Migration from Mexico to the United States: Wage Benefits of Crossing the Border and Going to the U.S. Interior

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Emigrating from Mexico to the United States requires three steps: going to the border, crossing it, and going to the final U.S. destination. This article attempts to measure the earnings benefits of each migration step, focusing particularly on the second step: crossing the border. Using U.S and Mexican microdata of workers living in Mexico and in the United States, this article compares wages of identical individuals on both sides of the border after controlling for unobserved differences between migrants and nonmigrants. On average, Mexican workers increase their wages 1.22 times by moving to the Mexican side of the border, 4.15 times by crossing it, and 1.12 times by moving to an interior location in the United States. Gains are larger for unskilled workers. Also, gains for crossing the border are larger for illegal workers, while gains for going to the U.S. interior are larger for legal workers.

Keywords: Migration, Wage, United States, Mexico, Border.

Emigrar de México a los Estados Unidos requiere tres pasos: ir a la frontera, cruzarla e ir al destino final en los Estados Unidos. Este artículo calcula las ganancias salariales en cada paso, enfocándose particularmente en el segundo paso: cruzar la frontera. Utilizando microdatos de México y de los Estados Unidos, este artículo compara los salarios de trabajadores idénticos en ambos países después de controlar por características no observables de los migrantes y los no migrantes. En promedio, los trabajadores mexicanos incrementan su salario 1.22 veces al migrar al lado mexicano de la frontera, 4.15 veces

al cruzarla, y 1.12 veces al migrar de la frontera al interior de los Estados Unidos. Las ganancias son mayores para trabajadores no calificados. Las ganancias de cruzar la frontera son mayores para los trabajadores ilegales, mientras que las ganancias de ir al interior de los Estados Unidos son mayores para los trabajadores legales.

Mexican–U.S. migration has a long history, but the dynamic of such population flow has changed through time. These days, Mexican workers migrate to the United States from virtually every corner of Mexico and live in virtually every city or town of the United States. For example, rural agricultural workers from specifically located areas of the Mexican states of Michoacán, Jalisco, Guanajuato, and Zacatecas[1] have traditionally worked the fields of the U.S. states of California and Texas, while better-educated workers from Mexican cities, such as Mexico City or Monterrey, work in large U.S. cities, such as Chicago or New York. Social migration networks have also changed from the traditional migration states in the mid-west of Mexico to every place in the country. Such social migration networks have been—and continue to be—the main channels individuals use to find their way to the United States. So, it is not surprising that very well-defined migrant enclaves exist in almost all U.S. cities and towns and come from specific Mexican villages and towns (Card and Lewis 2007; Durand, Massey, and Zenteno 2001).

Mexican migrants arrive to the United States via every possible means of transportation: plane, bus, boat, or even on foot. And, of course, they come whether their migration is legal or not. Most times, migrants plan in advance their whole trip and know their final destinations, helped and encouraged by relatives and friends in both countries. However, the Mexican side of the United States–Mexico border is full of individuals who were not able to cross the border, who are waiting for the correct time to cross it, who were deported and abandoned by the U.S. border patrol in the Mexican border cities and are not able to go back to their hometowns in Mexico, or who were deported and are waiting to reenter the United States (Anderson and Gerber 2007; Durand and Massey 2004).

In their attempts to migrate to the United States, migrants have to complete three steps: (1) moving within Mexico from their places of origin to the Mexican side of the United States–Mexico border; (2) crossing the border; and (3) moving within the United States to their final destinations. Each step has a cost and therefore a benefit. Each step represents a different challenge and takes a different amount of time. But all three steps together represent the journey a migrant has to take to start a new life in a new country.

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[1] These states have had high U.S. migration rates since the end of World War II, specifically since the start of the Bracero Program. The Bracero Program was created to satisfy the growing demand for agricultural laborers in the United States during World War II. The program ended in the early 1960s, but social networks remained long after.

The main objective of this article is to disentangle the wage gains of the Mexico–United States migration to associate those gains with each one of the three steps. Which of the three migration steps provides the largest increase in earnings? And do different steps benefit certain types of migrants more than others?

The Mexican–U.S. case allows us to compare the benefits of moving gained from two different forms of migration: those involving financial costs and those involving other (legal and cultural) costs. The first step of the migration from Mexico to the United States may require significant transportation costs (as well as courage) but does not require getting special working permits or learning a new language, new skills, or new culture. Crossing the border represents no transportation costs but certainly carries other costs.[2] To cross the border requires getting a visa or work permit or hiring a smuggler (and risking your life).[3]

Finally, moving from the U.S. side of the United States–Mexico border to a place in the interior of the United States requires, in addition to transport costs, learning a new language and living in a different culture. These last costs are so substantial that many Mexican migrants "stop" at the U.S. side of the United States–Mexico border (Orrenius, Zavodny, and Lukens 2008).

Which step generates larger wage differentials for migrants? Using microdata from the American Community Survey (ACS) of 2008 and the Mexican Survey of Occupation and Employment (*Encuesta Nacional de Ocupación y Empleo* [ENOE 2008]) of the same year, this article computes wage differentials for identical individuals working in the interior of Mexico, at the U.S.–Mexican border, and in the interior of the United States.[4] Wage differences are calculated controlling always for unobserved differences in the productivity of migrants and nonmigrants.

In addition, wage differentials for every migration step can be calculated for different categories of migrants, such as men and women, people of different ages, and workers with different levels of schooling. Making such calculations allows us to know whether all workers gain the same wage increases by going to the border, crossing the border, or going to the interior of the United States. Therefore, we can determine which groups of migrants may be better off staying at the Mexican side of the border and which groups are consistently better off crossing it.

[2] Cross-border cost may not reflect the cost of crossing the border for illegal migrants because the labor markets of twin cities in the border region are, to a certain extent, integrated. They are integrated by the presence of international outsourcing plants known as "maquiladoras" that distribute jobs according to the relative supply of categories of workers and by cross-border commuting.

[3] There exist also other benefits for crossing the border, such as the lack of opportunities in Mexico or a better future for children.

[4] By "identical," we mean that individuals share observable characteristics, such as gender, age, education, and occupation. In the fourth section of this article, we note the difficulties of finding exactly identical groups of workers to compare and explain how we adjust our calculations to account for this challenge.

A second goal of this article is to compare wage differentials at the border region with wage differentials for the whole of both countries. Does a smaller wage differential at the border region imply economic integration at the border? Does economic integration at the border suggest future integration for the rest of the two countries? Is the border region a "lab exercise" for supporting larger flows of workers between Mexico and the United States? Even though these questions cannot be answered formally in this article, comparing Mexico–United States wage differentials at the border and in nonborder regions will help us gain a better understanding of such issues.

