

**International Migration, Self-Selection, and the Distribution of Wages:
Evidence from Mexico and the United States**

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Abstract. In this paper, we use data from the 1990 and 2000 Mexico and U.S. population censuses to examine who migrates from Mexico to the U.S. and how their skills and economic performance compare to those who remain in Mexico. We use these data to test Borjas' (1987) negative-selection hypothesis that in countries with high returns to skill and high earnings inequality (e.g., Mexico) those most likely to migrate to countries with low returns to skill and low earnings inequality (e.g., the U.S.) are the less skilled. We find that 1) Mexican immigrants, while much less educated than U.S. natives, are on average more educated than residents of Mexico, and 2) were Mexican immigrants in the U.S. to be paid according to current skill prices in Mexico they would tend to occupy the middle and upper portions of Mexico's wage distribution. These results are inconsistent with the negative-selection hypothesis and suggest, instead, that in terms of observable skills there is intermediate or positive selection of immigrants from Mexico.

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1. Introduction

In recent decades, rising immigration from poor countries has made the U.S. labor force larger, younger, and less-skilled than it otherwise would have been (Borjas, 1999). The shift in immigrant composition appears due in part to the 1965 Immigration Act, which relaxed long-standing country-of-origin restrictions on immigrant admissions.

In an important body of work, Borjas (1987) argues that who migrates to the U.S. from a particular country will depend on that country's wage distribution. In countries with high returns to skill and high wage dispersion, as in much of the developing world, there will be negative selection of immigrants. Those with the greatest incentive to migrate to the U.S. will be individuals with below-average skill levels in their home countries. In countries with low returns to skill and low wage dispersion, as appears to be the case in Western Europe, there will be positive selection of immigrants. Those with above-average skill levels will have the greatest incentive to migrate. In support of this selection hypothesis, Borjas (1987, 1995) finds that as sources for U.S. immigration have shifted from Europe to Asia and Latin America, the economic performance of new immigrants has deteriorated. Relative to earlier cohorts, recent immigrants earn lower wages compared to natives at time of arrival and take longer for their earnings to converge to native levels.¹ These findings counter an earlier belief that, irrespective of origin country, immigrants have high potential for earnings growth (Chiswick, 1978).²

Largely missing in the discussion of U.S. immigration is evidence from source countries. Surprisingly, there is little work on how the skills of immigrants compare to

¹ Identifying changes in the average quality of immigrant cohorts is complicated by changes in unobserved cohort quality, immigrant assimilation, and labor-market disturbances that vary by skill group. See LaLonde and Topel (1992, 1997), Borjas (1999) and Butcher and DiNardo (2002) on how to deal with this issue.

² Evidence of positive selection includes brain drain from poor countries (Beine et al., 2001; Carrington et al., 1998) and the internal migration of skilled workers (Borjas, Bronars, and Trejo, 1992; Bound and Holzer, 2000).

the skills of non-migrating individuals in countries of origin. Such data are essential to evaluate the nature of migrant selection. One exception is Ramos (1992) who uses 1980 census data for the U.S. and Puerto Rico. Consistent with negative selection, non-migrants in Puerto Rico are more educated than individuals migrating from Puerto Rico to the U.S. and less educated than those migrating from the U.S. to Puerto Rico.³

In this paper, we use data from the 1990 and 2000 Mexico population censuses and data on Mexican immigrants in the 1990 and 2000 U.S. population censuses to examine who in Mexico migrates to the U.S. and how their earnings and observable skills compare to those who remain at home. Mexico is the largest source country for U.S. immigration, accounting for 31.3% of net new arrivals in the 1990's. In 2000 the 9.2 million Mexican immigrants in the U.S. were equal to 9.4% of Mexico's total population. Mishra (2003) estimates that over the period 1970-2000 emigration raised average wages in Mexico by 8.0%.⁴ Relative to the U.S., Mexico has high returns to schooling and high wage dispersion, making it an ideal candidate to test the negative-selection hypothesis.

Following Borjas (1991), we develop a simple model, presented in section 2, to show that migrant selection in a country like Mexico may be negative, intermediate, or positive, depending on the size of migration costs and how they vary with skill. A simple test for negative selection is to compare the observable skills of those who migrate and of those who do not. In section 3, we find that Mexican immigrants, while much less educated than U.S. natives, are more educated than residents of Mexico. Individuals with

³ To compare Ramos' results to ours, it is important to note that many costs of migrating to the U.S. that are relevant for Mexico (binding quotas, border enforcement, bureaucratic delays) are not relevant for Puerto Rico.

⁴ In the U.S., many studies find that regional immigration inflows are only weakly correlated with wage changes for low-skilled U.S. natives, suggesting immigration has little impact on U.S. wages (LaLonde and Topel, 1997; Smith and Edmonston, 1997; Borjas, 1999). However, Borjas, Freeman, and Katz (1997) and Borjas (2003) argue that commonly used cross-area wage regressions require strong and unrealistic identifying assumptions. Using alternative approaches, these two studies find that higher immigration depresses wages for low-skilled U.S. natives.

10 to 15 years of schooling are the Mexican cohort most over-represented in the U.S.⁵ This is suggestive evidence against the negative selection of Mexican immigrants in terms of observable skill.⁶ However, schooling may not be a sufficient statistic for skill or for potential earnings. To compare migrants and non-migrants, we would prefer to see what each would earn in the same labor market, under a *common* price for skill. *Realized earnings* of non-migrants, which reflect Mexican skill prices, and of migrants, which reflect U.S. skill prices, are not very informative.

To evaluate the selection of Mexican immigrants in terms of observable skills, we compare actual wage densities for residents of Mexico with counterfactual wage densities that would obtain were Mexican immigrants paid according to skill prices in Mexico. The *difference* between these actual and counterfactual wage densities nonparametrically summarizes immigrant selection in terms of potential earnings. To construct these densities, we extend the framework in DiNardo, Fortin, and Lemieux (1996), as shown in section 4. The results, presented in section 5, suggest that were Mexican immigrants in the U.S. paid according to Mexican skills prices they would fall disproportionately in the middle and upper portions of Mexico's wage distribution. These findings do not support negative selection and suggest instead there is intermediate or positive selection of Mexican immigrants. Also in section 5, we examine the robustness of these results.

2. Theory

In this section, we motivate the empirical analysis by developing a simple model of migration. Borjas (1987) applies Roy (1951) to show that in countries with relatively

⁵ In related work, Feliciano (2001) finds that before 1990 average schooling was also higher for Mexican immigrants.

