Self-Selection Among Undocumented Immigrants from Mexico

Pia Orrenius
Madeline Zavodny

Research Department
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Federal Reserve Bank of Dallas

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Pia Orrenius
Research Department
Federal Reserve Bank of Dallas
2200 N. Pearl St.
Dallas, TX 75201
(214) 922-5747
pia.orrenius@dal.frb.org

Madeline Zavodny
Research Department
Federal Reserve Bank of Atlanta
104 Marietta St.
Atlanta, GA 30303
(404) 521-8977
madeline.zavodny@atl.frb.org

Abstract: This paper examines the effect of changes in migration determinants on the skill level of undocumented immigrants from Mexico. We focus on the effect of changes in economic conditions, migrant networks, and border enforcement on the educational attainment of Mexican-born men who cross the border illegally. Although previous research indicates that illegal aliens from Mexico tend to be unskilled relative to U.S. natives and that economic conditions, networks and border enforcement affect the size of illegal immigrant flows across the border, the interaction of these variables has not been investigated. Results from hazard models using data from the Mexican Migration Project indicate that improvements in U.S. and Mexican economic conditions are associated with relatively less-skilled undocumented immigrants. Stricter border enforcement is associated with higher skill levels. Access to a network of previous immigrants appears to lower the cost of migrating but has no differential effect by skill level.

JEL classification: F22, J61

Key words: undocumented immigrants, illegal aliens, Mexican migration

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I. Introduction

Illegal immigrant flows from Mexico to the United States are substantial. Warren (2000) estimates that the undocumented Mexican population has grown by an average of 202,000 persons each year since 1987, and about 3.1 million illegal aliens from Mexico resided in the U.S. in January 1997. More than 1.5 million apprehensions were made along the U.S. border in fiscal year 1999, the vast majority of them originating in Mexico (U.S. Immigration and Naturalization Service, 2000). The passage of the Immigration Reform and Control Act (IRCA) in 1986 briefly slowed the flow of undocumented migrants by granting legal status to 2.3 million Mexicans, but flows have since returned to pre-IRCA levels (Donato, Durand and Massey, 1992).

The expected benefits, the opportunity cost, and the actual cost of migrating to the U.S. affect the size of undocumented migrant flows from Mexico. Economic conditions in both countries, particularly real Mexican wages, play a large role. Hanson and Spilimbergo (1999) estimate that a 10 percent decrease in the real Mexican manufacturing wage leads to at least a 6 percent increase in attempted illegal border crossings. Declines in agricultural income in Mexico similarly raise the likelihood of both first-time and repeat migration from rural areas (Orrenius, 1999). Higher U.S. wages relative to Mexican wages are also associated with larger illegal alien flows (White, Bean and Espenshade, 1990). However, migration flows were low during the Mexican economic crisis in 1982-83, perhaps because potential migrants had difficulty raising the funds necessary to cross the border (Donato, Durand and Massey, 1992). Tighter border control policies and higher fees charged by smugglers ("coyotes") also are negatively associated with attempted and actual border crossings by undocumented aliens (Hanson and Spilimbergo, 1999; Orrenius, 1999).

The premise of this paper is that changes in economic conditions and changes in migration costs affect the skill composition of the migrant flow as well as their number. For example, increases in real Mexican manufacturing wages may slow immigration of skilled Mexicans who work in the nonagricultural sector, while increases in agricultural incomes may reduce immigration flows of unskilled workers from rural areas. Increases in Mexican incomes may also enable more individuals to bear the cost of illegally entering the U.S., shifting the distribution of undocumented immigrants toward individuals with fewer resources and presumably lower education levels.

Although studies have examined the effect of changes in economic costs on the number of undocumented immigrants, little is known about their effect on the skill composition of illegal aliens. Traditionally, undocumented immigrants from Mexico are young men who have little formal education and are from rural areas. Since the 1980s, however, a growing proportion of illegal aliens from Mexico have been from urban areas, and the economic crises in Mexico in 1982-83 and 1986 reportedly boosted migration from urban areas (Cornelius, 1992; Durand and Massey, 1992). Sorensen and Bean (1994) report that mean years of education among recent immigrants from Mexico rose relative to U.S. natives and less recent Mexican immigrants after passage of IRCA but do not investigate the reason for the increase.

Changes in the composition of Mexican immigrants have implications for both the United States and Mexico. Higher immigration of unskilled individuals depresses the wages of low-skilled immigrants already present in the U.S. as well as the wages of low-skilled U.S. natives (Borjas, Freeman, and Katz, 1997; Jaeger, 1996; Johnson, 1998). Because low-skilled immigrants appear to be a complement to the labor of skilled workers, larger flows of unskilled immigrants boost the earnings of skilled U.S. natives and skilled immigrants (Jaeger, 1996; Johnson, 1998). Previous research suggests that higher levels of skilled migration have little effect on the wages of

U.S. natives (Borjas et al., 1997). Paradoxically, higher out-migration of skilled individuals may promote economic development in Mexico because remittances are positively associated with education, and the likelihood that remittances are invested in housing or productive capital instead of spent on consumption increases with the educational attainment of the migrant (Durand et al., 1996).

This analysis examines the determinants of self-selection among undocumented male immigrants from Mexico. Using data from the Mexican Migration Project, we first estimate the determinants of the likelihood that a man makes an initial illegal trip to the U.S. during the period 1965-96. We find that economic conditions in both the U.S. and Mexico are important determinants of migration and that increased border enforcement deters illegal migration. Having access to a network of previous migrants provides powerful incentives to migrate.

We then focus on the effect of changes in migration determinants on the skill level of undocumented immigrants. The results indicate that changes in migration determinants affect the self-selection of illegal immigrants to the U.S. Higher minimum and average wages in the U.S. result in greater negative selection (lower skill levels) among immigrants from Mexico. Better economic conditions in Mexico appear to provide a greater disincentive to migrate among skilled Mexican men than among the unskilled. Increased positive selection (higher skill levels) of Mexico-U.S. migrants occurs in response to worsened conditions in Mexico and tighter border enforcement. Access to a migration network does not appear to have differential impacts on the migration behavior across skill groups.

II. Theoretical Model

Beginning with Sjaastad (1962), locational choice models posit that individuals decide where to live by comparing their utility in their current location to their expected utility in all other

possible locations, including the disutility of moving to those locations, and choose the location with the highest utility. The literature on international migration has focused on the earnings component of utility, positing that individuals become immigrants when their expected earnings in another country, less migration costs, are higher than their earnings in the country of origin (Borjas, 1987; Chiswick, 1999; Taylor, 1987).

In the simple model developed here, individuals move if their expected earnings in the destination country exceed their earnings in their home country plus migration costs. Following Borjas (1987) and Taylor (1987), an individual migrates from country 0 to country 1 if

$$\ln w_1 > \ln w_0 + \ln M, \tag{1}$$

where w is earnings and M is migration costs.