In brief, our findings indicate that Mexican-born, Mexican-educated workers in the United States earn, on average, 5.34 times the wage of identical workers in Mexico. On average, migrants (both legal and illegal) increase their wages 1.22 times by migrating from their origin places in Mexico to the Mexican side of the United States–Mexico border, 4.15 times by crossing the border, and 1.12 times by going to their final destinations in the interior of the United States. For illegal migrants, the wage gain for going to the interior of the United States is considerably smaller than for the legal ones; however, the wage gain for crossing the border is almost the same for legal and illegal migrants. This result may explain why wages on the U.S. side of the United States–Mexico border are lower relative to wages in the interior of the United States.

The rest of the article is organized as follows: the second section reviews the existing literature on Mexican–U.S. migration, the third section describes the current flows of Mexican migrants to the United States and averages regional wages and worker characteristics, the fourth section presents the selection model and some applications in the international migration literature, the fifth section reviews the empirical application and the results, and the sixth section concludes.

Background and Literature Review

Mexican–U.S. migration has been widely studied, especially in recent decades. The work of Durand, Massey, and Zenteno (2001) presents a comprehensive description of the migration dynamic between Mexico and the United States. The authors observe a very stable geographic distribution of the international migration flows. International migrants come mainly from the West and Center of Mexico and are generally working-age males. Hanson (2006) reviews the factors behind recent increases in migration from Mexico and suggests that the growth of the relative size of Mexico's working-age population, the greater volatility in United States–Mexico relative wages, and recent changes in U.S. migration policies are all candidate explanations. Card and Lewis (2007) explore the widening geographic distribution of Mexican immigrants in the United States during the last two decades and conclude both demand and supply effects. Both effects are associated with changes in industry concentration demand and labor skills supply. Additionally, Orrenius,

Zavodny, and Lukens (2008) compare Mexican migration to the U.S. side of the border with migration to the U.S. interior and find that border migrants are more likely to be female, to have first migrated within Mexico, and to lack migrant networks as compared with migrants to the U.S. interior.

Differences between Mexican immigrants and natives of the United States have also been widely studied. For example, Trejo (2003) found that even though men of Mexican origin earn considerably less than whites, most of these differences are explained by the immigrants' relatively low levels of education. Livingston and Kahn (2002) show that such differences decrease from the first to the second generation but apparently stall in the third generation. Blau and Kahn (2007) observe that gender differences should be taken into account when comparing Mexican immigrants and whites. The authors find that immigrant women are more likely to be married with a spouse present and to have higher fertility rates than U.S. natives, and to present a lower labor supply than U.S. natives.

Feliciano (2001) compares earnings and education levels of Mexican immigrant workers with those of their American counterparts and observes that such differences have decreased through time. However, Borjas and Katz (2007) comment that the wages of Mexican immigrants in the United States and their native-born counterparts converge at a much weaker rate than the wages of other immigrant groups converge with U.S. natives. Dávila and Mora (2008) found that even though workers along the U.S. side of the United States–Mexico border earn less than those in the U.S. interior, the average earnings of Mexican immigrants along the border improved in the past decade relative to those accrued by their counterparts in the U.S. interior.

Chiquiar and Hanson (2005) compare earnings and education levels of Mexican immigrants in the United States with those of Mexicans who stay in Mexico. The authors conclude that Mexican immigrants are, on average, more schooled than Mexican residents (although they have much lower levels of human capital than Americans). However, not much study has been done with respect to relative wages (or earnings) of Mexican immigrants in the United States and Mexican residents. This article is an attempt to study such earnings differences, controlling always by observed and unobserved worker characteristics.

Neo-classical theory states that regional earnings differentials should disappear over the long run for various reasons. One reason is labor migration from low-wage areas to high-wage areas; however, perfect mobility of workers and perfect information should be assumed. Another reason is capital flows to regions with relatively low labor costs. In this case, perfect mobility of capital and perfect information should be assumed. A third reason is the ability to produce cheaper goods and services in the low-wage areas, which allows competitively advantaged local industries to export their products, increasing their labor demand and consequently increasing wages. In this case, perfect mobility of goods and perfect information should be assumed.

However, workers, capital, and goods are not perfectly mobile. Transport and legal costs may deter the flows of people, capital, and goods, as may regional differences, such as amenities, local taxes, and cultural backgrounds. The three steps of the Mexico–United States migration journey allow us to study and compare how wage differentials adjust under two different migration scenarios: when transport costs are high but no legal costs are incurred and when legal costs are high but no transport costs are involved.

Data and Average Population Differences

We use microdata from the Mexican Survey of Occupation and Employment (ENOE) of 2008 and the ACS of 2008. The Mexican database ENOE is a quarterly survey aimed at identifying occupational characteristics from the Mexican population. It provides information about 124,000 families that lived in Mexico in 2008. The ENOE includes individual and family socioeconomic characteristics, such as age, education, employment status, wage, and hours worked, as well as some migration characteristics. The ENOE is a large database, significant for every state of Mexico and for some large cities, including the northern border cities of Tijuana, Mexicali, Ciudad Juárez, Nuevo Laredo, Reynosa, and Matamoros.[5] The ACS of 2008 includes 1,304,000 families living in the United States in 2008 and also reports individual and family socioeconomic characteristics, as well as some migration characteristics. The ACS is significant for every state of the United States and for all communities larger than 100,000 inhabitants, including southern border cities, such as San Diego, Calexico, El Paso, Laredo, McAllen, and Brownsville.

Table 1 reports some averaged characteristics of the populations of Mexico and the United States, paying special attention to the United States–Mexico border region (Tijuana-San Diego, Mexicali-Calexico, Ciudad Juárez-El Paso, Nuevo Laredo-Laredo, Reynosa-McAllen, and Matamoros-Brownsville). All monetary numbers are in U.S. dollars as of 2008.

The total population of the considered border cities is about 11 million, with 6.3 million living in the Mexican border cities and 4.5 million living in the U.S. border cities. The Mexican border cities represent 5.8 percent of the total population of Mexico (108 million), while the U.S. border cities represent 1.5 percent of the total population of the United States (304 million). Inmigration in this region is larger than that in the rest of Mexico or in the rest of the United States. Forty percent of the population of the Mexican border cities is inmigrants compared with 20 percent in the rest of Mexico. Forty-six percent of

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[5] ENOE's general purpose is to provide representative national data about the occupational characteristics of Mexicans, while its particular objective is to provide a wide description of occupational status, inscription to labor force, and socio demographic profiles. Data entries refer to the last week before the survey was conducted.

Table 1. Descriptive Statistics

	Mexico		United States	
	Border	Total	Border	Total
Population (million)	6.3	108.1	4.5	303.8
Education (years)	9.6	9.7	13.0	13.4
Mexican-Americans			12.8	12.6
Mexican born			10.5	9.6
Wage/hour (dollars)	2.95	2.60	18.27	19.52
Mexican-Americans			14.70	16.13
Mexican born			12.53	12.77
Inmigration rate	.40	.20	.46	.45
National			.23	.33
International			.22	.12
Mexican			.10	.04

Source: Own estimations with data from American Community Survey (2008) and *Encuesta Nacional de Ocupación y Empleo* (2008).

the population of the U.S. border cities is inmigrants compared with 45 percent in the rest of the United States. Inmigrants to the Mexican border cities come mainly from the interior of Mexico. About 50 percent of inmigrants to the U.S. border cities come from the rest of the United States, and 50 percent come from a different country. Of those from a different country residing in the U.S. border cities, 45 percent are Mexicans.