⁶ Case-study evidence supports this view. See Orrenius et al. (2004), Durand et al. (2001) and Cornelius et al. (2001).

high returns to skill and earnings inequality migrants tend to be negatively selected – they are drawn primarily from the lower half of the skill distribution in their home country. Borjas (1991) shows that this result depends on assuming migration costs are constant across individuals. If migration costs are negatively correlated with earnings, negative selection may be overturned. We apply this insight to show that if migration costs are decreasing in skill migrants may be negatively or positively selected in terms of skill, depending on the size of migration costs and the shape of the skill distribution.

Individuals from Mexico, indexed by 0, choose whether or not to migrate to the U.S., indexed by 1. For simplicity, we treat this as a one-time decision, though the extension to a dynamic setting is straightforward (see Sjaastad, 1962; Borjas, 1991). Residents of Mexico face a wage equation given by

$$\ln(w_0) = \mu_0 + \delta_0 s \quad (1)$$

where for Mexico w_0 is the wage, μ_0 is the base wage, s is the level of schooling, and δ_0 is the return to schooling. We focus on migrant selection in terms of observable skills, in this case schooling. Implicitly, we imagine there are random components to wage determination, but for simplicity we leave such features in the background. If the population of Mexicans were to migrate to the U.S., they would face the wage equation

$$\ln(w_1) = \mu_1 + \delta_1 s \quad (2)$$

where for Mexican migrants in the U.S. w_1 is the wage, μ_1 is the base wage, and δ_1 is the return to schooling. Consistent with skill being scarce in Mexico, we assume that $\delta_0 > \delta_1$, or that the return to schooling is higher in Mexico than in the U.S.

Let C be migration costs and let $\pi = C / w_0$ be migration costs in time-equivalent

units (i.e., the number of labor hours needed to migrate to the U.S.). Combining (1) and (2), a resident of Mexico will migrate to the U.S. if

$$\ln(w_1) - \ln(w_0 + C) \approx \ln(w_1) - \ln(w_0) - \pi > 0. \quad (3)$$

Borjas (1987, 1999) assumes that π is constant, implying that all individuals require the same number of labor hours in order to migrate to the U.S. This assumption simplifies the analysis, but may not be an accurate reflection of reality. We assume instead that time-equivalent migration costs decrease with schooling, such that

$$\ln(\pi) = \mu_\pi - \delta_\pi s. \quad (4)$$

This corresponds to the case in Borjas (1991), in which the random component of earnings is negatively correlated with the random component in migration costs. Why might migration costs decrease with schooling? First, individuals migrating legally to the U.S. must satisfy many bureaucratic requirements, involving extensive paperwork and repeated interactions with U.S. immigration authorities. More-educated individuals may be able to meet these requirements more easily.⁷ Second, a large service industry of lawyers and other specialists exists to help migrants manage the U.S. admissions process. Given the cost of these services is more or less fixed, the time-equivalent cost of migration will be lower for individuals with higher hourly wages. There is also a large service industry oriented towards illegal immigrants (Orrenius, 1999). To enter the U.S. successfully, an illegal entrant must cross the border, find transport to a safe location in the U.S., and obtain counterfeit residency documents. These costs are also fixed, implying higher-wage individuals require fewer effective labor hours to migrate to the

⁷ Over 90% of legal Mexican immigrants in the U.S. are admitted under family reunification provisions of U.S. immigration law. While obtaining legal assistance cannot change an individual's eligibility for admission, it may help an individual clear the queue for legal admission more quickly.

U.S. Third, credit constraints may raise migration costs for low-income individuals, who are also likely to be less educated. Individuals may have to borrow to cover migration costs. If lower-income individuals face higher borrowing costs, due to a higher expected probability of default, they will face higher migration costs.⁸

Combining (3) and (4), Figure 1 shows $\ln(w_0)$ and $\ln(w_1) - \pi$, which defines the cutoff schooling level for who migrates to the U.S. in the case where $\delta_\pi = 0$ and $\mu_1 - \mu_0 > e^{\mu\pi}$. Here, time-equivalent migration costs are constant and small, which corresponds to the assumptions in Borjas (1987). He focuses on unobservable skills but the analogy to observable skills is straightforward. In Figure 1, there is negative selection of migrants: individuals with schooling less than s^* migrate from Mexico to the U.S. and individuals with schooling greater than s^* remain in Mexico. Individuals with relatively high levels of schooling are less likely to migrate to the U.S. due to the fact that the return to schooling is higher in Mexico.

Figure 2 shows an alternative case in which $\delta_\pi > 0$ and $\mu_1 - \mu_0 < e^{\mu\pi}$.⁹ Here, time-equivalent migration costs are decreasing in schooling and are large. Individuals with schooling in the interval (s_L, s_U) migrate from Mexico to the U.S. and those with schooling outside this interval remain in Mexico. The selection of migrants in terms of observable skills depends on the distribution of schooling in Mexico. There are three possible cases: (a) *negative selection*: if the support for the schooling distribution goes from some value between s_L and s_U to some value greater than s_U , migrants will have low

⁸ A related possibility is that more-educated individuals may face less uncertainty with regards to the U.S. wages they would earn, making them more likely to migrate for any given wage differential.

schooling relative to those who remain in Mexico; (b) *positive selection*: if the support of the schooling distribution runs from some value below s_L to some value between s_L and s_U , migrants will have relatively high levels of schooling; or (c) *intermediate selection*: if the support of the schooling distribution goes from some value below s_L to some value above s_U , migrants will have intermediate levels of schooling. In case (c), fixed migration costs preclude those with low schooling from migrating and high returns to schooling in Mexico dissuade those with high schooling from migrating, giving those with intermediate schooling the strongest incentive to migrate to the U.S.

One caveat is that our analysis ignores migration networks, which appear to be important in Mexico (Munshi, 2003; Woodruff and Zenteno, 2001). Individuals with friends or relatives in the U.S. may face lower migration costs. A second caveat is that we ignore unobservable skills. If the correlation between observable and unobservable skills is positive and strong, we expect our results would apply to migrant selection in terms of unobservable skills, as well. In the empirical analysis, we discuss how migration networks and unobserved determinants of migration might affect our results.