In addition, an individual must be able to pay the cost of migrating, M, up front in order to migrate. For example, an illegal immigrant hiring a smuggler to assist in his first border crossing must pay in advance.[1] This migration cost is paid out of savings, and individuals can migrate only if their savings are at least as large as the migration cost. Because savings and access to capital markets depend largely on earnings and wealth, which in turn depend on skill, savings are modeled as a function of an individual's skill. Savings are hypothesized to increase with skill. Skill is denoted by x and is distributed normally with mean zero and variance σ_x^2. If the savings of an individual with skill level x are given by $(S + sx)$, an individual can migrate only if $(S + sx) \geq M$.[2] This "cash in advance" constraint is consistent with the observation that the least-skilled Mexicans do not migrate (Stark and Taylor, 1991).

[1] Most commonly, the migrant pays a portion of the smuggler's fee in advance and the remaining part upon reaching his destination. The staggered payment means the coyote has an incentive to deliver the migrant and not abandon him or allow him to be captured by the Border Patrol. It still means the migrant has to have the money ready upon initiation of the trip however.

[2] An individual may be able to utilize household resources to pay the migration cost. The predictions of the model are similar if ability is correlated across household members or if the willingness of a household to use the household's savings to pay an individual's migration cost depends on that individual's ability.

Immigrants' earnings in both the home and destination country also depend on skill, which is perfectly observable. In the home country, the distribution of wages, w_0, is given by

$$\ln w_0 = \mu_0 + \eta x, \tag{2}$$

and the distribution of earnings in the destination is

$$\ln w_1 = \mu_1 + x + \varepsilon. \tag{3}$$

Mean earnings in the home and destination country are μ_0 and μ_1, respectively, and η is the return to skill in the home country relative to the destination country. Because the return to skill in Mexico is higher than the return to skill in the U.S. (Borjas, 1996), η is greater than one. The term ε is a random component of earnings distributed normally with mean zero, and its value is realized after an individual migrates.

The migration decision is determined by the sign of the index function

$$I = \frac{\mu_0 - \mu_1 - \varepsilon + m}{(1-\eta)}, \tag{4}$$

where m is the log of M, migration costs. Migration to the U.S. from Mexico occurs when $I > 0$ and an individual's skill is high enough that savings can cover the migration cost ($x \geq (M-S)/s$). Solving Equation (4) for the average skill level of immigrants gives

$$E(x \mid I > 0) = -\frac{\sigma_x}{\sqrt{2\pi}} \exp\left[-\left(\frac{\mu_0 - \mu_1 + m}{1-\eta} \right)^2 / 2\sigma_x^2 \right] + \frac{\sigma_x}{\sqrt{2\pi}} \exp\left[-\left(\frac{M-S}{s} \right)^2 / 2\sigma_x^2 \right], \tag{5}$$

which is less than the average skill level in the home country if

$$\left(\frac{M-S}{s} \right)^2 > \left(\frac{\mu_0 - \mu_1 + m}{1-\eta} \right)^2. \tag{6}$$

When the inequality in Equation (6) holds, the model predicts negative selection of Mexican immigrants. This prediction is consistent with previous research suggesting that immigrants from

Mexico are negatively selected in terms of human capital variables, particularly education (Borjas, 1996; Massey, 1987; Taylor, 1987).

Figure 1 shows which individuals move from Mexico to the U.S. in this model. The least-skilled individuals do not migrate because they do not have enough savings to pay the up front cost of migration. The most-skilled individuals do not migrate because the return to skill is higher in Mexico than in the U.S. The cut-off point for the skill level beyond which individuals do not become immigrants is positive in the figure because mean income in the United States is higher than in Mexico. Individuals with skill levels between the two cut-off points become immigrants.

The average skill level of immigrants will change as the various factors in the model change. Based on Equation (5), the average skill level of immigrants will decrease as average income in Mexico increases. The average skill level of immigrants will rise as average income in the U.S. increases. The effect of a change in migration costs, M, is ambiguous in the model. This suggests that changes in border enforcement or in access to a network of earlier migrants who can help an individual cross the border may either increase or decrease the average skill level of immigrants. The effect of an increase in the skill invariant portion of savings, S, lowers the average skill level of migrants as poorer households are able to afford the migration cost.

This model makes several simplifying assumptions. It does not include multiple destinations, although individuals presumably choose between home and several alternative locations. For example, Mexicans may migrate to the U.S.-Mexico border and work in the *maquiladora* industry instead of crossing into the U.S. In addition, the model does not distinguish between different types of immigration, such as legal and illegal immigration. We assume that individuals would always prefer to migrate legally instead of illegally and that individuals who become undocumented immigrants cannot migrate legally. The model also does not include return migration, although many undocumented Mexican workers in the U.S. return to Mexico. Many of

these Mexican immigrants may be "target earners" who work in the U.S. to earn a predetermined amount of money and then leave; alternatively, economic conditions in either country may have changed, prompting a return to Mexico. In either case, the decision to return to Mexico involves another round of self-selection that is not studied here. Incorporating these factors into the model should not affect the selective migration predictions.

III. Data

We use data from the Mexican Migration Project (MMP) to test the predictions of the model. The MMP is a household survey conducted primarily in December and January of 1982-83 and 1987-97 in 52 communities in Mexico. The survey focused on areas in Mexico that have traditionally sent the majority of migrants to the U.S. About 200 households were randomly sampled in each community, and a complete life history was gathered from the household head. This retrospective history emphasizes migration experience, work history, marriage and fertility behavior, and property ownership. In addition, questions were asked about the first and most recent trips to the U.S. by the spouse and all children, including nonresident children who have formed their own households.

The MMP offers several advantages over other migration data sources. The MMP data include both migrants and non-migrants, whereas the decennial Census and other U.S. data sources include only individuals currently residing in the U.S. Observing both types of individuals allows us to estimate the direction of selection by comparing the characteristics of migrants and non-migrants. The MMP includes legal status at migration, allowing us to focus on undocumented migration, whereas most U.S. surveys do not ask about legal status. Most U.S. data sources undersample undocumented immigrants; for example, the 1980 Census captured about 50 to 60 percent of undocumented Mexican immigrants (Bean, Lowell and Taylor, 1988). If

the likelihood of an undocumented immigrant being included in the Census depends on skill, then results based on Census data will be biased.[3] Selective emigration also complicates use of Census data. In addition, the Census reports year of arrival in the U.S. in intervals, making it difficult to ascertain the effect of economic conditions and border enforcement on migration.

We use data from the 1987-97 MMP surveys, which encompass 47 communities in nine states. Figure 2 highlights these states, which are predominately rural and agricultural. We focus on male household heads and sons aged 15-64 and examine whether they made an undocumented first trip to the U.S. in 1965 or later. Because of the structure of the MMP, we use a sample of male household heads and a separate sample of sons of household heads.

About 70 percent of men report having never migrated to the U.S. We include one observation per year from age 15 (or 1965) until age 64 or their age at the time of the survey for these men. For the 30 percent of men who migrated to the U.S. illegally, we exclude observations after the first undocumented trip to the U.S. The samples are therefore unbalanced panels. Individuals who first migrated to the U.S. legally are not included in the sample, although the results are robust to including these observations and not differentiating between legal and illegal migration.[4] The sample of heads includes 5,878 individuals and a total of 110,334 observations. The sample of sons includes 101,003 observations on 9,559 individuals.

