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What makes you go back home? Determinants of the duration of migration of Mexican immigrants in the United States

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Abstract

This paper examines the optimal migration duration of Mexican immigrants in the USA using individual-level data from the Mexican Migration Project (MMP). A simple theoretical model rationalizes the decision of the migrant to return to Mexico, despite higher wages in the USA. I use the Cox proportional hazard model to empirically examine the determinants of return migration of Mexican immigrants. This paper contributes to the literature by introducing distances from origin states in Mexico to destination states in the USA as a proxy for costs of migration and uses a US expected wage measure instead of the average US real wages. The empirical analysis shows that the optimal migration duration increases as the US expected wage increases. Importantly, tighter US migration policies have an ambiguous effect on the optimal migration duration while longer distances decrease the hazard of return to their state of origin.

JEL Classification: F22, O15

1 Introduction

The evolution of Mexican migration to the USA is understood to be the result of several forces that encourage migration. The Mexico-US migration system is the largest and oldest migration system in the world (Massey, Durand, and Pren 2016). Understanding this system has gained new urgency in the current political climate. Mexican immigrants are at the center of one of the largest mass migration in modern history. Mexico is the top source of immigrants and newly arrived immigrants into the USA, according to a new Pew Research Center analysis of Census Bureau data (Pew Research Center 2015). Empirical studies on Mexican migration suggest a dynamic pattern of cross-border migration in which the economic situation in Mexico and the USA, as well as the presence of relatives in the USA, determines the location and length of stay of Mexican migrants (Massey et al. 1987; Hanson and Spilimbergo 1999; Lindstrom 1996). The relation between duration of migration trips and forces that spur migration (i.e., individual characteristics, location choices, and labor market conditions) is important and interdependent. Analyzing the determinants of this dynamic pattern is crucial in understanding Mexico-US migration and the long-term effects of policies to influence it.

Prior to 1986, Mexican migration to the USA was characterized by great circularity, with Mexican migrants coming and going in response to economic conditions on both

sides of the border (Massey, Durand, and Pren 2016). Between 1986 and 2008, this pattern changed to a more permanent undocumented Mexican population in the USA because of the sanctions imposed by the USA's immigration and border policies along with the sustained wage differential between Mexico and the USA. Return migration is still considerable in the Mexico-US border. From 2009 to 2014, 1 million Mexicans and their families (including US-born children) left the USA for Mexico, according to data from the 2014 Mexican National Survey of Demographic Dynamics (ENADID). The decline in the flow of Mexican immigrants to the USA is primarily due to the slow recovery of the US economy after the Great Recession (Passel et al. 2012) and the implementation of stricter migration policies. Thus, the Mexico-US migration system seems to be returning to less permanent migration trips.

Measuring migration flows between Mexico and the USA is challenging because there are no official counts of how many Mexican immigrants enter and leave the USA each year. Understanding duration allows one to better predict the stock of illegal immigrants at any point of time as a function of policy. Therefore, a clear understanding of the determinants of trip duration is crucial for evaluating the impact of US migration policies. This paper presents a simple theoretical model of a migrant's trip duration that incorporates social and economic factors in Mexico and the USA.

This paper fills a gap in the migration literature by analyzing the factors that increase or decrease the length of stay of Mexican immigrants in the USA, an issue widely ignored in the migration literature. The literature has mainly focused on describing the individual characteristics of migrants and estimating the number of entering migrants into the USA (Bean et al. 1987; Durand and Massey 1992). A notable exception is Angelucci (2012) who looks at the probability of Mexican immigrants staying in the USA given an increase in border enforcement. She estimates a discrete choice model of the decision to migrate to or from the USA. She finds that while increased border enforcement discourages migrants from crossing into the USA, it may discourage the return of migrants already in the USA to Mexico. Thus, if deterrence increases duration sufficiently, it may increase the level of illegal immigration to the USA. This study differs from Angelucci (2012) by estimating the determinants of the individual duration of migration trips and by using individual-level data on border enforcement; therefore, this study analyzes the effect of expected wages and distance traveled on the duration of migration trips that is not feasible when data is at an aggregate level.

By analyzing the determinants of the time individuals spend in the USA, I can describe how the duration of migration varies across individuals and in subsequent migrations. I also examine whether demographic characteristics, economic conditions, or social networks drive the duration of Mexican immigrants in the USA. Moreover, two new variables are introduced in the duration analysis. First, the distance in miles between the individual's origin state in Mexico and the destination state in the USA. This distance accounts for the transportation costs individuals incur when migrating. Secondly, instead of using the average US real wage to account for migration benefits, I use an expected US wage based on the destination state of each migrant that is a function of both the unemployment rate level and the average US real wage of the state. I also examine whether these durations have changed across migration trips and whether the characteristics that drove the duration of the first migration trip are similar for the last migration trip undertaken by the migrant.

The data is drawn from the Mexican Migration Project (MMP)[1] which is a survey conducted jointly by research centers based in Mexico and the USA since 1982. This survey focuses on the migration experience and social characteristics of Mexican migrants who have migrated to the USA, some of whom have never returned to Mexico. I use a cross section of 2375 individuals aged 15–64, who report the duration of their first trip to the USA. A second sample from the same source is also a cross section of 2658 individuals who report the duration of their last trip to the USA.

I use the Cox proportional hazard model to estimate the impact of characteristics of the individual, household, destination and origin areas, and the effect of US migration policy on the hazard of returning to Mexico during migration trips to the USA. The estimation of the baseline hazard function in this model bypasses parametric assumptions. I use information on Mexican immigrants who have completed their migration trips and have returned to Mexico, as well as those who migrated to the USA and have not yet returned to Mexico at the time of the survey (8% of migrants in the first migration sample never returned to Mexico, and 25% of migrants in the last migration sample never returned to Mexico). Moreover, I am able to establish from the nonparametric baseline hazard estimates, for example, that the migrants who are proficient in English have a lower hazard of return relative to those who do not speak or understand English.[2] Finally, the model estimates suggest that the hazard of returning to Mexico falls as the probability of being apprehended increases, while a tighter US migration policy increases the hazard of returning to Mexico. Therefore, I estimate an ambiguous effect of migration policy on the duration of migration trips by Mexican immigrants, a result that is consistent with Angelucci (2012).

The rest of the paper proceeds as follows. Section 2 presents a literature review of the determinants of migration. Section 3 presents a simple theoretical migration model that illustrates the relationship between wage differentials and optimal migration duration. Section 4 presents the empirical model. Section 5 discusses the results and policy implications of the empirical findings. Section 6 concludes.

2 Literature review

The migration literature indicates that the most important reason for people in Mexico to migrate to the USA is the difference in real wages between the two countries (Hanson and Spilimbergo 1999; Chiquiar and Hanson 2005). An assumption is that observed migration is preceded by a desire to migrate. This is based on the seminal work by Sjaastad (1962), in which migration is viewed as an investment decision: an individual decides to migrate if the expected discounted difference in the income stream between two places exceeds moving costs.

There are two features that facilitate migration trips between Mexico and the USA conditional on the wage differential between the two countries. The first feature is the existence of job and social networks among Mexican immigrants in the USA. Previous literature suggests that the most important determinant of immigrants' locational choices within the US is the presence of earlier immigrants. For example, we would expect that the probability of an immigrant living in a certain city is positively correlated with the fraction of the same ethnic population that resides in the area (e.g., Bauer et al. 2003; Bartel 1989). Chiswick and Miller (2014) find geographical agglomeration among international migrants by language. On the other hand, Bartel (1989) finds that highly

educated immigrants tend to be less geographically concentrated than less educated immigrants. Jaeger (2004) finds that migrants are more likely to locate in areas/neighborhoods with a high proportion of foreign-born individuals. Finally, Garcia (2005) found three distinct yet disconnected subnetworks: a traditional subnetwork, a church subnetwork, and a contact subnetwork.