Education levels in the two countries—and in the cities on both sides of the border—are considerably different. The average schooling level of a worker in the United States is 13.4 years, while the average schooling level of a worker in Mexico is 9.7 years. The average schooling level of a Mexican-born worker in the United States is slightly lower than her or his counterpart in Mexico (9.6 years versus 9.7). The average schooling level of a worker in the U.S. border cities is around 3.5 years higher than her or his counterpart in the Mexican border cities (13.0 years versus 9.6). However, while Mexican-born workers in the U.S. border cities are less educated than all workers on the U.S. side of the border (10.5 years versus 13.0), they are more educated than their conational workers on the Mexican side of the border (10.5 years versus 9.6).

Hourly wages are also considerably larger in the United States than in Mexico. On average, a domestic-born, domestic-educated worker in the United States earns $19.52 per hour compared with $2.60 per hour for a domestic-born, domestic-educated worker in Mexico. (The U.S. wages are 7.5 times higher.) However, such differences are not so large when comparing Mexican-born workers on both sides of the border. On average, before controlling for differences in skills and unobserved productivity, a Mexican-born worker in the United States makes $12.77 per hour compared with the $2.60 that a

Mexican-born worker can make in Mexico (a ratio of 4.91).[6] Within the border region, a worker in the Mexican border cities makes, on average, $2.95 per hour while a Mexican-born worker in the U.S. border cities makes $12.53 per hour (a ratio of 4.24). Given that Mexican-born workers on the U.S. side of the border are more educated than Mexican-born workers on the Mexican side, this difference may get smaller when comparing similar individuals. The next section explains the methodology to control for such observed and unobserved differences.

The Model

As noted, the first aim of this article is to compare wages of identical individuals living in Mexico and in the United States. However, a core problem arises when estimating such individuals' wage differences. Wages at different places cannot be observed simultaneously for the same individual, so we need to use the earnings of a comparison group, but the groups being compared might be biased by self-selection. Workers with identical characteristics (e.g., young, male, Mexican-born, Mexican-educated gardeners) are not randomly distributed across both countries or along both sides of the border. Plus, Mexican immigrants in the United States may have unobserved characteristics that make them different from the Mexicans who stay in Mexico. Such differences may encourage them to travel to the United States and stay, and even though such differences are unobserved, they do have effects on their observed wages.

Obviously, large wage differences exist between Mexico and the United States. The selection of unobservable determinants of productivity may explain, at least in part, the observed wage differentials between observable identical individuals. Selection differences can be generated by the migrants themselves and by migration policies and laws.[7]

To control for the problem of self-selection and obtain comparable wages adjusted for workers' productivity on both sides of the Mexican-U.S. border, we

[6] Other studies that compare earnings among different countries or specifically between Mexico and the United States present diverse results. For 1990, Chiquiar and Hanson (2005) present a United States–Mexico wage ratio of 10.20 for men and 7.12 for women. For 1994, Rama and Artecona (2002) compound a ratio of 6.57. For 1995, Freeman and Oostendorp (2000) come up with a ratio of 2.78, and for 2006, Hoefort and Hofer (2007) calculate a ratio of 7.49 for Mexico City. Comparing wages for Mexican workers in Mexico and the United States, Chiquiar and Hanson (2005) present a wage ratio of 5.60 for men and 4.98 for women in 1990 while Clemens, Montenegro, and Pritchett (2008) compute an unadjusted wage ratio of 3.82 for 1999.

[7] An additional factor that may cause wages of identical workers to differ on both sides of the border is called "natural" barriers. Workers may require higher wages to compensate for the difficulty of learning a new language, being away from their families, and learning how to live in a new culture, as well as the direct costs of travel (Clemens, Montenegro, and Pritchett 2008).

follow the standard two-step procedure of Heckman (1979). Following Mincer (1976), wages are mostly explained by individual characteristics, such as experience, education, and gender, as well as other local characteristics, as follows:

$$\ln(w_i) = \theta_0 + \theta_1 X_i + \theta_2 Z_i + \varepsilon_i \tag{1}$$

where $\ln(w_i)$ is the natural logarithm of the wage of individual i, X_i are individual characteristics, Z_i are other local characteristics, and ε_i is the residual.

However, using the estimated parameters of equation 1 to impute wages for a different group of individuals may generate distortions caused by missing information.

Mincer's (1976) equations at both sides of the border for individual i can be defined as:

$$\ln(w_{Mi}) = \theta_{M0} + \theta_{M1} X_i + \theta_{M2} Z_{Mi} + \varepsilon_{Mi} \tag{2}$$

$$\ln(w_{USi}) = \theta_{US0} + \theta_{US1} X_i + \theta_{US2} Z_{USi} + \varepsilon_{USi} \tag{3}$$

where w_{Mi} is the wage of worker i in Mexico and w_{USi} is the wage of the same worker i in the United States. X_i are her individual characteristics. Z_{Mi} and Z_{USi} are local characteristics for worker i in Mexico and the United States, respectively.

If Mexican workers are not randomly distributed at both sides of the border, wage equations 2 and 3 are missing important information (i.e., workers' productivity and other unobservable characteristics), and ordinary least squares estimation delivers biased and inefficient coefficient estimators.

Heckman's (1979) methodology inserts a selection correction variable into the regression equations 2 and 3 that controls for such missing information, as follows:

$$\ln(w_{Mi}) = \theta_{M0} + \theta_{M1} X_i + \theta_{M2} Z_{Mi} + \frac{\sigma_{Mi}^2}{\left(\sigma_{Mi}^2\right)^{1/2}} \hat{\lambda}_i + \eta_{Mi} \tag{4}$$

$$\ln(w_{USi}) = \theta_{US0} + \theta_{US1} X_i + \theta_{US2} Z_{USi} + \frac{\sigma_{Mi,USi}}{\left(\sigma_{Mi}^2\right)^{1/2}} \hat{\lambda}_i + \eta_{USi} \tag{5}$$

where $E(\eta_{Mi}) = 0$; $E(\eta_{USi}) = 0$.

Such a correction variable is called the "inverse Mills ratio" (λ_i) and can be proved to generate efficient and unbiased estimators for all the other

parameters.[8] Inverse Mills ratios are computed for migrants and nonmigrants using the individuals' probabilities of being part of each group.