The MMP includes several characteristics of household heads that are likely to affect the probability of migration, such as marital status and the number of minor and adult children the head has each year. These demographic characteristics are not available for the sons, so they are included only in the empirical models for the heads. The empirical models estimated below also

[3] Undocumented immigrants who permanently reside in the U.S. were more likely to be covered in the 1980 Census than non-settlers, and these individuals are likely to be positively selected because unsuccessful immigrants are more likely to return to their country of origin than successful immigrants (Bean, Lowell and Taylor, 1988; Massey, 1987).
[4] The first migration to the U.S. was legal for 114 household heads (1198 observations) and 315 sons (2346 observations). Individuals who migrated to the U.S. legally but without permission to work in the U.S. (such as on a tourist visa) and worked in the U.S. or who had forged documents are coded as illegal migrants.

include a time-invariant indicator variable for whether an individual lives in an urban area in Mexico, which is determined based on the size of individuals' community of residence at the time of the survey.[5]

The number of years of schooling an individual has completed provides the measure of skill used here. We use five categories of educational attainment: no or little formal schooling (0-1 years), some schooling (2-5), completed primary school (6-8), completed secondary school (9-11), and preparatory school or above (12 and up). Household heads' schooling category can change over time because the life histories compiled by the MMP include education each year; however, most heads' schooling category does not change because very few men in the sample attended school after age 15. Sons' schooling category does not vary over time and is their educational attainment as of the time of the survey.

Access to a network of prior migrants is also likely to influence whether an individual migrates. Knowing previous migrants who can provide information about crossing the border and finding employment in the U.S. lowers an individual's migration cost. Networks are also an important source of loans for migrants who have to pay the smuggler's fee up front. The MMP reports whether an individual's father has ever migrated to the U.S. and how many of a man's siblings have ever migrated to the U.S.[6] Family network variables may capture an underlying propensity for members of a family to migrate, such as the effect of family income and land holdings, in addition to reflecting the effect of access to a migrant network. The network variables

[5] For sons present in the U.S. at the time of the survey, the community is the community in Mexico in which the household head resides.

[6] We also include a dummy variable indicating that the father's migration history is unknown in the specifications for sons. The estimated coefficient on this variable is not statistically significant in any of the regressions. The sample mean of this variable is 0.23. The results are similar when sons whose father's migration history is not reported are not included in the sample. Among household heads, the number of siblings whose migration history is reported is truncated at six.

are time varying, and we only include networks before the migrant himself has migrated in order to avoid endogeneity problems.

The data are merged with annual data on economic conditions in Mexico and the U.S. For Mexico, the value of agricultural output per capita, gross domestic output (GDP) per capita, real manufacturing wage and the real interest rate (deflated by the Mexican consumer price index) are used. For the U.S., the average hourly wage for hired agricultural workers, average non-agricultural wage, and federal minimum wage are included. These variables are deflated by the U.S. CPI for urban consumers. The U.S. unemployment rate is also included.[7] All economic variables are annual averages.

Total annual hours spent by U.S. Border Patrol agents on linewatch duty is included to measure border enforcement. Previous research suggests that apprehensions are positively associated with linewatch hours, but it is not clear whether increased enforcement deters illegal immigration because almost all persons attempting to cross the border eventually do so even if they are first apprehended several times (Kossoudji, 1992). Nevertheless, increased border enforcement raises the cost of crossing the border by causing migrants to cross in more remote areas or hire a coyote to smuggle them into the U.S. In addition, being apprehended increases the amount of time it takes an immigrant to successfully cross the border, creating an opportunity cost of foregone workdays.

[7] The non-agricultural wage is a weighted average of hourly earnings for production workers in eight industries (mining, construction, manufacturing, wholesale trade, retail trade, transportation and public utilities, finance/insurance/real estate, and services). The weights are based on the industry distribution of Mexican-born men aged 15-64 in the 1960, 1970, 1980 and 1990 decennial Censuses who immigrated in the last five years and do not report being a citizen (except for 1960, when citizenship was not asked). The industry shares are linearly interpolated, and the weights vary by year. The unemployment rate is constructed in an analogous manner using state unemployment rates and the distribution of Mexican-born men across states. Using unweighted national averages gives similar results.

Table 1 reports sample means stratified by migrant status for the variables used in this analysis.[8] The sample means indicate that men who become undocumented migrants tend to come from the middle of the educational distribution. A larger proportion of non-migrant men has little or no formal education than do men who migrate, particularly among household heads. More non-migrants also have a high school degree and some university-level education than do migrants. The sample means also indicate that the second generation is more educated than the first generation, with a considerably higher proportion of both migrant and non-migrant sons having at least 5 years of schooling than among the household heads.

The descriptive statistics in Table 1 suggest few differences in average economic conditions and border enforcement faced by individuals who chose to migrate illegally at some point and individuals who are not observed to migrate. However, there are clear differences in access to a network of previous migrants between the two groups. The fraction of men with a father who migrated to the U.S. is higher among migrants than among non-migrants, and migrants tend to have more siblings who have migrated to the U.S. than do non-migrants.

Is the MMP Representative of Mexican Immigrants?

A potential concern about the MMP data is that the survey does not include Mexican-born household heads who migrate to the U.S. permanently.[9] If skill affects whether migrants return to Mexico, as previous research suggests, our sample of household heads is not representative of all potential immigrants because it only includes non-migrants and return migrants. Previous research suggests that Mexican-born migrants who settle in the U.S. tend to be better educated

[8] The panel data used to generate these sample means include all observations in the sample and are not a snapshot of individuals at a point in time. For example, the sample means suggest that migrants are younger than nonmigrants because observations on migrants are truncated after they migrate, whereas nonmigrants remain in the sample until age 64 or the time of the survey.

[9] The MMP also conducts a survey in Mexican communities in the U.S. We do not use this data because it is not clear that the sample is random or representative because the data are gathered using snowball sampling techniques.

than sojourners (Donato, 1993). However, because the survey is conducted during the winter months in most communities, a time when Mexican migrants tend to return home for the holidays, the survey includes many Mexican-born men who spend most of the year in the U.S. The sample of sons includes non-migrants, return migrants, and men who are present in the U.S. at the time of the survey because the information is reported by the head, who is in Mexico.

We investigate the representativeness of the MMP by comparing educational attainment in our two samples to a survey of undocumented immigrants who permanently settled in the U.S. The 1989 Legalization Population Survey (LPS) contains data on the characteristics of undocumented immigrants who applied for legal permanent resident status in the U.S. under the amnesty provision of IRCA in 1986. To be eligible for the amnesty program, these individuals must have resided continuously in the U.S since January 1, 1982.[10] Our sample from the LPS includes men who first migrated to the U.S. from Mexico in 1965 or later and were aged 15-64 at the time of first migration. These individuals presumably would not be observed in Mexico by the MMP surveys and represent undocumented immigrants who have permanently settled in the U.S.

Migrants in the MMP tend to be less educated than men in the LPS. Appendix Table 1 reports the educational distribution of migrants in the MMP and the educational distribution of men in the LPS. The educational distribution of men in the LPS appears quite similar to sons in the MMP, except that a higher fraction of men in the LPS attended preparatory school and/or university. This difference likely results in part from the LPS not including illegal aliens who applied for amnesty under the special agricultural worker (SAW) provision of the IRCA. Agricultural workers tend to have less education than other workers, and a substantial fraction of

[10] About 4 percent of the sample reported that their last year of education was received in the U.S.

migrants in the MMP worked in agriculture in the U.S.[11] Household heads in the MMP are clearly the least educated group among the three samples.