3. Data and Preliminary Evidence

To compare outcomes for residents of Mexico and immigrants from Mexico, we use 1% samples from Mexico's 1990 and 2000 *Census of Population and Housing* and the 5% Public Use Microdata Sample from the U.S. 1990 and 2000 *Census of Population and Housing*. For much of the analysis, we focus on recent Mexican immigrants, defined as those arriving in the U.S. within the last 10 years. They reflect individuals admitted

⁹ If $\mu_1 - \mu_0 > e^{\mu\pi}$ (migration costs are small), then even if migration costs are decreasing in schooling there is still an unambiguous prediction for the negative selection of migrants. An additional assumption needed to obtain Figure 2

under current U.S. policy. One measurement issue is that many Mexican immigrants are in the U.S. illegally. The U.S. census shows 4.3 million Mexican-born individuals in the U.S. in 1990 and 9.2 million in 2000. Of these, the Census Bureau estimates 1.0 million were illegal immigrants in 1990 and 3.9 million were in 2000 (Costanzo et al., 2001). By its own estimation, the Census Bureau undercounts illegal immigrants by 15-20%. Others suggest the undercount rate is higher. The Immigration and Naturalization Service (2003) puts the number of illegal Mexicans at 2.0 million in 1990 and 4.8 million in 2000, close to estimates by Bean et al. (2001) and Passel et al. (2004).¹⁰ In section 5 we assess how undercounting illegal immigrants may affect our results.

3.1 Summary Data

Overall, the accumulated outflows of individuals born in Mexico are large. Table 1 shows Mexican immigrants in the U.S. as a percentage of the total population born in Mexico by age cohort for males and females. We take the total Mexico-born population to be the sum of the Mexico-born population in Mexico and the Mexico-born population in the U.S. Consider first the cohort of males born in Mexico who were 16-25 years old in 1990 (and thus 26-35 years old in 2000). The fraction of this cohort residing in the U.S. was 7.6% in 1990 and 17.5% in 2000, implying that during the 1990's about 10% of the cohort migrated to the U.S. Consider next the cohort of males who were 26-35 years old in 1990. The fraction of this cohort residing in the U.S. rose from 10.9% in 1990 to 15.5% in 2000, implying a within-decade emigration rate of about 4.6%. Within-decade

is that $\partial(\ln w_1 - \pi) / \partial s = \delta_1 + \delta_\pi e^{\mu\pi - \delta\pi s} > \delta_0$ for small s .

¹⁰ Most estimates of the illegal immigrant population subtract from the enumerated immigrant population new legal immigrant admissions (less estimated departures and deaths for these individuals). This residual foreign born population is taken to be illegal immigrants. See Bean et al. (2001), Costanzo et al. (2001), and INS (2003).

migration rates decline for each succeeding cohort. This suggests migration rates from Mexico to the U.S. are highest for young adults. Comparing the stock of individuals in the U.S. for different cohorts at the same age suggests that migration rates are rising over time. The share of males 16-25 years old who resided in the U.S. rose from 7.6% in 1990 to 12.0% in 2000, and rose also for every other age group. For women migration rates and migrant stocks are lower, but patterns are similar.

Tables 2a-2d show means for age, schooling, labor-force participation, and hourly wages for residents of Mexico, Mexican immigrants in the U.S., and, for comparison, other U.S. immigrants and U.S. natives. We choose education categories that are reported in the U.S. census (Mexico reports more categories). Fortunately, these categories correspond to modes for high grade of schooling completed in Mexico, which occur at grade 6 (primary schooling), grade 9 (secondary schooling), and grade 12 (preparatory schooling).¹¹ Grogger and Trejo (2002) report that Mexican immigrants who arrive in the U.S. before age 6 complete as much education as second-generation Mexican-Americans. In contrast, those who arrive after age 15 complete much less schooling. To focus on migrants likely to have been schooled in Mexico, we limit the immigrant sample to individuals aged 21 or older at time of U.S. entry.

Tables 2a-2d reproduce the familiar facts that when compared to U.S. natives Mexican immigrants in the U.S. are younger, are much less educated, and have much lower hourly wages. In 1990, 68.3% of all Mexican immigrant men and 62.8% of recent

¹¹ For Mexico, average hourly wages are calculated as monthly labor income/(4.5*hours worked last week); for the U.S., average hourly wages are calculated as annual labor income/(weeks worked last year*usual hours worked per week). For Mexico, we need to assume individuals work all weeks of a month, which could bias wage estimates downwards. However, this does not affect the results in section 5 since in no exercise do we compare Mexico and U.S. wage levels. To avoid measurement error associated with implausibly low wage values or with top coding of earnings, we restrict the sample to be individuals with hourly wages between \$0.05 and \$20 in Mexico and \$1 and \$100 in the U.S. (in 1990 dollars). This restriction is nearly identical to dropping the largest and smallest 0.5% of wage values.

Mexican immigrant men had completed 9 or fewer years of school, compared to only 7.3% of U.S. native men. However, Mexican immigrants, and recent immigrants in particular, compare favorably when we examine residents of Mexico. In 1990, 75.2% of male residents of Mexico had 9 or fewer years of schooling. Beyond 9 years of education, Mexican immigrants outperform Mexican residents in every category except college graduates. Relative to male residents of Mexico, recent Mexican immigrant men are less likely to have 9 or fewer years of education (62.8% versus 75.2%), more likely to have 10-15 years of education (32.4% versus 16.3%), and less likely to have 16 plus years of education (4.8% versus 8.4%). A similar pattern holds for women.

Over time, educational attainment among the Mexico-born has increased, but this has not changed the gap in educational attainment between Mexican residents and Mexican immigrants. In 2000, relative to male residents of Mexico, recent Mexican immigrant men remain less likely to have 9 or fewer years of education (55.8% versus 69.4%), more likely to have 10-15 years (38.8% versus 19.3%), and less likely to have 16 plus years (5.4% versus 11.3%). Again, a similar pattern holds for women.

Tables 2a-2d give preliminary evidence against the negative-selection hypothesis. In terms of observable skills, it is the moderately well educated, not the least educated, who are most likely to migrate from Mexico to the U.S. One concern about this evidence is that recent Mexican immigrants may have high levels of schooling in part because they are relatively young and educational attainment in Mexico has been rising over time. To control for age, Table 3 shows average schooling for 26-35 year old Mexican residents and Mexican immigrants in the U.S. For this high-migration age cohort, it remains the case that Mexican immigrants have high schooling relative to Mexican residents.

A related concern is that Mexican immigrants may obtain schooling after arriving in the U.S., in which case the U.S. census would overstate educational attainment of Mexican immigrants at the time they left Mexico. Additional schooling may take the form of degree-oriented learning, or, more commonly, English language classes. We have dealt with this issue in part by restricting the sample to those who were age 21 years or older at time of arrival in the U.S. Adults appear less likely to continue schooling in the U.S. Some adult immigrants may further their education by satisfying a high-school equivalency requirement through passing the General Education Development (GED) exam.¹² The bunching of Mexican immigrants at exactly 12 years of education (relative to Mexican residents) in Tables 2a-2d could be consistent with such behavior.