Equations 4 and 5 are estimated by maximum likelihood, and according to Lee (1982), this two-stage estimation procedure results in unbiased, efficient, and consistent estimates.[9]

Empirical Estimations and Results

We include in our regressions male and female Mexican-born workers between 16 and 65 years old who worked at least 20 hours a week and present positive labor earnings either in Mexico or in the United States. To estimate selection-corrected wages for migrants and nonmigrants, we need to estimate first the inverse Mills ratio. We estimate the probability of having been part of the migrant group using a Probit regression with age, age squared, gender, years of schooling, marital status, family size, number of children in the family, and possession of health insurance as the independent variables.[10] Table 2 presents coefficient estimates of this Probit regression for the three mentioned migration steps: (1) the probability of moving from any place in Mexico to the Mexican side of the United States–Mexico border; (2) the probability of moving from the Mexican side of the border to the U.S. side of the border; and (3) the probability of moving from the U.S. side of the border to any place in the United States.[11]

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[8] The wage in the United States for Mexican worker i is observed if $\theta_{M0} + \theta_{M1}X_i + \theta_{M2}Z_{Mi} + \varepsilon_{Mi} > 0$. In other words, worker i will decide to work in the United States if his or her net gains for moving to the United States are larger than his or her net gains for staying in Mexico. In this case $E(\varepsilon_{USi}) \neq 0$ and the term $E(\varepsilon_{USi} \mid \varepsilon_{Mi} > -\theta_{M0} - \theta_{M1}X_i - \theta_{M2}Z_{Mi})$ must be estimated and added to equation 3. Similarly, $E(\varepsilon_{Mi}) \neq 0$ and the term $E(\varepsilon_{Mi} \mid \varepsilon_{Mi} > -\theta_{M0} - \theta_{M1}X_i - \theta_{M2}Z_{Mi})$ must be estimated and added to equation 2. As Heckman shows, $E(\varepsilon_{USi} \mid \varepsilon_{Mi} > -\theta_{M0} - \theta_{M1}X_i - \theta_{M2}Z_{Mi}) = \frac{-\sigma_{Mi,USi}}{(\sigma_{Mi}^2)^{1/2}} \lambda_i$, $E(\varepsilon_{Mi} \mid \varepsilon_{Mi} > -\theta_{M0} - \theta_{M1}X_i - \theta_{M2}Z_{Mi}) = \frac{-\sigma_{Mi}^2}{(\sigma_{Mi}^2)^{1/2}} \lambda_i$, and

$\lambda_i = \frac{f(\phi_i)}{1 - F(\phi_i)}$. Where $\phi_i = \frac{-\theta_{M0} - \theta_{M1}X_i - \theta_{M2}Z_{Mi}}{(\sigma_{Mi}^2)^{1/2}}$. f and F are, respectively, the density and distribution function of the standard normal distribution.

[9] For further discussion of the estimation procedure and its theoretical properties and conditions, refer to Lee (1982).

[10] The selection of the instruments is based on their ability to explain migration without been correlated to workers' earnings. Marital status, family size, and children at home are not related to earnings and are commonly used in the literature to control for the migration effect. However, with the exception of marital status, these characteristics could be different for the same individual before and after he or she migrates. Age, gender, and schooling are also commonly used as instruments in the literature; although these variables are correlated to earnings (and gender and schooling are also included in the earnings equations), they do not change for the same individual before and after he or she migrates. Possession of health insurance may be correlated with income; however, this variable is also correlated with the worker's well-being, beyond his or her capacity for income.

[11] The cross-border regression includes six city-pair dummies to control for possible regional differences along the United States–Mexico border. The control dummy is the rest of the border cities and towns.

Table 2. Probit Regression Equation 6, Mexican-Born Workers

	Mexico to Border	Cross Border	Border to United States	Mexico to United States
Age	−.003	.024**	.020**	.074**
Age squared	.000*	.000	.000**	−.001**
Gender	.008	−.166**	.234**	.137**
Education	−.030**	.049**	−.043**	.005**
Married	.001	−.103**	−.093**	−.287**
Farm size	−.157**	.152**	.069**	.121**
Children	.142**	.007	−.085**	−.002
Health insurance	.349**	−.423**	.148	−.106**
San Diego-Tijuana		−.049		
Calexico-Mexicali		−.825**		
El Paso-Ciudad Juárez		−.371**		
Laredo-Nuevo Laredo		−.013		
McAllen-Reynosa		.009		
Brownsville-Matamoros		−.166**		
Constant	−1.212**	−2.976**	1.569**	−3.378**
Observations	311, 988	22, 529	49, 773	439, 141
Chi-squared	1351**	1673**	977**	6131*
Pseudo-R^2	.04	.11	.04	.03

Source: Own estimations with data from American Community Survey (2008) and *Encuesta Nacional de Ocupación y Empleo* (2008).
Notes: * and ** denote significance at 5% and 1%, respectively.

In addition, we estimate the probability of moving from any place in Mexico to any place in the United States.

In all steps, Mexican migrants tend to be older than nonmigrants. Women and single workers are more likely to cross the border but not to migrate to the Mexican side of the border or to migrate to the interior of the United States.[12] Education decreases the probability of going to the Mexican side of the border or going to the interior of the United States but increases the probability of crossing the border. Also, education increases the probability of moving from any place in Mexico to any place in the United States. Workers living in large families are more likely to migrate to the United States but not to migrate to the Mexican side of the border. Presence of children in the family increases the probability of going to the Mexican side of the border but decreases the probability of going to the interior of the United States. Workers with health insurance benefits prefer to migrate within the same country but not from one country to the other.

With the coefficient estimates of the Probit regression, we compute the inverse Mills ratio for every migration step. Once the inverse Mills ratios are

[12] This result corroborates the findings of Orrenius, Zavodny, Lukens (2008).

computed, wage equations 4 and 5 are regressed using as independent variables gender; years of schooling; years of experience; years of experience squared; the interaction of gender with schooling, experience, and experience squared; and eight dummies for industry sector.[13]

Equations 4 and 5 coefficient estimates are displayed in Table 3. The first panel displays regressions for nonmigrants, and the second panel displays regressions for migrants. We use such coefficient estimates to predict biased-corrected "origin" and "destination" wages for migrants and for nonmigrants.[14]

The sign and significance of the estimated coefficients of the inverse Mills ratio (Lambda) tell us the existence of self-selection and whether it is positive or negative. Positive coefficients indicate positive self-selection. All regressions present statistically significant inverse Mills ratio coefficients, implying the presence of self-selection in all cases. The coefficients obtained suggest the presence of negative self-selection into the migrants' group (equation 5) for the first and second steps and positive self-selection into the migrants' group for the third step. Migrants from the interior of Mexico to the Mexican side of the border and migrants who cross the United States–Mexico border have lower earning capabilities than nonmigrants (negative self-selection), while migrants from the U.S. side of the border to the interior of the United States have higher earnings capabilities than those who stay on the U.S. side of the border (positive self-selection).[15] We also found negative self-selection for the whole Mexico–United States migration phenomenon (fourth column).[16]

Table 4 reports estimated inverse Mills ratio coefficients for nonmigrants and migrants for every migration step, dividing the sample into smaller

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[13] Border city-pair dummies and state dummies are also included when possible, but because of space limitations, their coefficients are not displayed in the table. Border city-pair dummies are included to take into account regional wage differences along the United States–Mexico border.