The second feature is the demand for the quantity of unskilled labor that exists in the USA at a given wage rate. Hispanic immigrants who arrived in the USA between 2000 and 2004 secured nearly 1 million new jobs in 2004 (Kochhar 2004). More generally, labor market conditions affect the locational choice and at the same time impact the length of stay. Bartel (1989) found that Hispanics are less likely to live in areas with high unemployment rates. High unemployment levels in the USA are likely to negatively impact the amount of time Mexican immigrants stay abroad.

Despite a wide literature on the incentives of Mexican immigrants to move to the USA, we know little about the determinants of their migration duration. Return migration may occur despite a positive wage differential for two reasons. First, there may exist a relatively high preference for consumption at home (Djajic and Milbourne 1988; Galor and Stark 1991; Dustmann and Weiss 2007). This implies that the preference to stay in Mexico for longer periods of time is higher when the individual's family resides in Mexico or owns a property in Mexico.[3] Another reason, put forward by Dustmann (2003) and Dustmann and Weiss (2007), is the existence of a higher purchasing power of the dollar in Mexico. In the past, Mexico has suffered peso collapses that suddenly increased the purchasing power of the dollar. These conditions may incentive an *earlier* return since savings increase in relative terms. An important issue is the role that expected wages play in the optimal migration duration. Based on the prior discussions, intuition suggests that the optimal migration duration increases as the expected wage increases.

In the past, temporary migrations were frequent among Mexican immigrants (Massey, Durand and Pren 2016). This pattern may be changing due to the tightening of the Mexico-US border. Recent evidence suggests that an increasing proportion of migrants eventually settle in the USA (Vernez and Ronfelt 1991). Moreover, Angelucci (2012) finds that, while increased border enforcement discourages migrants from crossing into the USA, it may discourage the return to Mexico of migrants already in the USA. Even so, temporary migrants still constitute a significant portion, if not a majority, of Mexican migrants to the USA. This change in the pattern of migration trips implies that the USA may be experiencing an increase in the number of illegal migrants residing within its borders. The existence of an illegal community in the USA has made migration reform a top and contentious policy issue.

3 Theoretical model of migration

In this section, I construct a simple theoretical model of migration following Dustmann (2003) and Dustmann and Kirchkamp (2002) that illustrates the relationship between wage differentials and optimal migration durations.[4] Dustmann (2003) analyzes optimal migration duration using a dynamic model of temporary migrations. He finds evidence that migration duration may decrease if the wage differential increases. Dustmann and Kirchkamp (2002) develop a model where migrants decide simultaneously optimal migration duration and their after-return activities.

The economy starts at some initial point in time, $t = 0$, where the migrant can choose to migrate or to stay at home. The migrant will choose the option that generates the highest utility. The individual dies at time T. Migrants decide simultaneously between staying in their home country and the optimal consumption and migration duration. Optimal migration duration results from a positive difference in real wages between the USA and Mexico and the existence of social networks in the USA. To simplify the analysis, I abstract from uncertainty in the model, particularly about wages in Mexico and in the USA. Individuals choose the optimal migration duration given a positive wage differential between Mexican and US wages ($w^{\mathrm{mx}} < w^{\mathrm{us}}$). I also assume that wages in Mexico and the USA are constant throughout the lifetime and that there is a continuum of migrants with different abilities and heterogeneous migration costs. The utility function depends on the consumption by the migrant in the USA and in Mexico (c^{us}, c^{mx}) and that the migrant will have an appetite for consumption in both places. Every month, a migrant decides whether to stay in the USA or return to Mexico. If the immigrant decides to return to Mexico, then temporary migration occurs. Assuming the migrant chooses the optimal duration in the USA, he will return at $\hat{t} \in (t, T)$. However, given the parameters of the model, different abilities will be associated with varying optimal migration durations, including $\hat{t} = 0$ and $\hat{t} = T$ which refer to permanent migrations. Permanent migrations occur when individuals choose to stay in Mexico or in the USA for their lifetime.

Following Dustmann (2003), the model only considers the case of interior solutions, which leads to temporary migrations. To present the choice problem, assume the existence of a utility function representing individual preferences. The migrant's lifetime utility function is given by

$$U = \sum_{\tau=1}^{\hat{t}} u(\mu^{\mathrm{us}}, c^{\mathrm{us}}) + \sum_{\tau=\hat{t}+1}^{T} u(\mu^{\mathrm{mx}}, c^{\mathrm{mx}}). \tag{1}$$

Since it was assumed that wages (w^{mx}, w^{us}) are constant throughout a lifetime, the utility function simplifies to

$$U = \hat{t}u(\mu^{\mathrm{us}}, c^{\mathrm{us}}) + \left(T - \hat{t}\right)u(\mu^{\mathrm{mx}}, c^{\mathrm{mx}}) \tag{2}$$

where $u(\cdot)$ are the utility functions in Mexico and the USA. This utility function exhibits diminishing marginal returns. μ^{mx} and μ^{us} are preference parameters. If $\mu^{\mathrm{mx}} > \mu^{\mathrm{us}}$, then the migrant prefers to live in Mexico rather than in the USA. Assume that immigrants have an appetite for consumption in both places, that is $u_c > 0$ and $u_{cc} > 0$. The maximization problem can be represented as

$$\max_{c^{\mathrm{us}}, c^{\mathrm{mx}}, \hat{t} \in (t,T)} U\left(c^{\mathrm{us}}, c^{\mathrm{mx}}, \hat{t}\right) = \hat{t}u(\mu^{\mathrm{us}}, c^{\mathrm{us}}) + \left(T - \hat{t}\right)u(\mu^{\mathrm{mx}}, c^{\mathrm{mx}}) \tag{3}$$

subject to the budget constraint

$$\left(T - \hat{t}\right)w^{\mathrm{mx}} + \hat{t}w^{\mathrm{us}} - \hat{t}pc^{\mathrm{us}} - \left(T - \hat{t}\right)c^{\mathrm{mx}} - cc = 0$$
$$w^{\mathrm{mx}} < w^{\mathrm{us}}$$

In the budget constraint of Eq. (3), the parameter p denotes the relative price of consuming in the USA relative to Mexico. If $p > 1$, then consumption in the USA is costlier than consumption in Mexico.[5] The term (cc) denotes the costs of crossing the

border, which include transportation costs, ability to cross the border, non-labor income (e.g., income from property owned in Mexico), and forgone income. The model presented here does not include savings as part of the budget constraint because I do not model the activity the migrant pursues if a temporary migration occurs. I assume that the migrant has used all his lifetime savings (if any) for covering the costs of crossing the border.[6]

The main analysis based on this model concentrates on investigating the duration of migration, discussed next. Denote the marginal utility of wealth as (θ). Differentiating the associated Lagrange equation with respect to the optimal time of return $\hat{t}$ yields a condition that determines the optimal migration duration:

$$\theta[(w^{us}-pc^{us})-(w^{mx}-c^{mx})]-[u(\mu^{mx},c^{mx})-u(\mu^{us},c^{us})]=0 \tag{4}$$

The first term of Eq. (4) $[(w^{us} - pc^{us}) - (w^{mx} - c^{mx})]$ represents the benefit of remaining an additional month in the USA. If $[(w^{us} - w^{mx}) > (pc^{us} - c^{mx})]$, $w^{us} > w^{mx}$, and $p > 1$, I expect this term to be positive (i.e., each month spent in the USA increases the migrant's lifetime wealth). However, note that this first term decreases in $\hat{t}$. The second term of Eq. (4) represents the costs of staying one additional month in the USA and is increasing in $\hat{t}$. Unfortunately, this second term cannot be signed since, although μ^{mx} is greater than μ^{us}, the model makes no assumption about the ordering of c^{mx} and c^{us}. The difference between the benefits and costs of staying one additional month in the USA decreases in $\hat{t}$. Thus, the optimal time of return occurs when the benefits of staying one more month in the USA are equal to the costs of doing so.