Available evidence indicates few Mexican immigrants pass the GED. Using the CPS, Clark and Jaeger (2002) find that among Mexican immigrants who lack a high-school diploma and who completed their schooling abroad only 1.2% had passed the GED. And among Mexican immigrants who completed some schooling in the U.S. (most of whom arrived in the U.S. as young children) only 3.7% had passed the GED. More generally, while Betts and Lofstrom (1998) find that school enrollment rates for adult immigrants are higher than for adult U.S. natives, the same does not hold for immigrants from Mexico (Borjas, 1996; Trejo, 1997). Table 3 shows schooling levels for 26-35 year-old Mexican immigrants who have been in the U.S. 0-3 years or 4+ years. In 1990 and 2000, earlier arrivals are not less likely to have 12 years of schooling, suggesting adult immigrants are unlikely to continue formal education after arriving in the U.S.

¹² On the returns to a GED, see Grogger and Trejo (2002), Clark and Jaeger (2002), Cameron and Heckman (1993), and Murnane, Willett, and Tyler (2000).

3.2 Labor-Force Participation in Mexico and the United States

Returning to Tables 2a and 2b, there appear to be differences in labor-force participation rates between residents of Mexico and Mexican immigrants in the U.S. Table 4 reports the fraction of the population of Mexican residents and of recent Mexican immigrants in the U.S. with positive labor earnings by year, age, and schooling cells. This definition of labor-force participation reflects the sample of individuals for whom we have observations on wages. For males 26-55 years of age with more than four years of education, labor-force participation rates in the two countries are similar. Participation rates are somewhat higher for Mexican immigrant males in the oldest cohort (56-65 years), and in the cohort with least schooling (0-4 years).

However, labor-force participation rates for women differ markedly between migrants and non-migrants. Among women with 11 or fewer years of education, immigrants are much more likely to have positive labor earnings. This could be due to more elastic female labor supply, in which case higher wages in the U.S. would induce higher rates of labor-force participation. Alternatively, women who are more likely to work at any wage level may be more likely to self-select into migration. In either case, Mexican immigrant women in the U.S. who work may differ from the subpopulation of these women that would work were they to return to Mexico.¹³

This poses a problem for the empirical analysis. Differences in labor-force participation between migrant and non-migrant females may affect the pattern of migrant selection we uncover from data on wage earners. We return to this issue in section 4.

¹³ See Baker and Benjamin (1997) for further discussion of immigrant male and female labor supply.

3.3 Returns to Observable Skill in Mexico and the United States

A primary motivation for individuals in Mexico to emigrate is to earn higher wages. The model in section 2 assumes that the base wage (the wage of an individual with minimal skill) is higher in the U.S. and that returns to skill are higher in Mexico. Available evidence is consistent with these assumptions. For Mexican immigrants in the U.S., estimated returns to education are low. In the 1980's and 1990's, an additional year of schooling is associated with an increase in log wages for men of 0.025 to 0.032 (Borjas, 1996; Trejo, 1997; Groger and Trejo, 2002).¹⁴ In Mexico in the 1990's, an additional year of schooling is associated with an increase in log wages for men of 0.076 to 0.097 (Chiquiar, 2003).¹⁵ Figure 3 shows kernel density estimates for wages of Mexican immigrants and Mexican residents (individuals 21-65 years of age, where immigrants were at least 21 years of age at time of U.S. entry and immigrated within the previous 10 years). Not surprisingly, mean wages in Mexico are much lower.¹⁶

To summarize differences in returns to observable skills in the two countries, we estimate OLS wage regressions for four samples of men: residents of Mexico, recent Mexican immigrants in the U.S. (those arriving in the last 10 years), all Mexican immigrants in the U.S., and other U.S. immigrants. Table 5 reports the results. Unreported results for women are similar. The regressors are dummy variables for schooling, age group, marital status, residence in a metro area, region of residence, race (for other U.S. immigrants only), and year of entry into the U.S. (for immigrants only).

¹⁴ Bratsberg and Ragan (2002) estimate slightly higher returns to schooling (0.035) for a sample of U.S. immigrant men from any country. In all samples, the estimated return to education for U.S. natives is roughly twice as large.

¹⁵ On the returns to education in Mexico, see also Cragg and Epelbaum (1996) and Ariola and Juhn (2003).

¹⁶ Figure 3 suggests wage dispersion is lower among Mexican immigrants in the U.S. than among residents of Mexico. However, since immigrants tend to be more homogeneous than the population from which they came, it is natural for them to exhibit lower wage dispersion. This is a direct implication of self-selection (Heckman and Honore, 1990).

Estimated returns to schooling for residents of Mexico are much higher than for Mexican immigrants.¹⁷ In 2000, completing 12 years of schooling is associated with an increase in hourly wages of 60.5 log points for men in Mexico but only 11.2 to 15.4 log points for Mexican men in the U.S. The difference is even larger for the 13-15 years and 16+ years of education categories. Returns to age are also higher for Mexican residents than for Mexican immigrants. Table 5 confirms previous results that estimated U.S. returns to education are lower for recent immigrants relative to earlier immigrants and for Mexican immigrants relative to other immigrants (Borjas, 1996 and 1999).

3.4 Migration Networks, Internal Migration, and Return Migration

Unobserved characteristics surely matter for the migration decision. Individuals may be more likely to migrate if they are highly motivated, have family or other contacts in the U.S., or have access to credit or financial resources. In the census, information on these features is lacking. If unobservables relevant to migration are correlated with schooling, the evidence in Table 2 might be misleading. To gain insight into how unobservables affect migration, we examine three groups of Mexican residents: individuals from high-migration states, internal migrants, and return migrants from the U.S.