[14] For example, the first column of Table 3 considers only migration from Mexico to the Mexican side of the border. The nonmigrants' regression (first panel) includes only nonmigrant workers, but its estimated coefficients are used to predict "origin" wages for migrants. Similarly, migrants' regression (second panel) includes only migrant workers, but its estimated coefficients are used to predict "destination" wages for nonmigrants.

[15] For the first and second steps, the sign of the inverse Mills ratio coefficient estimates for the nonmigrants' group (equation 4) and for the migrants' group (equation 5) oppose each other. We have positive self-selection into the nonmigrants' group but negative self-selection into the migrants' group. Intuitively this means that people who actually stay earn relatively more in Mexico than migrants if such migrants were in Mexico. Similarly, people who actually crossed the border earn relatively less in the United States than nonmigrants if such nonmigrants were in the United States.

[16] Negative self-selection is consistent with the findings of Borjas (1996) and Orrenius and Zavodny (2000). However, other authors, such as Chiquiar and Hanson (2005), have found positive self-selection. Overall, it seems that discrepancies in the selectivity of migrants can be attributed partially to the source of the data used; papers that find negative selection tend to use Mexican data, while papers that find positive selection tend to use U.S. data.

Table 3. Stayers and Migrants Wage Regression Equations 4 and 5, Mexican-Born Workers

	Mexico to Border	Cross Border	Border to United States	Mexico to United States
Equation 4: Nonmigrants' ln(wage)				
Gender	.139**	.007	.308**	.114**
Education	.069**	.071**	.091**	.069**
Experience	.019**	.016**	.022**	.020**
Experience squared	.000**	.000**	.000	.000**
Gender × education	−.005**	.003	−.024**	−.003**
Gender × experience	.004**	.012**	.011	.006**
Gender × experience squared	.000**	.000**	.000	.000**
Industry dummies	Yes	Yes	Yes	Yes
Border city dummies	No	Yes	No	No
State dummies	Yes	No	Yes	No
Lambda	1.426**	.518**	3.569**	−1.212**
Constant	−1.666**	−.775**	−4.585**	.533**
Observations	302, 337	18, 355	4, 174	389, 368
F-value	1526**	281**	41**	4354**
Pseudo-R^2	.37	.36	.18	.33
Equation 5: migrants' ln(wage)				
Gender	−.002	.250*	.084**	.081**
Education	.064**	.070**	.046**	.039**
Experience	.014**	.022**	.021**	.022**
Experience squared	.000**	.000	.000**	.000**
Gender × education	.001	−.017**	−.007**	−.005**
Gender × experience	.013**	.012	.012**	.013**
Gender × experience squared	.000**	.000	.000**	.000**
Industry dummies	Yes	Yes	Yes	Yes
Border city dummies	No	Yes	No	No
State dummies	Yes	No	Yes	No
Lambda	−1.226**	−2.155**	2.443**	−.882**
Constant	−1.050**	−.655**	1.977**	.705**
Observations	9, 651	4, 174	45, 599	49, 773
F-value	148**	43**	—	380**
Pseudo-R^2	.32	.23	.16	.15

Source: Own estimations with data from American Community Survey (2008) and Encuesta Nacional de Ocupación y Empleo (2008).
Notes: * and ** denote significance at 5% and 1%, respectively.

subgroups of Mexican-born workers: all workers (as shown in Tables 2 and 3), noncitizen workers, and noncitizen workers who do not speak English. The numbers suggest that the presence of self-selection (both positive and negative) is smaller when considering more disadvantaged groups of workers.

With the biased-corrected wages for migrants and nonmigrants, we can compare wages of identical individuals in the "origin" and "destination" for every migration step. In addition, we can compare wages for specific subgroups

of Mexican-born workers. Table 5 reports mean wage ratios for the three migration steps and for the total Mexico–United States migration. Wage ratios are computed dividing the biased-corrected wage of a worker in the destination by the biased-corrected wage of such worker in the origin. Table 5 also reports mean wage ratios for workers with three different levels of education: up to five years of schooling (elementary school dropouts), six to eleven years of schooling (elementary school graduates to high school dropouts), and twelve years or more of schooling (high school graduates and above).

The wage ratio for the first migration step is 1.22. This means that on average, after controlling for observable and unobservable individual characteristics, a worker will increase her or his labor earnings by 22 percent when moving from the interior of Mexico to the Mexican side of the border. Wage gains for going to the Mexican side of the border are larger for less educated workers.

Crossing the border is, by far, the most profitable of the three migration steps. On average, after controlling for observable and unobservable characteristics, a Mexican-born worker increases her or his wage 4.15 times just by crossing the United States–Mexico border. Also in this case, the wage gains are larger for less educated workers (4.94) than for more educated workers

Table 4. Inverse Mill Ratio Estimated Coefficients from Wage Equations 4 and 5

	Nonmigrants Wage Equation 4			Migrants Wage Equation 5		
	Lambda	Obs	Adj-R^2	Lambda	Obs	Adj-R^2
Step 1: Moving to the border						
Interior Mexico to Mexican side of the border	1.426**	302,337	.37	−1.226**	9,651	.32
Step 2: Crossing the border						
Mexican-born workers	.518**	18,355	.36	−2.155**	4,174	.23
Mexican-born not citizen workers	.642**	18,355	.36	−1.599**	2,526	.21
Mexican-born not citizen not English speaking	1.279**	18,355	.36	−1.059*	1,465	.20
Step 3: Moving to the U.S. interior						
Mexican-born workers	3.569**	4,174	.18	2.443**	45,599	.16
Mexican-born not citizen workers	3.211**	2,526	.16	1.961**	33,325	.13
Mexican-born not citizen not English speaking	3.020**	1,465	.17	1.502**	19,635	.12
All steps: From Mexico to United States						
Mexican-born workers	−1.212**	389,368	.33	−.882**	49,773	.15
Mexican-born not citizen workers	−1.654**	389,368	.33	−.876**	35,851	.12
Mexican-born not citizen not English speaking	−1.570**	389,368	.33	−.629**	21,100	.10

Source: Own estimations with data from American Community Survey (2008) and *Encuesta Nacional de Ocupación y Empleo* (2008).
Notes: * and ** denote significance at 5% and 1%, respectively.