These descriptive statistics suggest that the sons sample is more representative of Mexican immigrants who settle in the U.S. than is the household heads sample. Because of the nature of the MMP survey and the increase in permanent migration from Mexico to the U.S. over time, the sample of heads is largely composed of men who permanently reside in Mexico. Of course, the skill levels of both permanent and temporary undocumented immigrants are of interest.

IV. Methodology

The determinants of whether an individual migrates to the U.S. illegally are addressed using a Cox proportional hazard rate model.[12] We use a hazard rate model instead of a logit or linear probability model because we model the likelihood that an individual undertakes a first undocumented trip to the U.S. at a given point in time, conditional on the individual not having previously migrated. A hazard model also easily incorporates censoring, which arises in the data because some individuals are still at risk of migrating when they are surveyed. The Cox hazard model used here provides a flexible means of modeling the hazard function.

In the Cox hazard model, the hazard rate is modeled as a function of both the current duration, t, and a set of independent variables, x, or

$$\lambda(t|x) = \lambda_0(t)\exp(\beta'x). \quad (7)$$

The baseline hazard, $\lambda_0(t)$, is not specified in the Cox model and controls for changes over time in the likelihood that an individual migrates. The model restricts the coefficients to be the same

[11] About 40 percent of household heads and 31 percent of sons worked in agriculture during their first undocumented trip to the U.S.

[12] Results using a logit model with the dependent variable equal to one in period a man migrated generally gave similar results. Exceptions are noted below.

across time implying the proportional effect of a change in x on the hazard is the same at all durations. In other words, the effect of education on the likelihood of migration is the same if an individual is 20 years old or 60 years old, given that the individual has not yet migrated. The coefficients, β, give the estimated change in the hazard rate for a one-unit change in x. For ease of interpretation, we report exponentiated coefficients instead of hazard ratios. The hazard model treats all individuals who have not migrated at the time of the survey as right censored.

The set of independent variables includes measures of demographic characteristics, human capital, border enforcement, access to a network of previous migrants, and economic conditions in Mexico and the U.S. Based on previous research, stricter border enforcement is expected to lower the hazard of migrating, and having a father or siblings who have already migrated should raise the migration hazard. Better Mexican economic conditions are expected to be negatively associated with migration, and better U.S. economic conditions should be positively associated with migration.

To examine the effect of changes in the costs and benefits of migrating on selection, we run separate regressions in which the education indicator variables are interacted with covariates in the following categories: border enforcement, migrant networks, and economic conditions. Selection effects are evident if the effect on the probability of migration differs by education level as a covariate changes. Together with the main effect, the interaction terms indicate the direction of selection. For example, the model predicts that better economic conditions in Mexico lead to more negative selection. Empirical results consistent with the model would show that estimated coefficients on the interactions with Mexican wages or agricultural GDP become smaller as education increases.

The model also predicts that improved economic conditions in the U.S. lead to more positive selection. The coefficients on the interactions with U.S. wage variables should therefore

become larger as education increases if an increase in those variables led to more positive selection. The model does not give a clear prediction for the effect of changes in border enforcement and networks, which proxy for the cost of migration, *M*, in the model. The model does predict, however, that increases in exogenous savings, *S*, lead to more negative selection. If family networks share savings with the potential migrant, then empirical results consistent with this prediction would show network skill interactions decreasing in education level.

V. Results

A. Baseline Regression Results

Tables 2 and 3 show the results for the baseline regressions of time to migration for household heads and sons, respectively. The first column in each table shows the results when only demographic variables are included, and columns 2-5 report results as different sets of migration determinants are included. Column 6 displays the full specification.

The results for household heads indicate that married men are less likely to migrate. Conditional on marital status, the number of minor children in the family is positively related to migration. Urban residence lowers the hazard of migration for both heads and sons.

Very high and very low levels of schooling are associated with lower migration hazards. Men who have completed high school are the least likely to migrate, followed by those with no schooling (the omitted group with 0-1 years of schooling). These results are consistent with the predictions of Borjas's (1987) model of self-selection, which predicts unskilled immigration from countries with wider income distributions, as well as with our formulation of a budget constraint on the poorest, least-skilled households.

Among the older generation, household heads with some schooling, defined as 2-5 years of education, are the most likely to migrate. In the sons sample, those with 6-8 years of schooling

have the highest migration hazard. Among the heads, the relationship between schooling and migration turns negative with the group that has 9-11 years of education, whereas for sons the relationship does not turn negative until at least 12 years of education. This suggests, as others noted, that the schooling levels of illegal Mexican immigrants have increased over time.[13]

Border enforcement appears to have little effect of the migration decisions of heads or sons (column 2). The coefficient on border enforcement turns negative in the full specification (column 6), although it is still not statistically significant. Access to a network of previous migrants significantly increases the hazard of migration. This is consistent with the hypothesis that having a migrant network lowers the costs of migration, promoting more migration, and with the findings of previous research that networks have a large effect on first trips.

Mexican economic conditions are also important determinants of whether an undocumented trip occurs. As columns 4 and 6 indicate, improvements in the Mexican rural economy, as measured by agricultural output, significantly reduce the hazard of migration. Changes in the national economy, measured by per capita GDP, do not have a statistically significant effect. Higher real Mexican interest rates increase the hazard of migration, in particular for the sons sample. This effect is likely a result of the cost of borrowing. U.S.-bound migrants often cite the need to accumulate capital for investment (such as opening a business) or to fund a lumpy expenditure (such as a medical procedure) as a reason for migrating (Massey et al., 1987).

The effect of U.S. economic conditions is reported in columns 5 and 6. For household heads, the only significant variable is average hourly wages in the agricultural sector. Increases in U.S. farm wages increase the hazard of migration among the older generation. Average non-agricultural wages and the minimum wage, in contrast, appear to influence sons' migration

[13] It should be noted, however, that average education levels in the U.S. have been increasing at least as quickly. Hence improvements in the education levels of illegal Mexican immigrants have still left them relatively unskilled as compared to natives.

decisions. Increases in average wages and in the minimum wage are associated with increased hazards of migration in Table 3.

The results for U.S. economic conditions are consistent with the incentives that U.S. labor markets offer Mexican workers and with how those incentives have changed over time. Relatively high U.S. wages attract Mexican labor. The older immigrants held largely agricultural sector jobs, so their migration behavior responded to changes in farm wages. More recent immigrants are more likely than previous immigrants to work in non-agricultural industries, such as manufacturing, services, and construction (Donato, 1994). Consequently, sons' migration behavior is more affected by non-agricultural wages and the minimum wage.

B. Selection Results

Tables 4 and 5 report the findings on the selection effects of migration determinants in the hazard models for heads and sons, respectively. The regressions control for all of the main effects and interact one of the migration determinants with the education indicator variables.