Comparative statics are derived using Eqs. (3) and (4) and the first-order conditions for c^{mx} and c^{us}. The change in the optimal migration duration due to changes in wages in the USA is summarized as follows:

$$dt = \psi_1 dw^{mx} + \psi_2 dw^{us} \tag{5}$$

where Ψ_i combines the partial derivatives of (3) and (4) with respect to θ, $\hat{t}$, w^{mx}, and w^{us}. If there is an increase in the wage differential, the current literature suggests we would expect an increase in migration duration. However, this model implies that the income effect is negative because the value of staying in the USA one additional month decreases as total wealth increases, leading to a reduction in the optimal migration duration.[7] Consequently, the theoretical model implies that there could be either an increase or a decrease in the duration of migration trips due to an increase in the wage differential.

This ambiguity in sign of the effect of an increase in the wage differential is also found in the model by Dustmann and Kirchkamp (2002) because of separate substitution and income effects. Migrant workers would like to extend the duration of their migration trip as long as possible as a direct response to higher wages in the USA. However, there are two conflicting effects as a result of an increase in the wage differential: an increase in the opportunity cost of returning to Mexico but also an increase in accumulated savings that tends to shorten the trip abroad.

Given the ambiguity of the sign of the relationship between migration duration and the wage differential between Mexico and the USA, I will empirically explore this relationship in the next section. While there are other effects to analyze theoretically, they are left for further research, for example, the effect on the optimal migration duration

of an increase in Mexican real wages, the effect of an increase in border enforcement, and the effect of an increase in migration experience.

4 Empirical model

This study focuses on understanding the determinants of migrants' trip duration. It is unlikely that I will observe all variables that determine the length of time a migrant spends abroad. Nevertheless, I do observe several variables that do influence migration duration decisions, such as the migrant's age at entry and the expected wages they will receive in the destination communities, as well as the costs of migration. It is possible that Mexican migrants shorten their migration trip as a response to higher expected wages in the USA. Ideally, Mexican migrants prefer to spend as little time as possible away from home and yet earn as much as possible during their stay in the USA. Therefore, when Mexican migrants have earned or remitted up to some predetermined target level, they return to their places of origin in Mexico. Conversely, Mexican migrants may decrease the duration of their migration trip with lower destination wages because the migrants' costs will exceed the benefits of remaining in the USA.[8] Therefore, there is an ambiguous effect of a change in wages in the USA. In this context, the key variable of interest is the effect of the expected wage in the USA on the duration of migration trips.

In addition, the expected length of time a Mexican migrant spends in their destination state on a given trip increases with higher migration costs. A migrant minimizes costs by taking a single longer trip rather than several short trips. The expected length of the trip also increases with tighter border controls and illegal status. This effect has the same rationale as minimizing migration costs. Every time a migrant crosses the border, he incurs explicit costs (e.g., coyote fees) and implicit costs (e.g., days waiting to cross the border, time spent crossing the border, risk his life). If these costs increase, the migrant is likely to stay for longer periods of time.

4.1 Migration characteristics

I use data from the Mexican Migration Project (MMP) constructed jointly by researchers based in Mexico and the USA from 1982 to 1999. In the MMP, several communities in both countries were surveyed each year. Each community was surveyed only once, obtaining a retrospective history of migration patterns. The selected communities are diverse in size and economic base; they encompass small agricultural towns, mid-sized towns, and metropolitan areas located primarily in the western part of Mexico, which has been characterized as the major supplier of Mexican immigrants. In each community, representative households are selected through simple random sampling.[9]

I focus on the migration experience and social and economic characteristics of individuals aged 15 to 64[10] who have migrated to the USA. I use information from interviews that are conducted in Mexico, which can be provided by the spouse of the head of the household if the head of the household resides in the USA. The time period includes migration trips taken between 1963 and 1999. This period is considered as the modern period of illegal migration, which refers to migrations that occurred after the *Bracero* Program ended.[11] Because I focus on interviews conducted in Mexico and migration trips

that occurred after 1963, I do not have individuals in our sample who have been in the USA already. The sample period includes three major changes in the US immigration law: The Immigration Reform and Control Act (IRCA) in 1986, the Immigration Act (IA) of 1990, and the Illegal Immigration and Responsibility Act (IIRA) of 1996. Finally, the most recent Mexican economic collapses in 1982 and 1994 are also included in the sample.[12]

The IRCA contains four main provisions: (1) sanctions were introduced on employers hiring illegal immigrants; (2) the Border Patrol resources were increased; (3) an amnesty was provided for undocumented immigrants who could prove they had resided continuously in the USA from 1982; and (4) a special legalization program was implemented for undocumented agricultural workers. The next legislative step was the passage of the 1990 Immigration Act. While its main provision was to introduce a yearly cap on total legal immigration to the USA, it is important for illegal Mexican migrants because the Act provided increased resources with regard to enforcement on the Mexican Border.[13] Finally, the Illegal Immigration and Responsibility Act, passed in 1996, mainly increased the penalties to those smuggling immigrants to the USA.

Based on the MMP survey, I can identify completed monthly durations of Mexican migrations to the USA. The sample consists of male and female immigrants, with most immigrants crossing the border illegally.[14] I created two samples, one that refers to the social and economic characteristics during the first migration trip undertaken by individuals, while the other one corresponds to the last trip. The first sample consists of 2375 individual migration trips measured in months undertaken by male and female migrants that occurred after 1963. The second sample consists of 2658 migration trips measured in months undertaken by male and female migrants reported as the last trip taken by the individual.

Table 1 presents summary statistics for durations of the first migration and the last migration of Mexican immigrants. It also presents the percentage of individuals that return to Mexico in the indicated period. There is a higher percentage of individuals returning within 6 months of arriving to the USA in the last migration than in the first migration. Moreover, there is a higher percentage of individuals that stay more than 5 years in the last migration than in the first migration. This accounts for the fact that the last migration sample has 672 right-censored observations.[15] I do not expect that the empirical results are driven by the behavior of long-term stayers because the sample

Table 1 Return frequency summary statistics

Duration in months	Less than 6 months	6–12 months	13–36 months	37–60 months	60+ months	Total
First migration						
Number of migrants	871	728	465	137	174	2375
Percentage	0.37	0.31	0.20	0.06	0.07	1.00
Mean						26.69
Standard deviation						57.16
Last migration						
Number of migrants	1091	658	433	158	318	2658
Percentage	0.41	0.25	0.16	0.06	0.12	1.00
Mean						22.91
Standard deviation						54.21

Source: Mexican Migration Project, migration file

still portrays both types of migration trips (e.g., return and permanent migration). Furthermore, the number of censored long-term migrants (duration greater than 5 years) in the sample is relatively small.

4.2 Definition of variables/covariates

Tables 2 and 3 define the variables used in the estimation and present summary statistics for the first and last migration samples. Characteristics of the individual include age of individual when migration occurred (*Age*), marital status and place of residence of the spouse (*married MX* and *married US*), number of children aged up to 15 years old (*minors*),[16] occupation, and education. These last variables (e.g., occupation and education) are a measure of human capital and are constructed using flexible education[17] and occupation specifications. The reason for a flexible specification is to control for the heterogeneity in the ability of migrants to obtain a job in the USA. Finally, the migrant reports his English proficiency (*ESL*), that is, if they understand, speak, write, and read in English. They have a score from 1 to 4, where 4 is the highest score, and they must read, write, and speak English, and 1 is the lowest score. *ESL* is a dummy variable that takes the value of one if they report a score of 4 and zero otherwise.