Table 5. Wage Ratios Corrected for Self-Selection

| | Mean Wage Ratios | | | |
| | By Years of Schooling | | | |
	0-5	5-11	12 or more	Total
Step 1: Moving to the border				
Interior of Mexico to Mexican side of the border	1.23	1.23	1.22	1.22
Step 2: Crossing the border				
Mexican-born workers	4.94	4.38	3.57	4.15
Mexican-born not citizen workers	5.08	4.20	3.15	3.92
Mexican-born not citizen not English speaking workers	5.26	4.00	2.66	3.67
Step 3: Moving to the U.S. interior				
Mexican-born workers	1.26	1.14	1.07	1.12
Mexican-born not citizen workers	1.20	1.13	1.09	1.12
Mexican-born not citizen not English-speaking workers	1.15	1.11	1.09	1.11
American workers	1.08	1.03	1.04	1.04
All steps: From Mexico to United States				
Mexican-born workers	6.58	5.66	4.50	5.34
Mexican-born not citizen workers	6.55	5.43	4.07	5.07
Mexican-born not citizen not English-speaking workers	6.64	5.13	3.51	4.74

Source: Own estimations with data from American Community Survey (2008) and *Encuesta Nacional de Ocupación y Empleo* (2008).

(3.57). The wage gains of crossing the border are higher for less educated noncitizen Mexican-born workers (5.08) and even higher for less educated non-English-speaking Mexican-born workers (5.26). However, the wage gains of crossing the border for more educated, noncitizen Mexican-born workers are smaller (3.15), and those for more educated noncitizen, non-English-speaking Mexican-born workers are even smaller (2.66).

Moving from the U.S. side of the United States–Mexico border to the interior of the United States represents a wage gain of about 12 percent (1.12). The wage ratio is almost the same for noncitizen workers and for non-English-speaking workers. Just as for the second step, moving wage gains are larger for unskilled workers (1.26) and even larger for the legal ones.[17]

For Mexican-born workers, the wage benefits of moving from the interior of Mexico to the Mexican side of the border are larger than the wage benefits of moving from the U.S. side of the border to the interior of the United States (1.22 versus 1.12). For U.S.-born workers, the wage benefits of moving from the U.S. side of the border to the interior of the United States are considerably smaller (1.03).

[17] The number 1.26 in Table 5 includes all Mexican-born workers, citizen and noncitizen, so the wage ratio should be even larger if we considered only the citizen ones.

Table 6. Wage Ratios Corrected for Self-Selection by Border City-Pair

	Mean Wage Ratios					
	San Diego Tijuana	Calexico Mexicali	El Paso Cd. Juárez	Laredo N. Laredo	McAllen Reynosa	Brownsville Matamoros
Step 2: Crossing the border						
Mexican-born workers	4.70	3.77	3.88	4.15	3.52	4.24
Mexican-born not citizen workers	4.43	3.51	3.72	4.06	3.32	3.89
Mexican-born not citizen not English speaking	4.12	3.38	3.45	3.99	3.16	3.55

Source: Own estimations with data from American Community Survey (2008) and *Encuesta Nacional de Ocupación y Empleo* (2008).

**Figure 1.
Wage Ratio: Step 1—Moving to the Border**
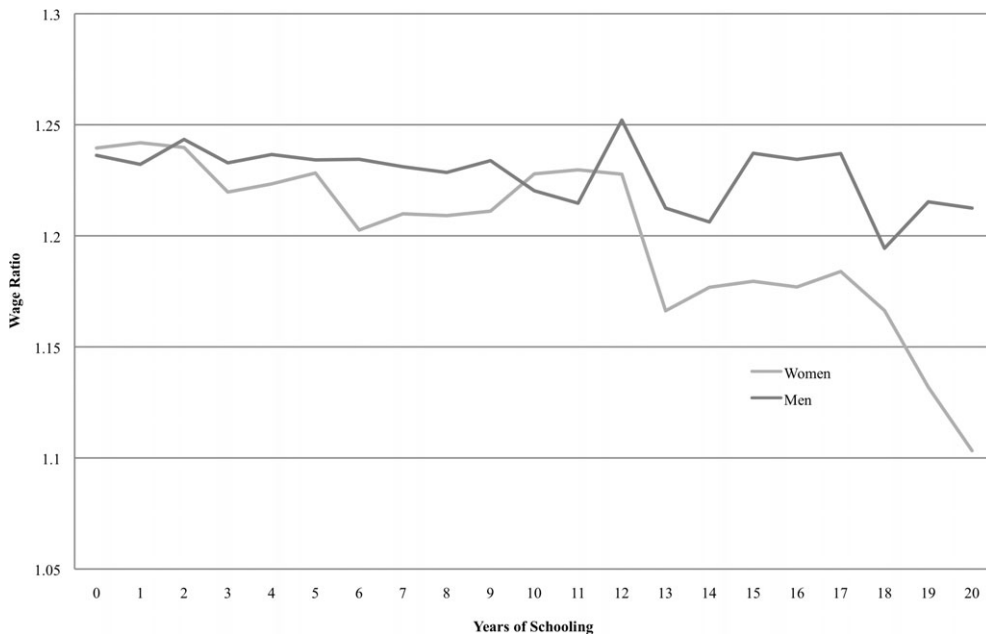
Source: Own estimations with data from American Community Survey (2008) and *Encuesta Nacional de Ocupación y Empleo* (2008).

Figure 2.
**Wage Ratio: Step 2—Crossing the Border**
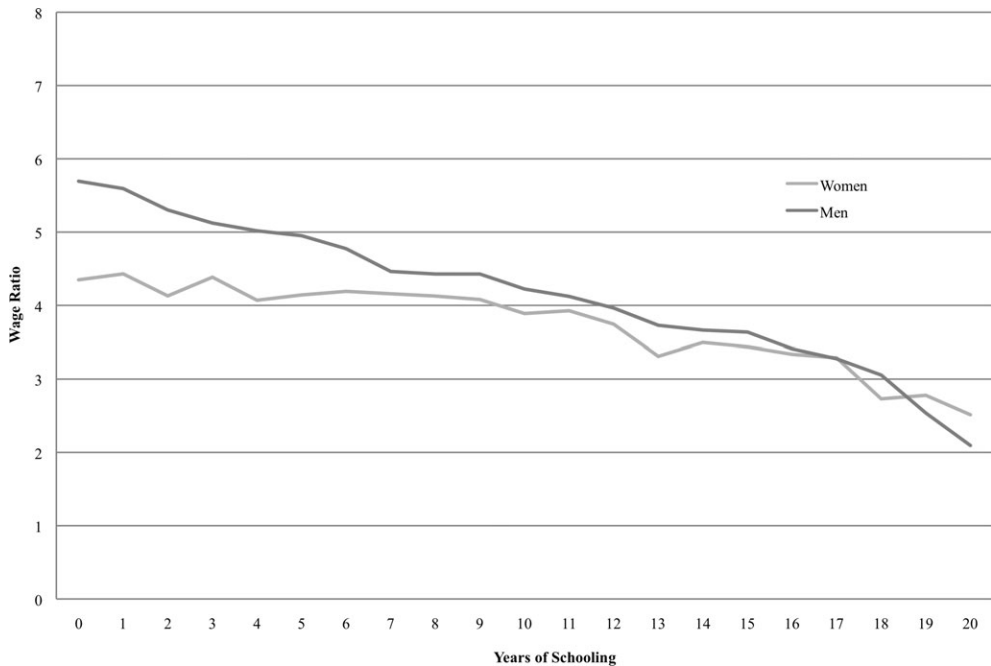
We also calculated wage ratios for moving from any place in Mexico to any place in the United States. On average, after controlling for individual characteristics and self-selection, Mexican workers increase their wages 5.34 times by moving to the United States. Wage gains are larger for unskilled workers (6.58) and even larger for the illegal ones (6.64). Skilled workers obtain better wage increments migrating legally to the United States than illegally, while unskilled workers have such low wages in Mexico that they are much better off migrating to the United States even if they go illegally and do not speak any English.

