text{Prob}>F=0.0000$.

In examining the time pattern of migrants' remitting profiles, we have worked with various samples of return migrants from the Mexican Migration Project (MMP107). In our first sample, we include all return migrants from the MMP107 (with the proviso that their first migration occurred in 1970 or later). This sample consists of: (1) immigrants who settle in the U.S. and return to Mexico to visit family and friends, and (2) immigrants who have temporarily migrated to the U.S. to work and are now returning to their homes in Mexico. Given their likely distinct remitting patterns, we attempt to distinguish between these two sub-samples using information on whether they left spouses/partners in Mexico during their last U.S. trip as a proxy for their temporary versus permanent migrant nature. Specifically, we consider that migrants who left spouses or partners in Mexico during their last U.S. spell are more likely to have migrated to the U.S. on a temporary basis with the intent to go back to their homes in Mexico. In contrast, migrants without spouses or partners in Mexico are more likely to settle in the U.S. and return to Mexico for just a visit.

Using all temporary and permanent migrants in the MMP107, we find that, on average, remittances start to decay when their U.S. experience exceeds 5.5 years. We then examine the

Table 3
Tobit Model of Remittances Sent Home by Migrants According to Whether They Left a Spouse in Mexico

Sample of Analysis		PANEL A – Migrants with a Spouse in Mexico			
Variables	Coefficient	S.E.	Partial Effect on the Probability of Being Uncensored	Partial Effect on the Conditional Expectation	
Male	40.6090	70.9210	0.0855	19.7283	
Age	-0.4776	2.0905	-0.0010	-0.2452	
Undocumented	35.7316	52.8269	0.0735	17.7919	
Years of Education	-6.9584	7.0602	-0.0139	-3.5716	
Speaks English	51.4675	52.9653	0.0973	27.6002	
Time in the U.S.	3.2454***	1.1724	0.0065	1.6658	
Time in the U.S. Squared	-0.0156***	0.0053	-3.12E-05	-0.0080	
Monthly Earnings in the U.S.	0.0179	0.0140	3.58E-05	0.0092	
Dependents in Mexico	-3.2720	95.7610	-0.0065	-1.6794	
Population Density in Origin	-0.0003**	0.0001	-5.71E-07	-0.0001	
Last Entered During the 1970s	21.7871	69.5380	0.0421	11.4839	
Last Entered During the 1980s	42.2967	48.5760	0.0813	22.3909	
Last Entered After 1999	-252.1922*	133.5634	-0.5465	-88.2776	
Number of Observations			105		
(Left) Censored Observations			31		
LR Chi2			38.81		
Prob > Chi2			0.0659		
Log Likelihood			-507.4067		

Table 3 (continued)

Sample of Analysis		PANEL B – Migrants without a Spouse in Mexico			
Variables	Coefficient	S.E.	Partial Effect on the Probability of Being Uncensored	Partial Effect on the Conditional Expectation	
Male	203.2054***	30.0908	0.2566	77.5264	
Age	0.3664	0.6012	0.0004	0.1655	
Undocumented	10.3515	14.4538	0.0125	4.6648	
Years of Education	-3.5893**	1.7756	-0.0043	-1.6212	
Speaks English	-26.2152*	14.8102	-0.0317	-11.7311	
Time in the U.S.	0.2725	0.1879	0.0003	0.1231	
Time in the U.S. Squared	-0.0021***	0.0005	-2.53E-06	-0.0009	
Monthly Earnings in the U.S.	0.0059**	0.0025	7.05E-06	0.0026	
Dependents in Mexico	38.2047	24.7962	0.0460	17.2558	
Population Density in Origin	-0.0001***	3.64E-05	-1.38E-07	-0.0001	
Last Entered During the 1970s	55.0980***	21.6284	0.0645	25.8684	
Last Entered During the 1980s	22.5566	14.6722	0.0270	10.2728	
Last Entered After 1999	81.0579***	32.0403	0.0924	39.2353	
Number of Observations			3240		
(Left) Censored Observations			937		
LR Chi2			229.66		
Prob > Chi2			0.0000		
Log Likelihood			-17214.098		

Notes: *** Signifies statistically different from zero at the 1% level or better, **5% level or better and *10% level or better. The regression includes a constant and a set of dummies indicative of the state of origin of the migrant. The omitted category for the decade of last visit is 'Last Entered during the 1990s'.