Table 2 Summary statistics

Variable characteristic	Variable name	Definition	First migration sample		Last migration sample	
			Mean	S.D.	Mean	S.D.
Individual	Age	Age at time of migration	26	9.252	26	9.010
	Married MX	1 if married and spouse resides in Mexico	0.888	0.35	0.972	0.165
	Married US	1 if married and spouse resides in USA	0.089	0.285	0.093	0.291
	Children	Number of children less than 15 years old	1.114	0.815	1.133	0.832
Occupation	Agricultural	1 if in agriculture	0.285	0.451	0.305	0.461
	Professional	1 if practices profession	0.052	0.222	0.056	0.231
	Manufacturing	1 if in manufacturing	0.176	0.381	0.219	0.414
	Unskilled	1 if unskilled laborer	0.163	0.369	0.152	0.359
	Self-employed	1 if self-employed	0.206	0.405	0.197	0.398
Household	Mother US	1 if mother resides in USA	0.103	0.304	0.098	0.297
	Father US	1 if father resides in USA	0.324	0.468	0.322	0.467
	Property MX	1 if owns property in Mexico	0.724	0.447	0.732	0.443
Origin	Urban	1 if comes from urban area	0.175	0.380	0.166	0.372
Schooling	Elementary	1 if completed 5th–6th grade	0.312	0.463	0.291	0.454
	Some middle education	1 if completed 7th–8th grade	0.052	0.222	0.047	0.212
	Middle education	1 if completed 9th grade	0.117	0.322	0.107	0.309
	Some high school	1 if completed 10th–11th grade	0.031	0.173	0.028	0.165
	High school	1 if completed 12th grade	0.045	0.207	0.041	0.198
	Some college education	1 if completed 13th–15th grade	0.027	0.163	0.025	0.156
	College education	1 if completed 16th–17th grade	0.024	0.154	0.022	0.146
	Some grad education	1 if completed 18th+ grade	0.009	0.094	0.008	0.091

Source: Mexican Migration Survey

Table 3 Summary statistics

Variable characteristic	Variable name	Definition	First migration sample		Last migration sample	
			Mean	S.D.	Mean	S.D.
Destination	Paisanos	1 if members same community reside same destination	0.634	0.482	0.637	0.481
	Exp. wage[a]	Expected wage in destination	9.858	1.211	9.531	1.361
Crossing border costs	Distance[b]	Distance in miles from origin to destination community	1.572	0.484	1.611	0.475
	Apprehension rate	Probability of apprehension	0.315	0.048	0.288	0.057
Migration Policy	Year migration	Year they migrated to USA	1981	7.756	1986	7.942
	IRCA	1 if legalized by IRCA 1986	0.928	0.259	0.158	0.364
	Year 1986	1 if crossed border after 1986	0.174	0.379	0.234	0.423
	Year 1990	1 if crossed border after 1990	0.129	0.335	0.364	0.481
Savings	Saving1[a]	1 if saved from 500 to 2500 USD during trip	0.261	0.440	0.258	0.437
	Saving2[a]	1 if saved more than 2500 USD during trip	0.186	0.389	0.187	0.390
	Remittances	1 if sent remittances to Mexico while in USA	0.661	0.473	0.657	0.475

Source: Mexican Migration Survey
[a]Series deflated by the US consumer index (CPI)
[b]Normalized by 1000 miles

Migration costs are defined as whether the city of origin is considered an urban (*Urban*) or a rural area.[18] This distinction of migration costs is because it is more likely that the migrant in an urban area has more options to travel than a migrant from a rural area. I also include as controls the apprehension rate for the year they crossed the border (*Apprehension*)[19] and the distance in miles between origin state capital in Mexico and destination cities in the USA (*Distance*).[20]

Destination communities are described by the presence of kin in the USA (*Mother US* and *Father US*), social networks (*paisanos*[21]) and the wage the migrant expects to receive (*expw*). Mexican migrants' response to the higher returns associated with increased trip duration should be influenced by the availability of employment in the destination community.[22] Hanson and Spilimbergo (1999) first used an expected wage measure constructed using information on the labor force participation of Mexican-born individuals in the USA. This expected measure captures the wage that a prospective migrant from Mexico expects to earn in the USA. I follow the idea in that paper but employ the state's unemployment rate since I am interested in capturing the probability of finding a job at the destination state. Therefore, the constructed expected wage in the USA at the year the migrant decides to migrate is constructed as $(1 - u_{it})(w_{it}/p_{it})$, where u_{it} is the unemployment rate in the destination state i in the USA at time t, w_{it} is the mean wage in the destination state i in the USA at time t, and p_{it} is the US CPI.[23] Unfortunately, this expected wage measure varies only at the state level, and it represents the average over the complete distribution. The wages received by Mexican immigrants can vary substantially by skill level. Moreover, if there is substantial variation across states in wage inequality, my expected wage measure can be a poor measure because Mexican immigrants are generally low-income earners. In an attempt to ameliorate these limitations, I control for sector of employment of Mexican migrants. Still, it is worth mentioning that a Gini

coefficient and mean income (under a distributional assumption) could be used to construct alternative measures of expected wage that could address this problem.

US migration policies are described by *irca*, which indicates whether the migrant was legalized during the amnesty of 1986, also whether the migration duration occurred after the 1986 (*Year 1986*) and 1990 (*Year 1990*) Migrations Acts. Finally, long-term savings are described by whether the migrant owns property in Mexico (*property mx*), the total amount of savings brought to Mexico (*saving1* and *saving2*),[24] and whether remittances were sent to Mexico during their stay in the USA (*Remittances*).[25] I also control for the year migration occurred (*year migration*).

Finally, the dummy (*property mx*) captures the effect of investment in fixed capital assets that can be sold in the future with some gain and proxies for long-term savings of migrants. This is in addition to the amount brought to Mexico after the trip has ended. Agricultural land and residential real estate are two of the most common forms of fixed capital in which migrants invest, as shown in Table 4. Therefore, *property mx* equals one whenever the migrant reports ownership of agricultural land and/or residential real estate.

The presence of kin (*mother US* and *father US*) and persons from the same community (*paisanos*) in the USA measures the extensiveness of social ties of Mexican immigrants. Together with marital status and community-based migration networks, they increase the migrants' flexibility and freedom in the choice of migration strategies because both sets of factors facilitate long-term migration to the USA as well as frequent cross-border movement. The human capital and migration experience variables are set to be equal to the values they assume at the start of the trip.

The theoretical model implies that migration duration is a function of migration costs at the time of the trip, including costs due to US migration policies. To measure the impact of changes in the duration due to changes in the US migration policy and border enforcement, I control for legalization sponsor (*irca*), year migration occurred, whether they migrated after Migration Acts were in place, and the rate of apprehensions the year they migrated. An increase in US border enforcement significantly reduces the flow of Mexican immigrants since migration costs are higher (Angelucci 2012). The model in the previous section shows migration durations are longer when the immigrant faces higher migration costs. Consequently, the individual

Table 4 Use of remittance income

Spending category (%)	First migration sample	Last migration sample
Productive capital[a]	27.83	27.62
Vehicle	0.17	0.1
Consumer goods	3.58	3.57
House/lot	11.37	11.96
Home construction/improvement	5.52	5.38
Family maintenance	45.09	44.89
Recreation	0.16	0.16
Debt	3.41	3.54
Savings	1.09	1.02
Other	1.78	1.76

Source: Mexican Migration Project, housefile
[a]Business, tools, farmland, and livestock

expectations of future migration costs also affect the optimal duration of subsequent migrations.