Finally, Table 6 displays estimated wage ratios for crossing the border for the six more important city-pairs in the United States–Mexico border: San Diego-Tijuana, Calexico-Mexicali, El Paso-Ciudad Juárez, Laredo-Nuevo Laredo, McAllen-Reynosa, and Brownsville-Matamoros. As expected (and as a result of the important regional economic differences along the United States–Mexico border), moving from Tijuana to San Diego increases the wage of a Mexican worker 4.7 times, while moving from Reynosa to McAllen

Figure 3.
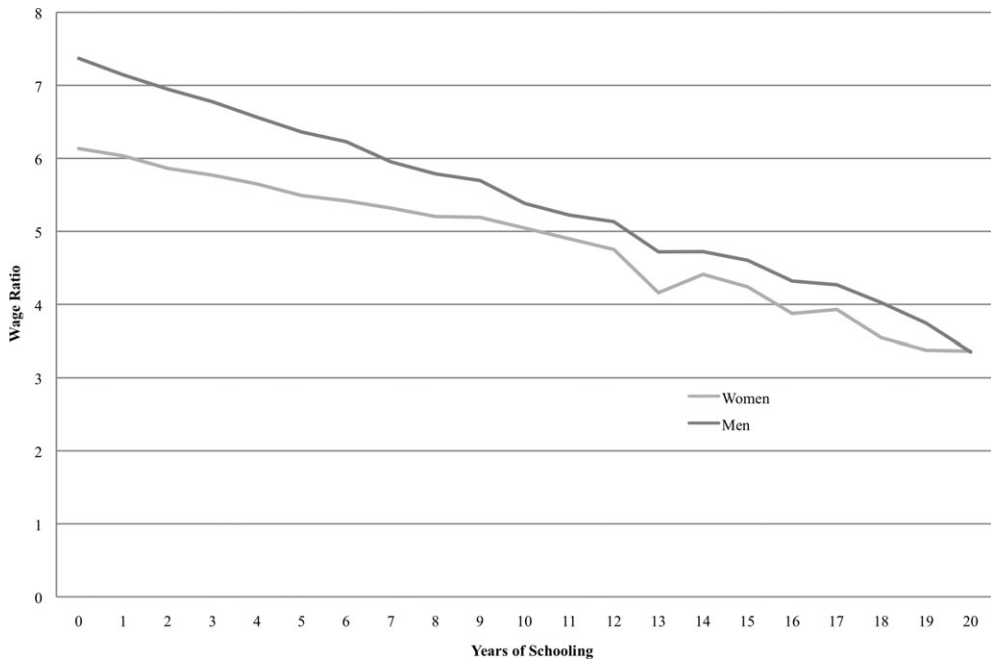**Wage Ratio: Step 3—Moving to the U.S. Interior**
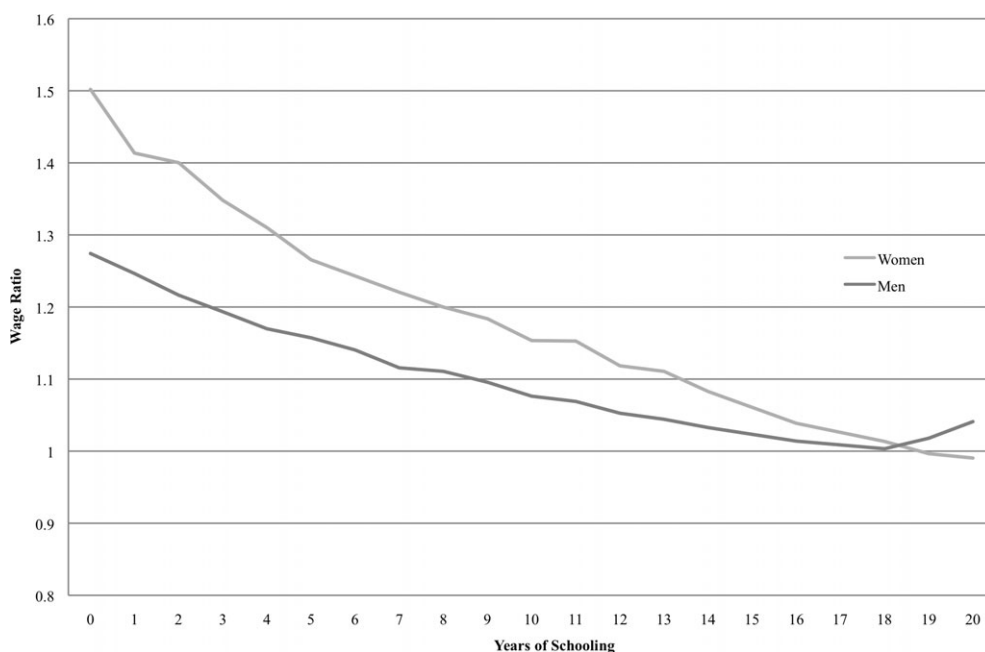
Source: Own estimations with data from American Community Survey (2008) and *Encuesta Nacional de Ocupación y Empleo* (2008).

increases her or his wage 3.52 times. In all cases and as shown before, wage gains are larger for legal and English-speaking workers.

Figures 1 to 4 present migration wage ratios by years of schooling and by male and female Mexican-born workers. Figure 1 shows wage ratios for the first migration step. Wage gains for moving from the interior of Mexico to the Mexican side of the United States–Mexico border are larger for men than for women but decrease with schooling. After twelve years of education, the wage gain of the first migration step stays flat for men and decreases for women. This result may reflect the presence of "maquiladoras" in the border cities that hire middle-skilled women. Figure 2 shows wage ratios for crossing the border. Similar to the first step, wage gains are larger for men than for women and for unskilled workers. Figure 3 presents wage ratios for the last migration step. Similar to the first two steps, wage gains are larger for unskilled workers, but in this case, women increase their wages relatively more than men when going to the interior of the United States. In total, Figure 4 shows that unskilled workers have higher wage gains than skilled workers when migrating from Mexico to the United States and that men have higher gains than women.

Figure 4.
Wage Ratio: All Steps—From Mexico to the United States

Source: Own estimations with data from American Community Survey (2008) and *Encuesta Nacional de Ocupación y Empleo* (2008).