remitting patterns of our sub-sample of migrants with spouses and partners remaining in Mexico. For this group of migrants with greater attachments to Mexico, we find that remittances exhibit a “hump-shaped” time pattern. Specifically, remittances first increase with the length of migrants’ U.S. experiences to eventually decline as their U.S. experiences exceed 8.7 years. The fact that remittances decay, even for this sample of migrants more likely to envision their emigration as temporary, is interesting and suggests the need for the literature to consider additional remitting motives. Furthermore, we find that remittances decay at a faster rate, i.e. after 5.7 years of U.S. experience, in the case of migrants without spouses/partners in Mexico more likely to maintain weaker ties to Mexico. Overall, however, while the resources that immigrants send to Mexico do persist for a significant period of time, they eventually decline for both sets of migrants.

Several questions arise with respect to our findings. First, is the reduction in remittance transfers that occurs over time of economic significance? In our opinion, it is. Length of residency

is only one of many factors that determine the flow of resources that migrants send home. We have presumably adjusted for other determinants and conclude that after approximately 5.5 years the level of earnings remitted by immigrants will begin to reverse.

A second question we ponder is: what lies behind remittance decay? This question takes us back to the more basic question, i. e. what motivates remitters? Specifically, are remitters simply providing for family members in their communities of origin? Are remitters building up stocks of housing wealth in the origin community in anticipation of a future return? Are remittances reflecting payments to cover past migration related debts? Are remittances purchasing the right to return to the home community at a later date should the need arise? Are remitters buying insurance? Depending on their motives for remitting funds home, we would expect different remitting patterns. Therefore, a better understanding of the motives shaping immigrants' remitting practices could help further our understanding of remittance behavior over time.

Finally, we should emphasize that our analysis is based on a cross-section of emigrants for whom the survey collects retrospective information. Given the lack of true longitudinal data, we are unable to track migrants' remitting patterns over time. Instead, our findings result from comparing migrants with U.S. experiences of different durations in a cross sectional framework while attempting to control for all the other characteristics that could possibly influence the level of flows. As such, the validity of our inferences is contingent on our adequate control for all other determinants of remittances.

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Appendix

Table A
Description of Variables Used in the Analysis

Variables	Definition	Observations	Mean	S.D.
Dependent variable:				
Percent of Migrants Remitting	Percent of migrants remitting some monthly earnings to Mexico during their last U.S. trip	4346	0.7165	0.4507
Remittances Sent Home (Unconditional Mean)	Monthly earnings remitted to Mexico during their last U.S. trip (includes non-remitters)	4346	179.6069	277.3122
Remittances Sent Home (Conditional Mean)	Monthly earnings remitted to Mexico during their last U.S. trip (excluding non-remitters)	3114	250.6652	299.1977
Independent variables:				
Male	Gender dummy	5314	0.9462	0.2257
Age	Age at time of last migration to the U.S.	5314	42.2352	13.0984
Undocumented	Dummy equal to 1 if migrant lacked proper documentation at time of last entry	5294	0.6437	0.4789
Years of Education	Years of educational attainment	5306	5.6481	3.9683
Speaks English	Dummy equal to 1 if migrant spoke English during last U.S. trip	5314	0.3043	0.4601
Time in the U.S.	Time ever spent in the U.S. in months	5153	81.5277	96.8281
Monthly Earnings	Monthly earnings during their last U.S. trip	3903	969.4784	2715.562
Left Spouse in Mexico	Dummy variable for leaving a spouse in Mexico	5314	0.7578	0.4284
Dependents in Mexico	Percent of household members of non-working age back in Mexico	5314	0.6288	0.2342
Population Density in Origin	Number of people in migrant's origin community	4756	84630.36	224412.60
Last Entered During the 1970s	Dummy variable indicative of decade of last entry	4805	0.1496	0.3568
Last Entered During the 1980s	Dummy variable indicative of decade of last entry	4805	0.3095	0.4623
Last Entered During the 1990s	Dummy variable indicative of decade of last entry	4805	0.5030	0.5000
Last Entered After 1999	Dummy variable indicative of decade of last entry	4805	0.0379	0.1909

Source: Mexican Migration Project (MMP107).