As seen in column 1, migrants with less education are more deterred by increases in border enforcement than are migrants with more education. This result is most obvious in the sons regression, where the deterrent effect is the strongest on the least educated, the omitted group, with a coefficient of -0.065. The deterrent effect of more border enforcement then decreases monotonically in education to the point where the net effect of increased border enforcement on migrants with a high school diploma or more education is no longer negative (-0.065 + 0.090 = 0.025). These results are consistent with heightened border enforcement leading to a more positively selected illegal immigrant population.

The interaction results for the father and sibling network effects did not indicate any significant differences across skill groups for fathers or sons and are not shown here.[14] The model did not give a clear prediction for the selection effect of changes in these variables. One might expect, however, that access to a network of previous migrants has a larger effect on low-skilled individuals than on high-skilled individuals, who have access to better information or money to pay for a guide or smuggler.

The results of interactions with Mexican agricultural GDP are consistent with the model. Among household heads, an improved rural economy leads to significantly lower hazard rates in all skill categories but has the greatest impact on the two highest skill groups. Selection becomes more negative as the Mexican economy improves. The same result holds among sons but none of the coefficients are statistically significant, suggesting that the importance of the agricultural sector in Mexico has diminished over time. The greater responsiveness of the high-skilled groups also implies that these men experience the largest increase in hazard rates if conditions worsen. Modest improvements in the rural Mexican economy may therefore have led to slightly more negative selection of illegal immigrants in the mid-1990s than there would otherwise have been.

The interaction results for Mexican manufacturing wages are similar to those for agricultural income. Among both heads and sons, the interaction terms suggest that selection becomes more negative as Mexican wages increase. For a given increase in the Mexican wage rate, the skilled groups delay migration longer (or never migrate) relative to the unskilled. The interaction terms with the Mexican interest rate were all insignificant and did not show a clear pattern, so they are not shown here.

[14] The sibling network interaction terms were statistically significant and indicated negative selection when a logit or linear probability model was used instead of the hazard rate model.

The last three columns in Tables 4 and 5 show skill interactions with U.S. economic conditions—the agricultural wage, the non-agricultural wage, and the minimum wage. The results for all three sets of interactions indicate that low-skilled men are relatively more likely to migrate than their high-skilled counterparts as U.S. wages rise. This is the opposite result of that predicted by the theoretical model. For example, column 4 indicates that higher agricultural wages lead to greater migration by the least skilled (coefficients of 6.327 and 3.518 for the omitted group in the heads and sons regressions, respectively), a result consistent with more negative selection of immigrants as farm wages rise. The net effect of higher agricultural wages is positive and significant for the three lower skill groups among the older generation and for the lowest skill group (the omitted group) among the younger generation.

Among sons, it appears that higher agricultural wages not only lure the least skilled but also repel the most skilled. The net effect on sons with at least two years of education is negative. The same result is observed for non-agricultural wages among household heads—higher non-farm compensation effectively deters migration by heads in the three upper skill groups. A potential explanation for both these results is a family-based migration strategy in which not all members migrate at once, but migration by some substitutes for migration by others (Taylor, 1987). When farm wages are high, the family optimizes by sending members who are agricultural workers (often the older family members or household head). When non-farm wages are relatively high, younger family members such as the sons are more likely to migrate.

More generally, the results for non-agricultural wages shown in column 5 of Tables 4 and 5 indicate more negative selection as wages rise. For sons with some schooling, the net effect of higher non-agricultural wages on the hazard of migration is 3.435, compared to 8.200 among sons with no education. The net effect for the primary school group is 4.403; secondary school, 1.078; and preparatory school, -1.111.

The migration behavior of the least skilled groups is also the most responsive to the U.S. minimum wage. Focusing again on the sons sample (Table 5, column 6), an increase in the minimum wage increases the hazard of migration by 3.172 for the no schooling group. The effect then decreases as skill increases; the net effect for the some schooling group is 2.704; primary, 2.357; secondary, 1.120; preparatory or above, -0.101. There are no clear differences across skill groups in the effect of changes in the U.S. unemployment rate, so those results are not shown in the tables.

The empirical results do not bear out the theoretical prediction of more positive selection as U.S. economic conditions improve. The results suggest that skilled individuals are more responsive to push factors (conditions within Mexico) and the unskilled are more responsive to pull factors (conditions within the United States). The first finding is consistent with theoretical predictions, and the second is not.

The finding that higher U.S. wages lead to more negative selection of undocumented immigrants is consistent with several other theories, however. For example, the results indicate that higher U.S. minimum wages attract relatively more low-skilled immigrants; if the minimum wage is binding, the least-skilled individuals benefit the most from increases in it (controlling for any disemployment effects). Also, our model assumes a constant relative rate of return to human capital, but if the return to skill in Mexico is rising as non-agricultural wages rise in the United States, skilled individuals in Mexico will appear unresponsive to changes in U.S. wages. A solution to the latter problem would be to include a time-varying measure of the return to skills in Mexico in the regressions. Another possible explanation for the limited response of skilled workers to changes in U.S. wages is skill transferability. Limited transferability of skills provides a larger disincentive to migrate as skill increases. If skilled Mexicans cannot qualify for high-end jobs in the U.S. because of language or licensing problems or simply because of a lack of

institutional knowledge, higher average wages may have less impact on the high-skilled than on the low-skilled. This question could be studied more closely by looking at occupational data by skill level.

V. Conclusion

This paper has examined how changes in migration determinants affect the skill composition of undocumented immigrants from Mexico. Although many studies have shown that economic conditions, migrant networks, and border enforcement influence the size of the Mexico-U.S. migrant flow, research has not addressed the impact of these variables on migrant self-selection by skill level. We develop a model that predicts the direction of self-selection among migrants in response to changes in the above migration determinants. The model assumes the least skilled are budget constrained and the high skilled earn higher relative returns to skill in the home country.

Our empirical results for the main effects of economic variables, demographic characteristics, access to a network of previous migrants, and border enforcement are similar to previous research. When the migration determinants are interacted with skill levels, the findings indicate that increased border enforcement has resulted in an illegal immigrant stream that is more positively selected, whereas higher U.S. wages and improved conditions in Mexico have had the opposite effect. Higher average U.S. wages and a higher minimum wage are associated with more immigration and with more negative selection among illegal immigrants from Mexico. Improved Mexican economic conditions are associated with less immigration but also with relatively lower education levels among those who do migrate. The results imply that when Mexican economic crises occur, they lead to more out-migration and to relatively more skilled immigrants.

More generally, the empirical results indicate an asymmetric response of migrants in different skill groups to Mexican and U.S. economic conditions. Less-skilled migrants are more responsive to pull factors (U.S. wages), whereas more skilled migrants appear more affected by push factors (economic conditions in Mexico). This finding has implications for both researchers and policy makers. As researchers, in modeling the migration decision, we need to consider the question of skill transferability and other factors that make certain groups more mobile than others. Policy makers, who face increasing pressure to manage not only the volume of immigration but also its composition, can gain from a better understanding of the factors at home and abroad that determine the skill composition of illegal immigrants.