Conclusions

Using the ACS of the United States and the Mexican Survey of Occupation and Employment (ENOE), both for the year 2008, this article compares wages for similar Mexican-born workers along their migration journey from Mexico to the United States. On average, after correcting for self-selection and other unobservable characteristics, a Mexican worker increases her or his wage 22 percent by moving from the interior of Mexico to the Mexican side of the United States–Mexico border, 315 percent by crossing the border, and 12 percent by going from the U.S. side of the border to the interior of the United States. In all cases, gains are larger for unskilled workers. Gains for crossing the border are larger for men and for illegal workers, while gains for going to the interior of the United States are larger for women and for legal workers.

As expected, crossing the border represents, by far, the largest wage gain for any Mexican migrant. The costs of crossing it are so large that wage benefits ought to compensate for them. Regional wage differences in Mexico are so important that moving from the interior of Mexico to the Mexican side of the

border provides larger wage benefits than moving from the U.S. side of the border to the interior of the United States.

The wage benefits of crossing the border are relatively smaller than the wage benefits of going from the interior of Mexico to the interior of the United States (even after controlling for transportation costs). A smaller wage differential at the border region may imply wage convergence and labor and economic integration on the border. A policy question coming from this issue is whether wage convergence in the border region implies future integration for the rest of the economies. Decreasing transportation costs, higher mobility of goods and capital, and a rapid economic and cultural integration at the border region will provide a solid background for North American economic integration.

References

AMERICAN COMMUNITY SURVEY (ACS). 2008. "Data." Accessed on November 11, 2010. Available online at www.census.gov/acs/

ANDERSON, JOAN B., and JAMES GERBER. 2007. *Fifty Years of Change in the U.S.-Mexico Border*. Austin: University of Texas Press.

BLAU, FRANCINE D., and LAWRENCE M. KAHN. 2007. "Gender and Assimilation among Mexican Americans." In *Mexican Immigration to the United States*, edited by George J. Borjas. Chicago: University of Chicago Press and National Bureau of Economic Research. 57-106.

BORJAS, GEORGE J. 1996. "The Earnings of Mexican Immigrants in the United States." *Journal of Development Economics* 51 (1): 69-98.

BORJAS, GEORGE J., and LAWRENCE F. KATZ. 2007. "The Evolution of Mexican-Born Workforce in the U.S." In *Mexican Immigration to the United States*, edited by George J. Borjas. Chicago: University of Chicago Press and National Bureau of Economic Research. 13-56.

CARD, DAVID, and ETHAN G. LEWIS. 2007. "The Diffusion of Mexican Immigrants in the 1990s: Explanations and Impacts." In *Mexican Immigration to the United States*, edited by George J. Borjas. Chicago: University of Chicago Press and National Bureau of Economic Research. 193-228.

CHIQUIAR, DANIEL, and GORDON HANSON. 2005. "International Migration, Self-Selection and the Distribution of Wages: Evidence from Mexico and the United States." *Journal of Political Economy* 113 (2): 239-281.

CLEMENS, MICHAEL A., CLAUDIO E. MONTENEGRO, and LANT PRITCHETT. 2008. "The Place Premium: Wage Differences from Identical Workers across the U.S. Border." *Center for Global Development* Working Paper 148 (December). Accessed on October 26, 2010. Available online at http://www.cgdev.org/files/16352_file_CMP_place_premium_148.pdf

DÁVILA, ALBERTO, and MARIE T. MORA. 2008. "Changes in the Relative Earnings Gap between Natives and Immigrants along the U.S.-Mexico Border." *Journal of Regional Science* 48 (3): 525-545.

DURAND, JORGE, and DOUGLAS S. MASSEY. 2004. "What We Learned from the Mexican Migration Project." In *Crossing the Border: Research from the Mexican Migration Project*, edited by Jorge Durand and Douglas S. Massey. New York: Russell Sage Foundation. 1-14.

DURAND, JORGE, DOUGLAS S. MASSEY, and RENE ZENTENO. 2001. "Mexican Inmigration in the United States: Continuities and Changes." *Latin American Research Review* 36 (1): 107-127.

ENCUESTA NACIONAL DE OCUPACIÓN Y EMPLEO (ENOE). 2008. "Data." Accessed on November 11, 2010. Available online at www.inegi.org.mx/est/contenidos/espanol/soc/sis/microdatos/default.aspx

FELICIANO, ZADIA M. 2001. "The Skill and Economic Performance of Mexican Immigrants from 1910 to 1990." *Explorations in Economic History* 38 (3): 386-409.

FREEMAN, RICHARD B., and REMCO H. OOSTENDORP. 2000. "Wages Around the World: Pay Across Occupations and Countries." *National Bureau of Economic Research* Working Paper No. 8058 (December). Accessed on October 26, 2010. Available online at http://www.nber.org/papers/w8058.pdf

HANSON, GORDON H. 2006. "Illegal Migration from Mexico to the United States." *Journal of Economic Literature* 44 (4): 869-924.

HECKMAN, JAMES J. 1979. "Sample Selection Bias as a Specification Error." *Econometrica* 47 (1): 153-161.

HOEFORT, ANDREAS, and SIMONE HOFER, eds. 2007. *Prices and Earnings: A Comparison of Purchasing Power around the Globe*. Zurich, Switzerland: Union Bank of Switzerland AG, Wealth Management Research.

LEE, LUNG-FEI. 1982. "Some Approaches to the Correction of Selectivity Bias." *Review of Economic Studies* 49 (3): 355-372.

LIVINGSTON, GRETCHEN, and JOAN R. KAHN. 2002. "An American Dream Unfulfilled: The Limited Mobility of Mexican Americans." *Social Science Quarterly* 83 (4): 1003-1012.

MINCER, JACOB. 1976. "Progress in Human Capital Analysis of the Distribution of Earnings." In *The Personal Distribution of Incomes*, edited by Anthony B. Atkinson. London: Royal Economic Society, Weidenfeld and Nicolson. 139-192.

ORRENIUS, PIA, and MADELINE ZAVODNY. 2000. "Self-Selection among Undocumented Immigrants from Mexico." *Federal Reserve Bank of Dallas* Working Paper 0005. Accessed on October 26, 2010. Available online at http://www.dallasfed.org/research/papers/2000/wp0005.pdf

ORRENIUS, PIA M., MADELINE ZAVODNY, and LESLIE LUKENS. 2008. "Why Stop There? Mexican Migration to the U.S. Border Region." *Federal Reserve Bank of Dallas* Working Paper 0803. Accessed on October 26, 2010. Available online at http://www.dallasfed.org/research/papers/2008/wp0803.pdf

RAMA, MARTIN, and RAQUEL ARTECONA. 2002. *A Data Base of Labor Market Indicators across Countries*. Washington, DC: World Bank, Mimeo.

TREJO, STEPHEN J. 2003. "Intergenerational Progress of Mexican-Origin Workers in the U.S. Labor Market." *Journal of Human Resources* 38 (3): 467-489.