One important unobserved characteristic is access to migration networks. In Mexico, there is strong historical persistence in regional migration behavior, which suggests migration networks are regionally concentrated. This appears due in part to historical accident. In the early 1900's, Texas farmers began to recruit laborers in

¹⁷ If unobserved ability and schooling are correlated, estimates of returns to schooling may be biased. Also, self-selection into the labor force or into migration may introduce further biases. In unreported results, we estimated wage regressions for Mexican-born men in Mexico and in the U.S., including the inverse Mills ratio derived from a probit model of the migration decision. Since we lack an instrument for migration, identification is achieved through the non-

Mexico. Given then small populations on the Texas-Mexico border, recruiters followed the main rail line into Mexico, which ran southwest to Guadalajara, a major city in the center-west of the country. Early migrants came from rural areas near the rail line. They helped later generations of migrants find jobs in the U.S. (Durand, Massey, and Zenteno, 2001). Emigration continues to be concentrated in central and western Mexico. The correlation between the fractions of the Mexican state population migrating to the U.S. in the 1950's and in the 1990's is 0.73 (Woodruff and Zenteno, 2001). This suggests individuals in high-migration regions in Mexico may be the relevant comparison group for Mexican immigrants in the U.S. Table 3 shows educational attainment for individuals in Mexico's high-migration states.¹⁸ Average schooling levels in these states are below those in the rest of country, indicating that comparing Mexican immigrants with residents of high-migration states would yield stronger evidence against negative selection.

Other important unobserved characteristics are drive and motivation, which may help an individual take the risk of moving abroad. Similar to emigrants, internal migrants have made the decision to relocate. Part of what distinguishes internal and external migration is the much higher cost of migrating abroad. If it is unobserved drive, and not migration costs, that shapes migration decisions, external and internal migrants should have similar characteristics. Comparing Tables 2 and 3, internal migrants (adults who resided in a different state five years previously) are more educated than Mexican residents overall. However, relative to immigrants in the U.S. internal migrants are under-represented among those with 10-15 years of schooling and over-represented

linear way in which the other regressors enter into the inverse Mills ratio and so depends on distributional assumptions. With these concerns in mind, correcting for self-selection into migration has little effect on the coefficient estimates.

¹⁸ These states are Aguascalientes, Colima, Guerrero, Hidalgo, Jalisco, Guanajuato, Michoacán, Morelos, Nayarít, Oaxaca, Queretero, San Luis Potosí, and Zacatecas. In 2000, 9.0% of the households in these states had sent migrants to the U.S. between 1995 and 2000, as compared to 2.6% of households in the rest of the country.

among those with lower and higher schooling levels. This again suggests that external migrants are intermediately selected in terms of educational attainment.

Return migrants are individuals who have chosen not to reside in the U.S. permanently. This may be by design – in migrating to the U.S. their plan may have been to stay temporarily – or a result of their U.S. earnings being lower than expected. Borjas and Bratsberg (1996) show that where migrants are positively (negatively) selected, return migrants will be more (less) skilled than non-migrants but less (more) skilled than permanent migrants. The Mexican census asks whether an individual resided in the U.S. five years ago, which gives some information on the return migrant population. In Table 3, returnee women fit the pattern of positive selection (they have schooling levels between those of residents and U.S. immigrants) but men fit neither pattern (they have lower schooling levels than either residents or U.S. immigrants). However, extremely small sample sizes for returnees make these results difficult to interpret.¹⁹

4. Migration Abroad and the Distribution of Wages in Mexico

In this section, we develop a framework to compare wage distributions for residents of Mexico and immigrants from Mexico in the U.S. This exercise will allow us to assess nonparametrically whether in terms of observable skills there is positive or negative selection of individuals who migrate from Mexico to the U.S.

Wage distributions for Mexican residents and Mexican immigrants may differ either because of differences in the distribution of skills between the two groups or because of differences in the prices of skills in the two labor markets. To examine

¹⁹ The fraction of adults aged 21-64 years who reported living in the U.S. five years prior in 2000 was only 0.7% for males and 0.3% for females and in 1990 was only 0.2% for males and 0.1% for females.

differences in the distribution of skills between Mexican residents and Mexican immigrants, we compute the counterfactual wage density of Mexican immigrants in the U.S., assuming they are paid according to Mexico's wage structure, and compare it to the actual distribution of wages in Mexico. Our framework does not address how the distribution of unobserved characteristics might influence the distribution of wages. If, holding age, education, and other observables constant, Mexican immigrants in the U.S. have low unobserved ability relative to residents of Mexico, we will tend to understate the extent of negative selection. By taking skill prices as given, our framework also fails to address the general-equilibrium effects of Mexico-to-U.S. migration.

4.1 Counterfactual Wage Densities

Let $f^i(w|x)$ be the density of wages w in country i , conditional on a set of observed characteristics x . Also, let D_i be an indicator variable equal to 1 if the individual is in the labor force and equal to zero otherwise. We further define $h(x|i=Mex, D_i=1)$ as the density of observed characteristics among wage earners in Mexico, and $h(x|i=US, D_i=1)$ as the density of observed characteristics among wage-earning Mexican immigrants in the U.S. To begin, we suppress time subscripts. The observed density of wages for individuals working in Mexico is

$$g(w|i=Mex, D_i=1) = \int f^{Mex}(w|x)h(x|i=Mex, D_i=1)dx \quad (5)$$

Likewise, the observed density of wages for Mexicans working in the U.S. is

$$g(w|i=US, D_i=1) = \int f^{US}(w|x)h(x|i=US, D_i=1)dx \quad (6)$$

Differences in $f^{Mex}(w|x)$ and $f^{US}(w|x)$ capture differences in skill prices in the two

countries.²⁰ Differences in $h(x|i=Mex, D_i=1)$ and $h(x|i=US, D_i=1)$ capture differences in the distribution of observed characteristics for Mexican resident workers and for Mexican immigrant workers. The differences in the $h(\cdot)$ functions are due in part to differences in the characteristics of Mexican immigrants and Mexican residents and in part to differences in who participates in the labor force in the two countries.

Consider the density of wages that would prevail for Mexican immigrant workers in the U.S. if they were paid according to the price of skills in Mexico:

$$g_{US}^{Mex}(w) = \int f^{Mex}(w|x)h(x|i=US, D_i=1)dx \quad (7)$$

This corresponds to the distribution of wages for Mexican residents in (5), except that it is integrated over the skill distribution for working Mexican immigrants in the U.S.