Both samples (first and last migration) are similar when considering individual characteristics (age, education, occupation, etc.) Both samples are consistent with common characteristics of Mexican immigrants described in the literature.[26] They are poorly educated, younger, and more likely to be males.[27] However, when I examine the nature of immigrant flows from Mexico to the USA, other important features are highlighted in the sample. First, past migrants were highly concentrated in only two states (California and Texas) and accounted for 81% of Mexican migrations. In recent migrations, there is more variation across states. Migrants mainly choose to locate in California, Texas, Illinois, Florida, and Arizona. This partly explains the increase in the mean distance measure from the first migration to the last migration, together with the fact that more recent migration comes from southern states in Mexico (e.g., Oaxaca, Puebla) that are farther away from the border.

Another important difference is that 92% of individuals in the first migration sample reported to be legalized through IRCA (note that this legalization process may not have occurred during the first migration). Also, there is a higher percentage of migrants that crossed the border after 1986 in the last migration than the first migration. This is somewhat expected because the last migration is more recent than the first one. For example, 23% of Mexican immigrants in the last migration trip sample made the trip after 1986 compared to 17% of Mexican immigrants in the first migration trip sample.

4.3 Empirical model

The dependent variable is the length of a migration duration measured in months. I use the Cox proportional hazard model to assess the impact of characteristics of the individual, the origin communities, and the destination communities on the hazard of returning to their origin communities. There are two possible outcomes for everyone in the sample. The first one is that a migration trip that started after 1963 and the individual was in the USA when surveyed, which means that the migration duration had not ended. This outcome in the hazard framework is considered as right censored. The second outcome is a migration that started after 1963 and the individual reports a return to Mexico, which is considered as a "failure" in the duration. Our sample observes migration trips that occurred after 1963, that is, I do not include migrants who were already in the USA. As a result, there is no left-censoring in our sample.

The instantaneous hazard rate of return migration at time t, conditional on survival to time t can be written as

$$h(t;x_i) = h_0(t) * \exp\left(x_i^{'}\beta\right) \tag{6}$$

where $h(t;x_i)$ is the hazard of return migration at time t for a migrant described by a vector of coefficient β associated with covariates that characterize the social and economic characteristics of migrants in the sample, where $h_0(t)$ is considered the baseline hazard rate. The crucial assumption in the Cox proportional hazard model is that the effect of the covariates is proportional over the entire baseline. Since the baseline hazard gives the shape of the hazard function, under the Cox proportional model, it will be the same for any given individual. Therefore, $h_0(t)$ is the same for all individuals,

and only the level of the hazard function (due to $\exp(x_i'\beta)$) can differ across individuals. While this is one of the simplest duration models available, it is sufficiently rich to capture many data properties. The Cox proportional hazard model does not make parametric assumptions on the underlying baseline hazard function.[28] The estimation of the baseline hazard function, estimated independently of the included covariates, enables us to identify the average length of stay of Mexican migrants in the USA when all covariate are set to zero.

The risk of return migration can vary over time and with variation in the covariates. Hazard ratios (exponentiated coefficients) greater than one are indicative of increasing hazard rates and thus are associated with a reduction in the expected time in the USA until returning to Mexico. Hazard ratios less than one imply that migrants postpone their return to Mexico, consequently having longer migration trips.

Although the model is dynamic, the data are recorded in discrete intervals, particularly in months. As a result, there are numerous migration spells of the same duration. Duration times are handled using the Peto-Breslow approximation procedure.[29] This approximation considers all the individuals that leave at the same time and adjusts the likelihood function. This implies that the likelihood function can be approximated as

$$L = \prod \frac{\exp\left(\sum_{j \in Di} x_{ij}'\beta\right)}{\left[\sum_{l \in R_i} \exp(X_l\beta)\right]^{m_i}} \tag{7}$$

where i is an ordered failure times $t(i)$, $(i = 1,\ldots,k)$, D_i is the set of observations j that fail at time $t(i)$, m_i is the number of individuals who exit at time $t(i)$, and R_i is the set of all observations l that are at risk to exit at time $t(i)$.

Unfortunately, this specification of the partial log-likelihood function does not explicitly account for the potential effect of unobserved heterogeneity on the hazard rate, which is a limitation of the present approach. The problem of heterogeneity in duration models can be viewed essentially as the result of an incomplete specification. Individual specific covariates are intended to incorporate observation-specific effects. With this framework, the best way to account for individual heterogeneity is to include a diverse array of individual covariates in the hazard model which control for individual characteristics as well as household characteristics. Meyer (1990) suggests that explicitly modeling unobserved heterogeneity has little effect on the estimated coefficients in a model in which the baseline hazard rate can be nonparametric.

4.4 Diagnostics and specification analysis

In this section, I undertake a series of diagnostic and specification tests of the duration data to provide a context for the estimation of the hazard rate. The purpose of this graphical analysis of the data is to distinguish the best functional forms and the homogeneity of the observations. I use the Kaplan-Meier estimator (also called the product limit estimator), which is the empirical survival function:

$$\hat{S}(t) = \pi(n_i - h_i)/n_i = \pi\left(1 - \hat{\lambda}_i\right) \tag{8}$$

where n_i is just the number "at risk" just prior to time t_i and h_i, the number of failures at time t_i. Therefore, $\hat{\lambda}_i$ is the number of "failures" at duration t_i divided by the number

"at risk" at duration t_i. I define failures as those migrants that returned to their origin community.

Figures 1 and 2 show a negative duration dependence, which means that the probability that the duration of the trip ends shortly increases as the trip length increases by 1 month. Comparing Figs. 1 and 2, I see that there is a higher probability of returning to Mexico for individuals migrating for the first time relative to individuals in their last migration trip. Furthermore, right-censoring is more prevalent in the last migration sample than the first migration sample. In the first migration sample, less than 10% remain in the USA after 60 months whereas nearly 25% of individuals in their last migration trip are still in the USA after 60 months. The graphs also show that the most common returning point occurs at the beginning of the trip. This highlights the temporary migration pattern of Mexican immigrants.

This nonparametric analysis allows me to test whether the effect of the covariates is proportional over the entire baseline as the Cox proportional hazard model requires. I tested each of the covariates. The English proficiency is the only covariate that presents different survival functions. When the sample is divided by English proficiency (*ESL*), I find that there are different survival functions for each subsample (also called strata). In Fig. 3, I see that those migrants that report being proficient in English have a lower hazard of returning to Mexico. Therefore, I estimate the model for each migration trip and stratify the sample by English proficiency.

5 Estimation results

The estimates of the determinants of the hazard of returning to Mexico for the first and last migration are summarized in Tables 5 and 6, respectively.[30] Column one refers to the hazard ratio of each variable on the duration of each trip. For interpretability, I present the hazard ratios by exponentiating the parameter estimates. Column two presents robust standard errors clustered at the destination state level. A statistically

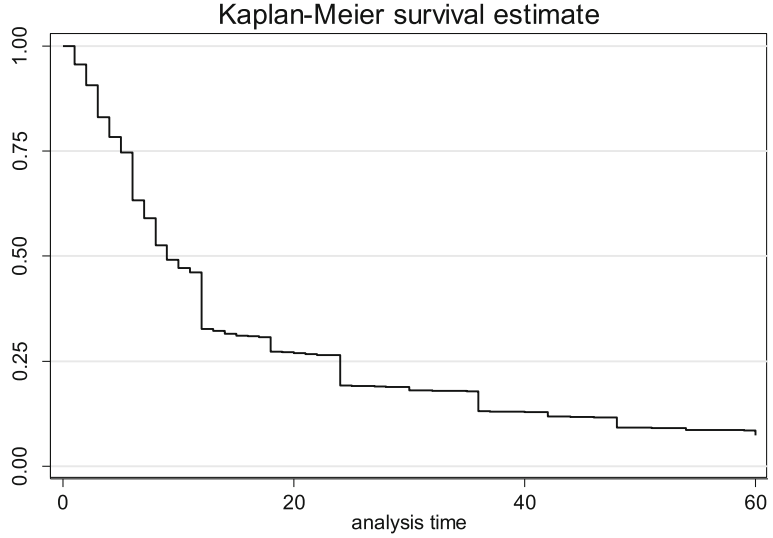

Fig. 1 Kaplan-Meier survival estimate for first migration sample. The *horizontal axis* displays the number of months of trips for an individual's first migration. The *vertical axis* displays the Kaplan-Meier survival estimates. "Failure" is return to Mexico