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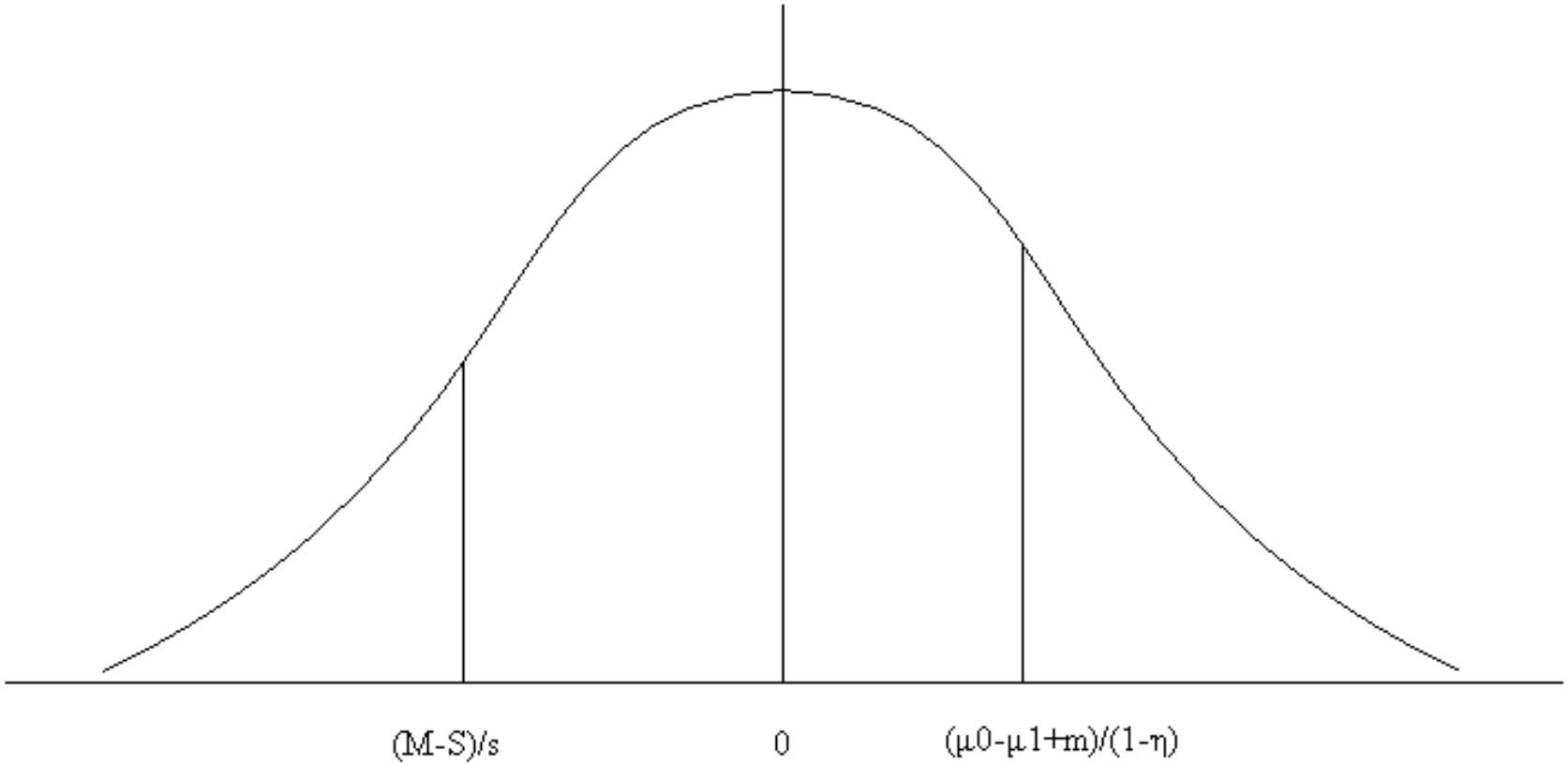

Figure 1. Distribution of skill in source country. Individuals with skill levels below the left cutoff and with skill levels above the right cutoff do not migrate.

FIGURE 2: SURVEYED STATES

TABLE 1
SUMMARY STATISTICS BY MIGRANT STATUS

	Male Household Heads		Sons	
	Migrants	Non-Migrants	Migrants	Non-Migrants
Age	25.0 (8.6)	34.9 (12.7)	20.0 (6.3)	24.4 (9.0)
Married	.51	.74	--	--
Number of minor children	1.52	2.46	--	--
Number of older children	.12	.80	--	--
Urban resident	.10	.25	.05	.23
Educational attainment (years):				
No or little schooling (0-1)	.17	.24	.06	.07
Some schooling (2-5)	.37	.26	.26	.18
Primary school (6-8)	.28	.24	.38	.31
Secondary school (9-11)	.11	.11	.19	.19
Preparatory school and higher (≥12)	.07	.15	.11	.25
Ln(border enforcement hours, 1000s)	58.1 (4.2)	60.3 (4.5)	60.5 (4.0)	62.1 (3.9)
Migration network:				
Father has ever migrated	.22	.09	.45	.27
Number of siblings have migrated	.49	.28	.80	.50
Mexican economic conditions:				
Ln(agricultural GDP per capita)	8.57 (.04)	8.57 (.04)	8.57 (.04)	8.57 (.04)
Ln(GDP per capita)	10.89 (.18)	10.96 (.17)	10.98 (.16)	11.02 (.14)
Ln(real manufacturing wage)	3.37 (.17)	3.31 (.22)	3.33 (.22)	3.25 (.23)
Real interest rate	-7.28 (13.27)	-9.58 (16.40)	-11.23 (16.67)	-11.52 (18.55)
U.S. economic conditions:				
Ln(agricultural hourly wage)	1.46 (.07)	1.46 (.06)	1.47 (.05)	1.46 (.05)
Ln(non-agricultural hourly wage)	2.22 (.05)	2.20 (.05)	2.21 (.05)	2.19 (.05)
Ln(minimum wage)	1.33 (.12)	1.26 (.14)	1.26 (.14)	1.20 (.14)
Unemployment rate	6.45 (1.54)	6.74 (1.46)	6.85 (1.42)	6.94 (1.33)
Number of individuals	1742	4136	3140	6419
Number of observations	17126	93208	22773	78230

NOTE.—Sample means (and standard deviations) are shown. All economic variables are real. The U.S. nonagricultural wage and unemployment rate are constructed based on the distribution of recent Mexican-born immigrants in the 1960, 1970, 1980 and 1990 Censuses across industries and states, respectively (see text for details).