While this distribution is unobserved, we can rewrite it as

$$\begin{aligned} g_{US}^{Mex}(w) &= \int f^{Mex}(w|x)h(x|i=US, D_i=1) \frac{h(x|i=Mex, D_i=1)}{h(x|i=Mex, D_i=1)} dx \\ &= \int \theta f^{Mex}(w|x)h(x|i=Mex, D_i=1)dx \end{aligned} \quad (8)$$

where

$$\theta = \frac{h(x|i=US, D_i=1)}{h(x|i=Mex, D_i=1)} \quad (9)$$

DiNardo, Fortin, and Lemieux (1996) (henceforth DFL) show that a counterfactual density as in (7) can be estimated by taking an observed density (e.g., for wage earners in Mexico) and re-weighting it (e.g., to reflect characteristics of Mexican immigrant workers) as in (8). To compute the weights, use Bayes' Law to write,

$$h(x) = \frac{h(x|i=US, D_i=1)\Pr(i=US, D_i=1)}{\Pr(i=US, D_i=1|x)} \quad (10)$$

²⁰ When the conditional expectation is linear in the observed characteristics, these terms are closely related to the

and,

$$h(x) = \frac{h(x | i = Mex, D_i = 1) \Pr(i = Mex, D_i = 1)}{\Pr(i = Mex, D_i = 1 | x)} \quad (11)$$

Combining (10) and (11) we can obtain an expression for θ that is a function of the ratio of the conditional probability that a Mexican-born individual works in Mexico to the conditional probability that a Mexican-born individual works in the U.S. DFL suggest estimating these probabilities parametrically, using the estimates to calculate θ , and then applying the θ 's to estimate a counterfactual wage density as in (8).

However, the counterfactual density in (8) is not precisely what we desire. The weight, θ , as seen in (9), adjusts for differences in the distribution of skills between Mexican immigrants and Mexican residents, conditional on Mexican immigrants working in the U.S. and Mexican residents working in Mexico. In order to compare wage distributions for the two groups, we want to condition on common labor-force participation behavior, which requires modifying the weight we use to construct the counterfactual wage density. First, note that it is possible to write the joint probability of migration and labor-force participation, conditional on x , as the product of the conditional distribution of the participation outcome and the marginal of the migration outcome:

$$\Pr(i = US, D_i = 1 | x) = \Pr(D_i = 1 | i = US, x) \Pr(i = US | x) \quad (12)$$

$$\Pr(i = Mex, D_i = 1 | x) = \Pr(D_i = 1 | i = Mex, x) \Pr(i = Mex | x) \quad (13)$$

Given (9)-(13), we can write:

$$\theta = \frac{\Pr(D_i = 1 | i = US, x) \Pr(i = US | x) \Pr(i = Mex, D_i = 1)}{\Pr(D_i = 1 | i = Mex, x) \Pr(i = Mex | x) \Pr(i = US, D_i = 1)} \quad (14)$$

regression equation for wages on observable characteristics (Butcher and DiNardo, 2002).

Next, note that $Pr(i = Mex, D_i=1)/Pr(i = US, D_i=1)$ is a constant given by the sample proportions of Mexican resident and Mexican immigrant workers. Since θ is scaled to sum to one once we estimate wage densities, we can without loss of generality set $Pr(i = Mex, D_i=1)/Pr(i = US, D_i=1) = 1$. Thus, the weight θ can be written as,

$$\theta = \theta^P \theta^M \quad (15)$$

where:

$$\theta^P = \left(\frac{\Pr(D_i = 1 | i = US, x)}{\Pr(D_i = 1 | i = Mex, x)} \right) \quad \text{and} \quad \theta^M = \left(\frac{\Pr(i = US | x)}{\Pr(i = Mex | x)} \right) \quad (16)$$

The first ratio – the conditional probability of a Mexican immigrant in the U.S. working over the conditional probability of a Mexican resident working – adjusts Mexico’s wage density in (8) to reflect U.S. labor-force participation rates for each realization of x . The second ratio – the probability of a Mexican-born individual being in the U.S. over the probability of a Mexican-born individual being in Mexico – adjusts the wage density of Mexican residents to reflect the characteristics of Mexican immigrants.

The second ratio, θ^M , is the appropriate weight to construct counterfactual wage densities. The full weight, θ , adjusts for differences in observables *and* in labor-force participation between Mexican immigrants and residents. In (8), we replace θ with θ^M , which yields the wage distribution that would obtain if immigrants were paid according to Mexican skill prices and participated in the labor force as do Mexican residents.²¹

To compute θ^M , we estimate $Pr(i=US | x)$ parametrically by running a logit on the probability of a Mexican adult being in the U.S. using the full sample of Mexican

²¹ For males, θ and θ^M are close in value (male labor-force participation is similar in the two countries), and either weight yields similar results. For females, labor-force participation rates differ in the two countries (see Table 4). The

immigrants and Mexican residents (and not just wage earners). Once we estimate this model, we can compute $Pr(i=Mex | x) = 1 - Pr(i=US | x)$ and construct the relevant weight θ_j^M for each observation j in the sample. After computing the weights, we estimate the wage densities nonparametrically, using a kernel density estimator.

To characterize the nature of immigrant selection nonparametrically, we estimate the *difference* between the wage density for Mexican immigrants and Mexican residents (under common skill prices and labor-force participation behavior), which is

$$g_{US}^{Mex}(w) - g^{Mex}(w) = \int [\theta^M - 1] f^{Mex}(w/x) h(x/i = Mex, D_i = 1) dx \quad (17)$$

If there is negative selection of migrants in terms of observable skills, this difference would show positive mass in the lower part of the wage distribution – indicating migrants are over-represented among Mexico-born individuals with below-average skills – and negative mass in the upper part – indicating migrants are under-represented among the Mexico-born with above-average skills. In contrast, with positive selection there would be negative mass for low wages and positive mass for high wages.

4.2 Comparing Migrant Selection over Time

During the 1990's, shocks to the Mexican and U.S. economies included changes in the return to education (evident in Table 5), a severe recession in Mexico, and a sharp increase in U.S. expenditure on enforcement against illegal immigration (Hanson and Spilimbergo, 1999). Each of these events may have altered the incentive to migrate from Mexico to the U.S. for individuals at different points in the skill distribution.

counterfactual wage density for females using θ as the weight puts more emphasis on earnings of women with low schooling and so is more supportive of negative selection (in contrast to the reported results, using θ^M as the weight).