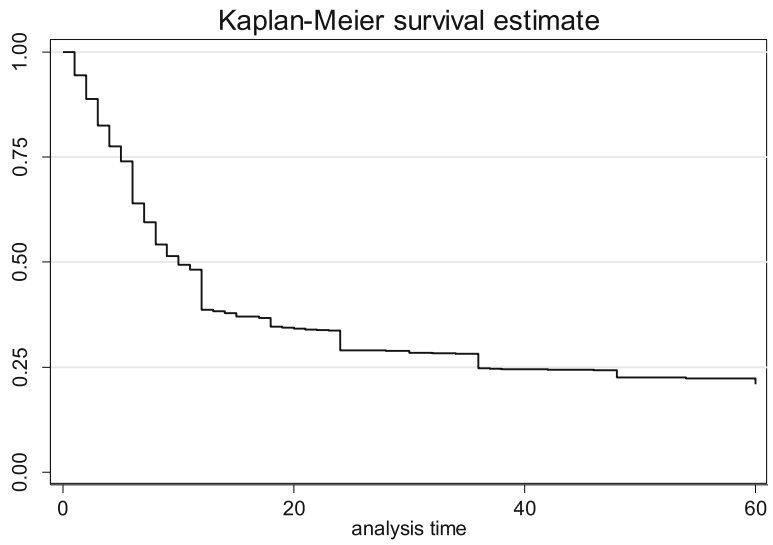

Fig. 2 Kaplan-Meier survival estimate for last migration sample. The *horizontal axis* displays the number of months of trips for an individual's last migration. The *vertical axis* displays the Kaplan-Meier survival estimates. "Failure" is to return to Mexico

significant difference from a hazard ratio of one means that a covariate significantly affects the length of the trip.

The (exponentiated) coefficient for the indicator variable *married MX* in the first migration indicates that individuals with their spouse in Mexico are 13% more likely to return during the first migration and 58% more likely to return during the last migration. On the other hand, the variable *married US* is not significantly different from one on both trips, meaning that the variable does not affect the length of the trip. The variable *minors* is significantly different from one, where those individuals with children

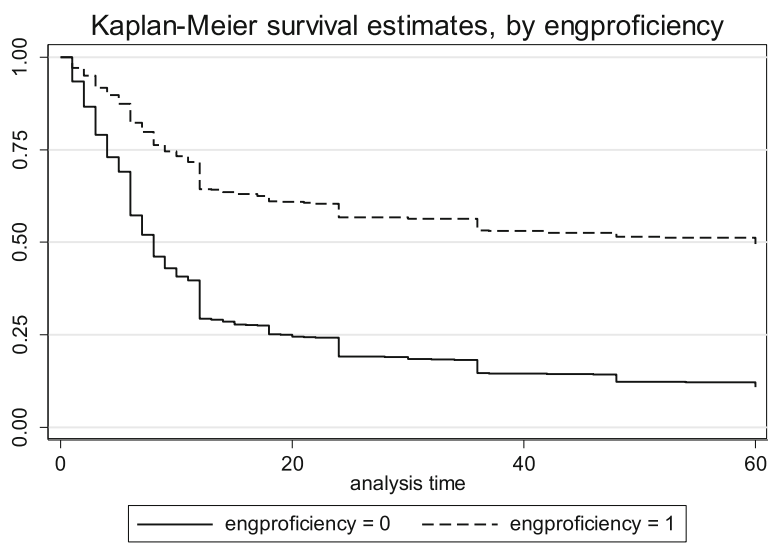

Fig. 3 Kaplan-Meier survival estimate for last migration sample. Strata English proficiency (ESL). The *horizontal axis* displays the number of months of trips for the first and last migrations, respectively. The *vertical axis* displays the Kaplan-Meier survival estimates

Table 5 Estimates of the determinants of the hazard of returning to Mexico for the first migration sample

First migration sample				
Variable/covariate	Hazard ratio	S.E.	*z*-stat	*P* value
Age	1.0063	0.0816	1.79	0.073
Married MX	1.1371	0.1828	−0.49	0.621
Married US	0.9049	0.0317	3.46	0.001
Children	1.1042	0.0798	0.88	0.377
Agricultural	1.0683	0.0975	−1.44	0.149
Professional	0.8470	0.0733	−1.02	0.308
Manufacturing	0.9222	0.0712	−1.77	0.076
Unskilled	0.8640	0.0670	−1.8	0.072
Self-employed	0.8706	0.1795	−0.26	0.793
Mother US	0.9516	0.0564	3.31	0.001
Father US	1.1726	0.0592	3.17	0.002
Property MX	1.1735	0.0472	−4.23	0.000
Urban	0.7721	0.0480	−2.06	0.039
Elementary	0.8954	0.0962	−0.53	0.599
Some middle education	0.9481	0.0672	−1.79	0.074
Middle education	0.8713	0.1167	−0.77	0.443
Some high school	0.9059	0.1021	−0.76	0.450
High school	0.9195	0.1620	1.31	0.189
Some college education	1.1950	0.2455	3.34	0.001
College education	1.6458	0.4245	2.42	0.016
Some grad education	1.7796	0.0582	5.36	0.000
Paisanos	1.2770	0.0171	−1.61	0.107
Exp. wage[a]	0.9721	0.0404	−1.94	0.052
Distance[b]	0.9180	0.0076	1.56	0.119
Apprehension rate	1.0118	0.0048	−3.89	0.000
Year migration	0.9812	0.0943	0.99	0.320
IRCA	1.0899	0.1261	2.64	0.008
Year 1986	1.2931	0.2159	4.01	0.000
Year 1990	1.6760	0.0561	1.64	0.100
Saving1[a]	1.0884	0.0590	0.6	0.547
Saving2[a]	1.0349	0.0436	−1.9	0.057
Remittances	0.9133	0.0816	1.79	0.073
Log-likelihood				−14,747
Number of observations				2375
Number of failures				2375

[a]Series deflated by the US consumer index (CPI)
[b]Normalized by 1000 miles

under age 15 are 10% more likely to return to Mexico in both trips. These results are consistent with Massey et al. (1987) and Waldorf (1995) who found that migrants early in the stage of family formation tend to remain in the host country for shorter periods than do married migrants or migrants without children, who are typically younger.