TABLE 2
HAZARD RATE ESTIMATES OF UNDOCUMENTED MIGRATION, MALE HOUSEHOLD HEADS

	(1)	(2)	(3)	(4)	(5)	(6)
Married	-.124†	-.124†	-.114†	-.127†	-.124†	-.116†
	(.066)	(.066)	(.067)	(.066)	(.066)	(.068)
Number of minor children	.045**	.045**	.045**	.045**	.045**	.047**
	(.016)	(.016)	(.016)	(.016)	(.016)	(.016)
Number of older children	-.004	-.004	.003	-.003	-.003	.004
	(.039)	(.039)	(.039)	(.039)	(.039)	(.039)
Urban resident	-1.244**	-1.243**	-1.022**	-1.244**	-1.242**	-1.022**
	(.087)	(.087)	(.087)	(.087)	(.087)	(.087)
Educational attainment:						
Some schooling	.324**	.324**	.248**	.322**	.322**	.244**
	(.076)	(.076)	(.077)	(.076)	(.076)	(.077)
Primary school	.262**	.262**	.142†	.261**	.259**	.140†
	(.081)	(.081)	(.083)	(.081)	(.081)	(.083)
Secondary school	-.060	-.060	-.212*	-.062	-.060	-.213*
	(.101)	(.101)	(.106)	(.101)	(.101)	(.106)
Preparatory school	-.685**	-.685**	-.886**	-.682**	-.682**	-.881**
	(.112)	(.112)	(.117)	(.112)	(.112)	(.117)
Ln(border enforcement hours)		.018				-.030
		(.022)				(.037)
Migration network:						
Father has ever migrated			.477**			.474**
			(.063)			(.063)
Number of siblings have migrated			.317**			.318**
			(.022)			(.022)
Mexican economic conditions:						
Ln(agricultural GDP per capita)				-4.948**		-3.878**
				(1.123)		(1.220)
Ln(GDP per capita)				.354		1.856
				(1.050)		(1.457)
Ln(real manufacturing wage)				-.107		-.669
				(.351)		(.574)
Real interest rate				.005*		.001
				(.002)		(.002)
U.S. economic conditions:						
Ln(agricultural hourly wage)					4.197**	4.138*
					(1.239)	(1.628)
Ln(non-agricultural hourly wage)					.842	.628
					(1.439)	(1.943)
Ln(minimum wage)					-.110	.343
					(.595)	(.716)
Unemployment rate					-.013	.001
					(.026)	(.027)
Log likelihood	-13463	-13462	-13262	-13442	-13443	-13231

† significant at .10 level; * significant at .05 level; ** significant at .01 level.

NOTE TO TABLE 2.— No or little schooling is the omitted education category. The regressions also include 8 dummy variables for state of residence in Mexico, a linear time trend and trend squared, a post-IRCA dummy variable, and a post-Immigration Act of 1990 dummy variable. Standard errors are in parentheses. The data consist of 110,334 observations on 5,878 men.

TABLE 3
HAZARD RATE ESTIMATES OF UNDOCUMENTED MIGRATION, SONS

	(1)	(2)	(3)	(4)	(5)	(6)
Urban resident	-1.765**	-1.765**	-1.429**	-1.772**	-1.766**	-1.442**
	(.090)	(.090)	(.090)	(.090)	(.090)	(.090)
Educational attainment:						
Some schooling	.410**	.410**	.370**	.411**	.411**	.371**
	(.090)	(.090)	(.090)	(.090)	(.090)	(.090)
Primary school	.468**	.468**	.380**	.469**	.470**	.384**
	(.087)	(.087)	(.088)	(.087)	(.087)	(.088)
Secondary school	.319**	.320**	.293**	.322**	.325**	.298**
	(.091)	(.091)	(.092)	(.091)	(.091)	(.092)
Preparatory school	-.531**	-.531**	-.587**	-.528**	-.526**	-.582**
	(.100)	(.100)	(.100)	(.100)	(.100)	(.100)
Ln(border enforcement hours)		.007				-.036
		(.015)				(.026)
Migration network:						
Father has ever migrated			.461**			.458**
			(.041)			(.041)
Number of siblings have migrated			.215**			.215**
			(.011)			(.011)
Mexican economic conditions:						
Ln(agricultural GDP per capita)				-1.830*		-1.823†
				(.854)		(.941)
Ln(GDP per capita)				-.276		-.076
				(.803)		(1.196)
Ln(real manufacturing wage)				.203		-.095
				(.273)		(.448)
Real interest rate				.004**		.005**
				(.001)		(.001)
U.S. economic conditions:						
Ln(agricultural hourly wage)					.045	-1.686
					(1.021)	(1.407)
Ln(non-agricultural hourly wage)					2.082	3.781*
					(1.285)	(1.754)
Ln(minimum wage)					1.192*	2.095**
					(.525)	(.646)
Unemployment rate					-.041†	-.034
					(.022)	(.022)
Log likelihood	-25768	-25768	-25482	-25754	-25758	-25458

† significant at .10 level; * significant at .05 level; ** significant at .01 level.

NOTE.—No formal schooling is the omitted education category. The regressions also include 8 dummy variables for state of residence in Mexico, a linear time trend and trend squared, a post-IRCA dummy variable, and a post-Immigration Act of 1990 dummy variable. The regressions with network variables also include a dummy variable for father's migration history not observed. Standard errors are in parentheses. The data consist of 101,003 observations on 9,559 men.

TABLE 4

HAZARD RATE ESTIMATES OF INTERACTIONS WITH EDUCATION VARIABLES, MALE HOUSEHOLD HEADS

Interacted variable:	Border	Mexican Ag. GDP	Mexican Wage	U.S. Ag. Wage	U.S. Non-ag. Wage	U.S. Min. Wage
	(1)	(2)	(3)	(4)	(5)	(6)
Interactions with education:						
Some schooling	-.030†	-2.882†	-.212	-.472	.342	.717
	(.017)	(1.724)	(.400)	(1.350)	(1.664)	(.536)
Primary school	-.013	-3.455†	-.673†	-2.749*	-3.690*	.054
	(.018)	(1.805)	(.400)	(1.409)	(1.679)	(.550)
Secondary school	.041	-6.551**	-1.735**	-6.273**	-7.423**	-1.653*
	(.029)	(2.240)	(.476)	(1.895)	(2.152)	(.714)
Preparatory school	.002	-5.956*	-1.703**	-7.146**	-5.907*	-1.161
	(.033)	(2.483)	(.512)	(2.085)	(2.334)	(.807)
Main effects of education:						
Some schooling	2.012*	24.935†	.967*	.941	-.506	-.682
	(.987)	(14.772)	(1.353)	(1.996)	(3.708)	(.707)
Primary school	.913	29.744†	2.417†	4.200*	8.337*	.073
	(1.087)	(15.468)	(1.352)	(2.085)	(3.733)	(.717)
Secondary school	-2.767	55.914**	5.544**	9.019**	16.182**	1.797*
	(1.754)	(19.189)	(1.586)	(2.784)	(4.756)	(.894)
Preparatory school	-1.054	50.152*	4.770**	9.627**	12.181*	.534
	(1.996)	(21.279)	(1.706)	(3.062)	(5.162)	(1.011)
Border enforcement hours	-.021	-.032	-.029	-.022	-.022	-.029
	(.040)	(.037)	(.037)	(.037)	(.037)	(.037)
Migration network:						
Father has ever migrated	.469**	.475**	.468**	.471**	.466**	.466**
	(.063)	(.063)	(.063)	(.063)	(.063)	(.063)
Number of siblings have migrated	.318**	.319**	.317**	.319**	.317**	.317**
	(.022)	(.022)	(.022)	(.022)	(.022)	(.022)