To evaluate how immigrant selection has changed over time, we cannot compare the density difference in (17) for 1990 with that for 2000, as this would confound changes in the composition of immigrant and resident populations with changes in skill prices. A meaningful comparison across time requires holding skill prices constant. To do so, first re-write the weighting function, θ^M , using time subscripts:

$$\theta^M \left(\frac{US,90}{Mex,90} \right) = \left(\frac{Pr(i = US / x, t = 1990)}{Pr(i = Mex / x, t = 1990)} \right) \quad (18)$$

This weight, as defined in (16), adjusts the characteristics of Mexican residents in 1990 to reflect those of Mexican immigrants in 1990. Second, define two weighting functions,

$$\theta^M \left(\frac{Mex,00}{Mex,90} \right) = \frac{Pr(i = Mex / x, t = 2000)}{Pr(i = Mex / x, t = 1990)}, \quad \theta^M \left(\frac{US,00}{Mex,90} \right) = \frac{Pr(i = US / x, t = 2000)}{Pr(i = Mex / x, t = 1990)} \quad (19)$$

The first adjusts the population of Mexican residents in 1990 to reflect Mexican residents in 2000, and the second adjusts Mexican residents in 1990 to reflect Mexican immigrants in 2000. These weights can be estimated using a simple logit, as described in section 4.1.

Putting (19) together with (17), we summarize nonparametrically immigrant selection in 2000, *evaluated at 1990 skill prices*, with the following density difference:

$$g_{US,00}^{Mex,90}(w) - g_{Mex,00}^{Mex,90}(w) = \int \left[\theta^M \left(\frac{US,00}{Mex,90} \right) - \theta^M \left(\frac{Mex,00}{Mex,90} \right) \right] f^{Mex}(w/x, t = 90) h(x/i = Mex, D_i = 1, t = 90) dx \quad (20)$$

Finally, we evaluate the change in migrant selection between 1990 and 2000 with the following double difference in wage densities:

$$\left(g_{US,00}^{Mex,90}(w) - g_{Mex,00}^{Mex,90}(w) \right) - \left(g_{US,90}^{Mex,90}(w) - g_{Mex,90}^{Mex,90}(w) \right) = \int \left[\left[\theta^M \left(\frac{US,00}{Mex,90} \right) - \theta^M \left(\frac{Mex,00}{Mex,90} \right) \right] - \left[\theta^M \left(\frac{US,90}{Mex,90} \right) - 1 \right] \right] f^{Mex}(w/x, t=90) h(x/i = Mex, D_i = 1, t = 90) dx \quad (21)$$

Equation (21) shows the change in immigrant selection between 1990 and 2000, based on 1990 skill prices. If negative selection of immigrants in terms of observable skills increased (decreased) in the 1990's, the double difference would have positive (negative) mass below zero – indicating an increase (decrease) in the relative population of migrants with below-average skill – and negative (positive) mass above zero – indicating a decrease (increase) in the relative population of migrants with above-average skill.

5. Empirical Results

We apply the methodology to the combined sample of Mexican residents and recent Mexican immigrants in the U.S. (individuals born in Mexico who are 21-65 years of age) in 1990 and 2000. Immigrants are individuals 21 years or older at time of U.S. entry and who have been in the U.S. for 10 years or less. To construct counterfactual wage densities, we estimate a logit for $Pr(i=US / x)$, using the sample of Mexican residents and Mexican immigrants in each year. The model links the choice of migrating to the U.S. to age and age squared, dummy variables for schooling and marital status, and interactions of these variables. Logit results are shown in Appendix A1. We use these to compute the weights, θ^M , which we apply to the sample of wage-earning Mexican residents to estimate counterfactual kernel densities of wages for Mexican immigrants in the U.S. All estimates are based on a Gaussian kernel function.²²

²² We first used Silverman's (1986) optimal bandwidth, which minimizes the mean integrated squared error if the data are Gaussian and a Gaussian Kernel is used. However, the resulting densities appeared to be excessively smoothed and

5.1 Actual and Counterfactual Wage Density Estimates

The results for Mexican males in 1990 are in Figures 4a and 4b. Although the counterfactual density for Mexican immigrants is close to the actual density of Mexican residents, some clear differences are apparent. Contrary to the negative-selection hypothesis, it is *not* the lowest-wage males who exhibit a stronger tendency to migrate to the U.S. For Mexican immigrants, there is less mass in the lower half of the wage density and more mass in the upper half, when compared with the actual wage density of Mexico residents. This is seen more clearly in Figure 4b, which shows the difference between the counterfactual and actual wage densities. The immigrant-resident density difference is negative from the left tail to just below zero, positive for middle and upper-middle wage values, and negative for high wage values. This suggests that immigrant males are drawn disproportionately from the middle and upper middle of Mexico's wage distribution, rather than from the bottom half. Low-wage and high-wage individuals appear least likely to migrate to the U.S. These counterfactual wage densities support intermediate selection of immigrant men in terms of observable skills.

The results for females in 1990, shown in Figures 4c and 4d, contain even less support for negative selection. Except for high wage values, the counterfactual wage density for immigrant females lies to the right of the actual wage density for resident females. The immigrant-resident density difference is negative for low wage values, strongly positive for upper-middle wage values, and zero for high wage values. For women, there appears to be moderate positive selection of immigrants.

could in fact suffer from bias if the data do not conform to the Gaussian assumption. In order to avoid large bias in our estimates, we instead started with a bandwidth of 0.03 log wage units, and sequentially increased it until the resulting densities looked relatively smooth. This implied bandwidths in our final estimates of 0.07 log wage units.

Figures 5a-5d show counterfactual wage densities for immigrants in 2000, evaluated at Mexican skill prices in 2000. For women, wage densities are very similar to 1990, again showing moderate positive selection of immigrants. For men, intermediate selection of immigrants again appears, but less strongly. Comparing Figures 4b and 5b, in 2000 immigrant men became somewhat less under-represented among low-wage workers and somewhat more under-represented among high-wage workers

To compare changes in the pattern of immigrant selection more precisely, we estimate the difference between immigrant (counterfactual) and resident (actual) wage densities in 1990 and 2000, using 1990 skill prices. Figures 6a and 6b show the density differences for 1990 and 2000 at 1990 skill prices (equations (17) and (20)) for males and females and Figures 6c and 6d show the density double differences (equation (21)) for males and females. For women, the density differences in the two years are very similar, causing the double density difference to fluctuate around zero. For men, the density difference in 2000 has less negative mass for low wage values and more negative mass for high wage values, as suggested by Figures 4b and 5b. The double density difference is thus positive below the mean, zero around the mean, and negative above the mean. This is consistent with male immigrants becoming less under-represented at low wage values and more under-represented at high wage values during the 1990's.

Summarizing our results, Mexican immigrants in the U.S. are drawn disproportionately from the middle and upper-middle of Mexico's wage distribution. Those most likely to migrate abroad would earn medium-to-high wages in Mexico and those least likely to migrate would earn low or very high wages in Mexico. In terms of observable skills, males exhibit intermediate selection and females exhibit positive selection.