Table 6 Estimates of the determinants of the hazard of returning to Mexico for the last migration sample

Last migration sample				
Variable/covariate	Hazard ratio	S.E.	*z*-stat	*P* value
Age	1.0070	0.0027	2.59	0.010
Married MX	1.5841	0.2812	2.59	0.010
Married US	1.2391	0.6707	0.4	0.692
Children	1.1022	0.0321	3.34	0.001
Agricultural	1.5839	0.1516	4.81	0.000
Professional	1.3071	0.1760	1.99	0.047
Manufacturing	1.2199	0.1246	1.95	0.052
Unskilled	0.7352	0.0852	−2.66	0.008
Self-employed	1.1289	0.1166	1.17	0.240
Mother US	0.5902	0.3153	−0.99	0.324
Father US	1.1550	0.0604	2.75	0.006
Property MX	1.4177	0.0846	5.85	0.000
Urban	0.7355	0.0523	−4.32	0.000
Elementary	0.8637	0.0493	−2.57	0.010
Some middle education	0.9994	0.1216	−0.01	0.996
Middle education	0.7489	0.0660	−3.28	0.001
Some high school	0.6868	0.1231	−2.1	0.036
High school	0.8628	0.1159	−1.1	0.272
Some college education	0.9303	0.1534	−0.44	0.661
College education	1.6762	0.2860	3.03	0.002
Some grad education	1.6692	0.4404	1.94	0.052
Paisanos	1.1676	0.0588	3.08	0.002
Exp. wage[a]	0.9622	0.0155	−2.39	0.017
Distance[b]	0.8619	0.0410	−3.13	0.002
Apprehension rate	0.9853	0.0067	−2.18	0.030
Year migration	0.9908	0.0059	−1.53	0.125
IRCA	0.7414	0.0561	−3.95	0.000
Year 1986	0.9802	0.1081	−0.18	0.856
Year 1990	1.2581	0.1695	1.7	0.088
Saving1[a]	1.3298	0.0723	5.24	0.000
Saving2[a]	1.2261	0.0739	3.38	0.001
Remittances	1.0049	0.0527	0.09	0.925
Log-likelihood				−13,058
Number of observations				2658
Number of failures				1986

[a]Series deflated by the US consumer index (CPI)
[b]Normalized by 1000 miles

Education shortens the duration of migration trips. For example, those individuals with at least some college education stay for shorter periods of time than those individuals who are less educated. On the last migration, individuals employed in professional occupations are 30% more likely to return and manufacturing workers have shorter trips as well (21% more likely to return). Conversely, unskilled migrant workers

(*unskilled*) have longer trips (for the first migration, unskilled workers are 27% less likely to return, and for the last trip, they are 14% less likely to return) than other migrants in other occupations. These results might imply that for Mexican immigrants, the returns to Mexican schooling are higher in Mexico than in the USA. This is consistent with Borjas (1987), who found that the USA is a magnet for workers with relatively low earning capacities and attracts workers with below-average skills. A possible cause for these results is that educational requirements are lower for the low skilled work they perform in the USA than in Mexico. Given a preference for remaining in Mexico, well-educated migrants have greater incentive to spend more time in Mexican labor markets and less time working in the USA than do less educated migrants. Finally, agriculture workers have a very high hazard of returning on the last migration (58% more likely to return), but on the first migration, they are only 6% more likely to return. A hazard greater than one is consistent with the temporal nature of agriculture.

Next, I examine the effects of economic factors and origin and destination characteristics. Migrants coming from urban areas tend to have longer trips than migrants coming from rural areas. Migrants from an urban area are 23% less likely to return in their first trip and 27% less likely to return in their last migration than migrants from a rural area. Migrants who own a house/lot or farmland have a higher hazard of returning to Mexico. A migrant who owns a property in Mexico increases the probability of return by 17% during the first trip and by 41% during the last trip. It appears that migrants from rural areas have little incentive to stay in the USA longer than is necessary to meet current income needs. It is plausible that migrants from urban areas, who have greater opportunities in Mexico after returning, stay longer periods of time to accumulate savings.

A way to proxy for transportation costs (which also count as migration costs) is to use the distance in miles between the origin state in Mexico and the destination state in the USA. As expected, the distance decreases the probability of returning to Mexico by 9% as the distance increases 1000 miles in the first migration and by 14% in the last migration. These findings support the idea that the expected length of stay decreases with lower migration costs.

The expected wage has the anticipated effect, where an increase of 1 US dollar in the expected wage decreases the probability of returning, consequently increasing the optimal time of return. Migrants are highly sensitive to occasional increases in the expected wage. The estimated coefficient for the first migration indicates that an increase of the expected wage decreases the probability of returning by 3% and by 4% for the last migration.

The estimated hazard ratio for savings shows that accumulation of savings is only significant in the last migration, where the probability of return of those that were able to save while in the USA is higher than those that reported no savings at all. The probability of return for those that reportedly saved between 500 and 2500 US dollars is 32% while the probability of return for those that saved more than 2500 US dollars is 22%. On the other hand, remittances are highly significant for the first migration. If the individual sent remittances to Mexico while in the USA, the probability of return decreases by 9%. It seems that the length of the last migration is not affected by whether or not the migrant sent remittances to Mexico while in the USA. These results suggest different intentions for each trip. Savings from the first trip may be used to cover current basic needs of the household while the savings from the last trip appears to be intended for long-term savings.

Of the social aspects of the destination community I examine, only the indicator variables *father US* and *paisanos* significantly differ from one in both samples. The presence of the father in the USA increases the probability of return to Mexico by 17% in the first migration and by 15% in the last migration. The presence of people from the same origin community in the destination area increases the probability of returning by 27% on the first trip and only 16% on the last trip. The prevalence of recurrent migration among people in a community is an indicator of the reach of migration networks, which are instrumental in reducing the costs of migration.

Finally, I look at the migration policy variables. Policy changes in both 1986 and 1990 negatively affected duration. During the first migration, the probability of return increases by 29 and 67% depending on whether migration occurred after 1986 or after 1990, respectively. The probability of apprehension, on the other hand, seems to be insignificant. The increases in border enforcement in the 1980s appear not to have affected duration. This is somewhat unexpected because in the theoretical model, I conclude that the length of migration trips increases when border enforcement is increased since migration costs increase. The empirical results suggest, on the contrary, that border enforcement does not affect the return migration pattern for the first migration. On the other hand, an increase of border enforcement does affect the duration of the last migration. An increase of border enforcement induces longer migration trips, consistent with the model. For example, more experienced migrants show a 2% lower hazard of returning to Mexico when the probability of apprehension increases by 1%. Therefore, I can expect a more permanent illegal community of Mexican immigrants as enforcement increases for more experienced migrants.[31] However, I find that migrants that crossed the border after 1990 in the last migration, the period in which border enforcement was increased, are 25% more likely to return to Mexico. Finally, those migrants that were legalized by IRCA 1986 have a lower hazard of returning to Mexico in their last migration, but it does not make a difference for their first migration. Thus, my results suggest that border enforcement has an ambiguous effect on the stock of illegal migrants in the USA.

The estimation of the Cox proportional hazard model stratified by English proficiency yields estimates of the underlying baseline hazard and survival function for a typical migrant in each stratum.[32] Figure 4 shows the baseline hazard estimates for each stratum. The hazard rate rises rapidly in the first months of the trip and then flattens out to two very different levels of risk. The lower baseline hazard applies to those migrants who are proficient in English; the higher hazard rate applies to those who do not speak or understand English. Therefore, those migrants proficient in English have on average longer durations. This may imply that assimilation in the US labor market of Mexican immigrants is easier if they speak English because the communication costs are lower.

6 Conclusions

This paper presents a simple theoretical model, with useful insights, regarding the migration duration of Mexican immigrants. Once in a destination area, temporary Mexican immigrants decide how long they will stay. In making this decision, this paper shows the trade-off the migrant faces. They weigh the economic benefits of remaining longer against the social cost of living abroad. The analysis shows that an increase in

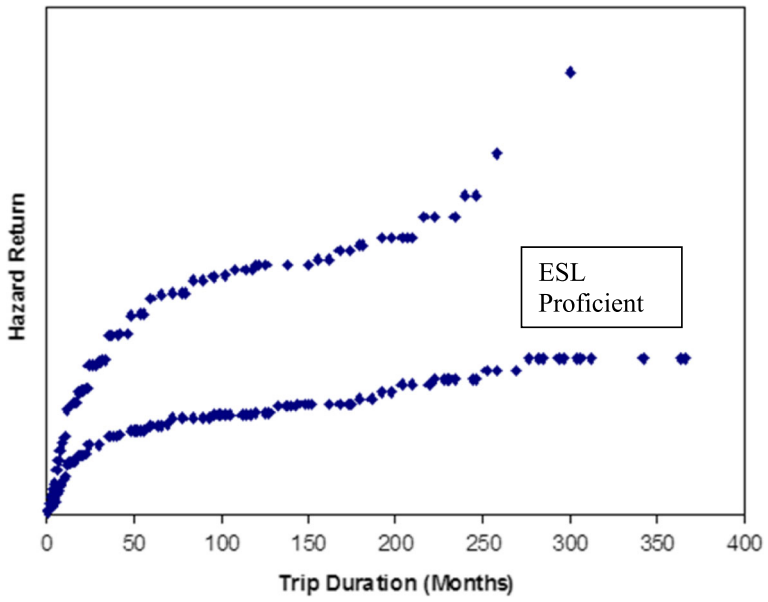

Fig. 4 Estimated baseline hazard for last migration sample by English proficiency

the benefits of remaining in the USA is positively correlated with an increase in the optimal duration migration and the costs.