TABLE 4, CONTINUED

Interacted variable:	Border (1)	Mexican Ag. GDP (2)	Mexican Wage (3)	U.S. Ag. Wage (4)	U.S. Non-ag. Wage (5)	U.S. Min. Wage (6)
Mexican economic conditions:						
Ln(agricultural GDP per capita)	-3.867**	-.564	-3.815**	-3.809**	-3.905**	-3.743**
	(1.219)	(1.826)	(1.219)	(1.222)	(1.224)	(1.219)
Ln(GDP per capita)	1.846	1.791	1.922	1.901	1.564	2.031
	(1.458)	(1.458)	(1.454)	(1.457)	(1.459)	(1.458)
Ln(real manufacturing wage)	-.653	-.703	-.058	-.717	-.621	-.678
	(.574)	(.575)	(.659)	(.576)	(.574)	(.573)
Real interest rate	.001	.001	.001	.001	.001	.001
	(.002)	(.002)	(.002)	(.002)	(.002)	(.002)
U.S. economic conditions:						
Ln(agricultural hourly wage)	4.182**	4.013*	3.894*	6.327**	4.091*	4.282**
	(1.628)	(1.630)	(1.630)	(1.961)	(1.626)	(1.631)
Ln(non-agricultural hourly wage)	.608	.641	.652	.223	2.092	.682
	(1.944)	(1.943)	(1.941)	(1.943)	(2.294)	(1.631)
Ln(minimum wage)	.344	.490	.361	.337	.301	.276
	(.716)	(.715)	(.716)	(.716)	(.717)	(.815)
Unemployment rate	.003	.001	-.001	-.003	-.006	.004
	(.027)	(.027)	(.027)	(.027)	(.027)	(.027)
Log likelihood	-13226	-13226	-13218	-13220	-13218	-13222

† significant at .10 level; * significant at .05 level; ** significant at .01 level.

NOTE.—No formal schooling is the omitted education category in the main effects and the interactions. The regressions also include dummy variables for married and urban resident, linear variables for the number of minor and adult children, 8 dummy variables for state of residence in Mexico, a linear time trend and trend squared, a post-IRCA dummy variable, and a post-Immigration Act of 1990 dummy variable. Standard errors are in parentheses. The data consist of 110,334 observations on 5,878 men.

TABLE 5
HAZARD RATE ESTIMATES OF INTERACTIONS WITH EDUCATION VARIABLES, SONS

Interacted variable:	Border (1)	Mexican Ag. GDP (2)	Mexican Wage (3)	U.S. Ag. Wage (4)	U.S. Non-ag. Wage (5)	U.S. Min. Wage (6)
Interactions with education:						
Some schooling	.005	1.851	-.418	-5.687**	-4.765*	-.468
	(.022)	(2.068)	(.429)	(1.923)	(1.998)	(.643)
Primary school	.013	-.042	-.702†	-4.186*	-3.797†	-.815
	(.022)	(1.980)	(.414)	(1.869)	(1.958)	(.628)
Secondary school	.053*	-1.975	-1.377**	-6.792**	-7.122**	-2.052**
	(.025)	(2.042)	(.435)	(2.044)	(2.123)	(.683)
Preparatory school	.090**	-1.975	-2.139**	-9.437**	-9.311**	-3.273**
	(.030)	(2.231)	(.480)	(2.229)	(2.316)	(.767)
Main effects of education:						
Some schooling	.075	-15.492	1.781	8.769**	10.926*	.975
	(1.326)	(17.721)	(1.442)	(2.853)	(4.436)	(.823)
Primary school	-.385	.746	2.742*	6.580*	8.820*	1.430
	(1.326)	(16.967)	(1.391)	(2.774)	(4.345)	(.801)
Secondary school	-2.995†	17.204	4.808**	10.304**	15.986**	2.769**
	(1.558)	(17.494)	(1.453)	(3.022)	(4.695)	(.854)
Preparatory school	-6.194**	16.334	6.371**	13.287**	19.899**	3.314**
	(1.840)	(19.113)	(1.590)	(3.286)	(5.111)	(.944)
Border enforcement hours	-.065*	-.036	-.035	-.033	-.032	-.037
	(.033)	(.026)	(.026)	(.026)	(.026)	(.026)
Migration network:						
Father has ever migrated	.456**	.460**	.460**	.459**	.457**	.457**
	(.041)	(.041)	(.041)	(.041)	(.041)	(.041)
Number of siblings have migrated	.217**	.216**	.217**	.216**	.217**	.217**
	(.011)	(.011)	(.011)	(.011)	(.011)	(.011)

TABLE 5, CONTINUED

Interacted variable:	Border (1)	Mexican Ag. GDP (2)	Mexican Wage (3)	U.S. Ag. Wage (4)	U.S. Non-ag. Wage (5)	U.S. Min. Wage (6)
Mexican economic conditions:						
Ln(agricultural GDP per capita)	-1.814†	-1.680	-1.761†	-1.872*	-1.883*	-1.610†
	(.942)	(2.056)	(.940)	(.940)	(.942)	(.942)
Ln(GDP per capita)	-.172	-.124	.001	.042	-.213	.110
	(1.198)	(1.195)	(1.191)	(1.195)	(1.195)	(1.197)
Ln(real manufacturing wage)	-.050	-.147	.710	-.163	-.079	-.147
	(.448)	(.448)	(.578)	(.449)	(.447)	(.448)
Real interest rate	.005**	.005**	.005**	.005**	.005**	.005**
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
U.S. economic conditions:						
Ln(agricultural hourly wage)	-1.621	-1.873	-1.999	3.518	-1.849	-1.564
	(1.407)	(1.409)	(1.410)	(2.192)	(1.406)	(1.408)
Ln(non-agricultural hourly wage)	3.698*	3.851*	3.855*	3.625*	8.200**	3.809*
	(1.759)	(1.752)	(1.750)	(1.757)	(2.469)	(1.759)
Ln(minimum wage)	2.122**	2.249**	2.109**	2.113**	2.102**	3.172**
	(.646)	(.647)	(.646)	(.645)	(.645)	(.858)
Unemployment rate	-.033	-.033	-.035	-.035	-.040†	-.028
	(.022)	(.022)	(.022)	(.022)	(.022)	(.022)
Log likelihood	-25448	-25452	-25435	-25447	-25445	-25437

† significant at .10 level; * significant at .05 level; ** significant at .01 level.

NOTE.—No formal schooling is the omitted education category in the main effects and the interactions. The regressions also include a dummy variable for urban residence, a dummy variable for father's migration history not observed, 8 dummy variables for state of residence in Mexico, a linear time trend and trend squared, a post-IRCA dummy variable, and a post-Immigration Act of 1990 dummy variable. Standard errors are in parentheses. The data consist of 101,003 observations on 9,559 men.

APPENDIX TABLE 1
COMPARISON OF EDUCATIONAL ATTAINMENT OF MIGRANTS IN MMP WITH LPS

	MMP Male Heads	MMP Sons	LPS
Educational attainment (years):			
No or little schooling (0-1)	.14	.05	.08
Some schooling (2-5)	.36	.22	.28
Primary school (6-8)	.31	.41	.35
Secondary school (9-11)	.11	.23	.14
Preparatory school (≥12)	.08	.09	.15

NOTE.—Educational attainment is as of the time of first migration for MMP male household heads and as of the time of the survey for MMP sons and LPS. The MMP and LPS samples consist of Mexican-born men who first migrated illegally to the U.S. between the ages of 15 and 64 in 1965 or later.