Empirical results also suggest that Mexican immigrants may, in fact, increase the length of the trip because of an increase in US expected wages. Considering wages as a sole indicator for migration patterns is misleading, since it neglects other social and economic factors that are important determinants of the migration duration, such as social networks in the destination area, family ties in Mexico, and communication costs. The important social dimension of migration is confirmed by the significant effect of kinship ties to experienced migrants on the hazard to return during last migration. Mexican migration is both an economic and social process. Once migrants are joined by their spouse and children, they gradually develop social and economic ties in destination areas; these ties reduce the likelihood of return.

The savings incentive associated with increased last trip duration is strongest for migrants who can convert current foreign earnings into a source of long-term income in their place of origin. On the other hand, savings in the form of remittances during the first trip are intended to cover basic needs of the household. Therefore, employment opportunities in the community of origin indicate the degree of likelihood that migration is motivated by the need to cover current household expenses as opposed to the simple desire to accumulate savings.

Based on a survey data of Mexican migrants in the USA, the empirical evidence is consistent with some of the predictions of the simple theoretical model. The exception is concerning border enforcement, where it finds that an increase in border enforcement does not yield longer migration trips for all migrants, in contrast to Angelucci (2012). This is only the case for the first migration. In the last migration, there is indeed a change in the return migration pattern since increased border enforcement increases the duration of the trip. Therefore, we find an ambiguous effect of migration policies on overall migration duration.

Future research will address the potential effect of unobserved heterogeneity on the hazard rate, since failure to account for such heterogeneity may bias the resulting estimates. Also, it is of interest to analyze whether immigrants stay longer when they have access to social assistance and whether they may be magnet effects of social assistance and whether they affect migration durations.

Endnotes

[1]The survey can be found at http://mmp.opr.princeton.edu/.

[2]I cannot tell from the survey whether the English proficiency reported was gained during the migration trip or it was the case that the migrant had gained those skills before making the trip. If it is the case that English proficiency was gained during the migration trip, then I may have endogeneity issues between the acquisition of the English language skills and the expected duration of stay.

[3]It is important to stress that owning property in Mexico may be endogenous because the migrant accumulates wealth during his stay and may delay his return to Mexico.

[4]This model is based on the one developed by Dustmann (2003). However, the current model explicitly adds the migration costs as part of the intertemporal budget constraint. It also follows Dustmann and Kirchkamp (2002) in that the migrant has a higher preference to return to Mexico. However, the model presented here is simpler than the one presented by Dustmann and Kirchkamp (2002) since I am not interested in the activity a migrant pursues once they have returned to their place of origin. Nevertheless, the model still captures the essential trade-off between staying longer in the USA and returning to Mexico.

[5]In the model, w is measured in pesos in both places because w^{us} is not multiplied by p. This also accounts for the purchasing power of the dollar in Mexico.

[6]The empirical model presented below includes savings and remittances as covariates. However, the maximum amount observed in our sample is not high enough to be considered as an investment in entrepreneurial activities.

[7]Note that the theoretical model presented above refers only to the duration of a single trip and not to lifetime participation in the US labor market or to the frequency of trips.

[8]An increase in the host country wage increases the marginal value of staying in the host country (relative wage effect) but, at the same time, decreases the marginal utility of wealth (income effect). Migrants may return earlier if the wage level in the host country increases.

[9]In some cases, the entire town was surveyed. In large urban cities, however, this procedure is infeasible; therefore, only demarcated and sampled specific working-class neighborhoods were included in the sample (Durand and Massey 1992).

[10]This is the age at which the individual migrated. This age can differ from the one reported in the survey because the age reported in the survey is the current age.

[11]Illegal migration began to rise after the end of the Bracero Program (1942–1964), which permitted farm laborers from Mexico to work in the US agriculture on a temporary basis. Laborers were required to return to Mexico after completing their contract work (see, e.g., Hanson and Spilimbergo 1999).

[12]For a complete treatment of US migration legislation and Mexican economic contractions, see Massey et al. (2002), Hanson and Spilimbergo (1999), and Angelucci (2012).

[13]During the 1990s, a series of local operations against illegal border crossing were put in place by the Border Patrol. The main feature of these operations was to discourage illegal border crossing.

[14]In the sample, 45% of migrants report crossing the border illegally, that is, they do not have the necessary papers to cross the border. The rest cross the border legally but become illegal migrants by staying after the expiration date on their visas.

[15]I do not observe any left-censored observations in both samples.

[16]Unfortunately, I cannot distinguish whether the children reside in Mexico or the USA. The survey only reports the number of children and their ages.

[17]Several specifications for the education dummy were tested. The most flexible was using a dummy for the highest level of completed schooling to the most restrictive using a dummy to indicate that the migrant completed elementary school. The specification used is the most parsimonious and the best that describes the characteristics of the sample.

[18]Per the Mexican census, an area is considered urban if its population is greater or equal to 50,000.

[19]This average is the ratio between total apprehensions and the total estimated undocumented migrations.

[20]If the destination city in the USA is not reported, then I use the distance traveled between origin state capital in Mexico and the destination state capital in the USA.

[21]Paisanos refers to individuals from the same origin community in Mexico but are not considered close relatives.

[22]In this case, there is a disconnect between the theoretical and empirical models since our empirical work does allow real wages to change unlike the assumption of the theoretical model.

[23]Ideally, I would like to construct a more individual-specific expected real wage rate. It may be possible to predict the potential unemployment rate and wage for a given migrant in each community. This will potentially reduce the bias produced when using aggregated unemployment rates and wage rates.

[24]Saving1 one denotes those individuals that saved from 500 to 2500 US dollars during their trip and saving2 refers to those individuals that saved more than 2500 US dollars during their trip. There is potential endogeneity when using these measures because I can expect that savings in the USA may be jointly determined with the duration of stay.

[25]There could be endogeneity concerns regarding remittances. To ease these concerns, I use an indicator function for whether remittances were sent to Mexico instead of the actual amount sent.

[26]See Borjas (1991) and Cuecuecha (2003) where they highlight a decline in immigrant skills, prominently males and young.

[27]Ninety-five percent of the individuals in the sample are males.

[28]The proportional hazard model is a common choice for modeling durations because it is a reasonable compromise between the Kaplan-Meier estimator (see below) and the possibly excessively structured parametric models (Greene 2003).

[29]Described in Kalbfleish and Prentice (1980).

[30]An alternative specification, not presented here, omits potentially endogenous variables (e.g., remittances, savings, sector of employment, and network size) and finds that the estimates of interest are not affected by the inclusion of these variables.

[31]This is consistent with Angelucci (2012).

[32]Each stratum is composed by migrants proficient in English (speak and understand English) and those migrants who are not proficient. In my estimation, in the last migration sample, 26% of migrants report themselves as proficient in English while in the first migration sample, 20% report themselves as proficient in English.

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The IZA Journal of Development and Migration is committed to the IZA Guiding Principles of Research Integrity. The author declares that she has observed these principles.

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