5.2 Parametric Results on Actual and Counterfactual Wage Distributions

An advantage of our nonparametric approach is that it characterizes differences in resident and immigrant wage densities across the entire distribution. A disadvantage is that it is difficult to assess whether the density differences are statistically significant. In this section, we provide a parametric analog to the density differences reported in the last section in order to gauge the statistical precision of these estimates. We see if the counterfactual wage distribution for Mexican immigrants matches the actual wage distribution for Mexican residents, when we summarize the distributions in terms of quantiles. First, we sort wage observations for Mexican residents in a given year into deciles. Then, we calculate the share of the population in each decile, *weighting observations by θ^M* (which adjusts the Mexican resident population to reflect the characteristics of the Mexican immigrant population in the U.S.). For each decile, we test whether the θ^M -weighted shares are statistically different from 0.10. Negative selection of immigrants in terms of observable skills would produce population shares above 0.10 for deciles below the median and below 0.10 for deciles above the median.

Table 6 reports the results. For males in 1990, immigrant population shares are below 0.10 in the first four deciles, above 0.10 in the 5th to 9th deciles, and below 0.10 in the 10th decile. All shares, except for the 4th decile, are statistically different from 0.10 at a 5% level of significance. This pattern reinforces the results in Figure 4, which shows that immigrants are over-represented in the upper middle of the wage distribution. For males in 2000, results are similar, except that immigrants are no longer under-represented in the 4th decile and are now under-represented in the 9th decile. This is consistent with the results in Figure 6, which suggest that during 1990's male Mexican immigrants

became somewhat less positively selected. For females in 1990, immigrant population shares are below 0.10 in the first four deciles, close to 0.10 in the 5th decile, and greater than 0.10 in the 6th to 10th deciles. All shares, except for the 5th decile, are statistically different from 0.10 at the 5% level. This is also consistent with Figure 4, in which female immigrants from Mexico appear to be positively selected. For females in 2000, the results are similar. Table 6 suggests the differences between actual and counterfactual wage densities in Figures 4 and 5, though small, are statistically significant.

5.3 Correcting for the Undercount of Illegal Immigrants

As discussed in section 3, the U.S. census appears to undercount illegal immigrants. If undercounted immigrants have low education levels, then our results could be biased against finding negative selection. We cannot remedy this problem directly, since we lack data on which immigrants are illegal within our sample. However, we do have data from other sources on the characteristics of illegal immigrants.

We repeat the exercises from the previous section, but now modify the immigrant sample so that the sampling weights for the logit analysis used to construct the counterfactuals correspond to those of a synthetic sample in which there is no illegal-immigrant undercount. We re-weight the original sample so that: i) the new weights reflect an increase in the total Mexican immigrant population in the U.S., corresponding to the estimated number of uncounted illegal immigrants, and ii) the re-weighting procedure increases the population size to a greater extent for education groups in which out-of-sample evidence suggests that illegal immigrants are concentrated.

Given multiple estimates of the illegal undercount, we report results based on both Census Bureau and INS estimates of the illegal Mexican population. The Census

Bureau (Costanzo et al., 2001) estimates put the number of Mexican illegal immigrants counted in the U.S. census at 1 million in 1990 and 3.9 million in 2000. Using Census undercount rates of 20% in 1990 and 15% in 2000, the number of Mexican illegal immigrants would be 1.3 million in 1990 – implying a 5.9% increase in the Mexican immigrant population counted in the census – and 4.6 million in 2000 – implying a 7.4% population increase. For the Census Bureau-based estimates, we re-weight the original sample to increase the populations by these percentages. The INS (2003) puts the illegal Mexican population at 2.0 million in 1990 and 4.8 million in 2000. These figures already take into account undercount assumptions and imply a much higher undercount rate for 1990.²³ For the INS-based estimates, we re-weight the original sample to increase the populations by the implied percentages. We call the Census Bureau-based estimate the low-undercount estimate and the INS-based estimate the high-undercount estimate.

To make this increased population have the characteristics of illegal immigrants, we adjust the weights by schooling group. The “new” population is assumed to follow the distribution of immigrants by schooling in Orrenius (1999), shown in Appendix A2. This distribution is based on the Mexican Migration Project (MMP), a household survey in rural Mexican communities over the period 1987-1997 where migration to the U.S. tends to be high (Durand et al., 1996; Massey et al., 1994). A high fraction of migrants in the MMP report having entered the U.S. illegally. Schooling levels of this group are much lower than of Mexican immigrants in the U.S. census or of Mexican residents in the Mexico census. A second data source on illegal immigrants is the Survey of Newly Legalized Persons in California, from 1989, which covered undocumented immigrants

²³ The INS estimate of 4.8 million illegal Mexican immigrants in 2000 is based on an assumed undercount rate 10%, which is less than the 15% undercount rate in Costanzo et al (2001) for that year. However, the INS estimates are

who were granted legal residence in the U.S. under the amnesty provision of the 1986 Immigration Reform and Control Act. Appendix A2 shows this population has higher education levels than the MMP, suggesting migrants with low schooling may be over-represented in the MMP. In our analysis, we use MMP education levels to give greater weight to the possibility our results are biased against negative selection.

Figure 7 shows results of correcting for an illegal immigrant undercount. Using a low undercount rate, differences between actual and counterfactual wage densities are very similar to those in Figures 4 and 5. Using a high undercount rate, results are very similar for 2000 and in 1990 show somewhat weaker patterns of intermediate selection for males and of positive selection for females. Overall, results for either a low or high undercount rate have similar qualitative implications to those without the undercount correction. Immigrants in the U.S. are over-represented in the middle and upper middle of Mexico's wage distribution. This suggests the undercount rate would need to be implausibly large to overturn our main findings.²⁴ Table 6 shows that, after controlling for the illegal-immigrant undercount, differences between the actual and counterfactual wage distributions are statistically significant. The θ^M -weighted population shares by decile are statistically different from 0.10 for nearly all deciles.

5.4 Robustness Checks

In section 3, we discussed the possibility that Mexican immigrants may obtain additional education after arriving in the U.S. In Figure 8a, we restrict the immigrant sample to be individuals who arrived in the previous 3 years – a group unlikely to have

based on a different methodology for computing the residual foreign born population.

obtained U.S. schooling. The estimated density differences are very similar to those in Figures 4 and 5. There again appears to be intermediate selection of immigrant men and positive selection of immigrant women. An alternative way to address this issue would be to adjust for the bunching of immigrants at 12 years of education. In unreported results we combined individuals with 9 to 12 years of education into a single schooling category. This addresses the concern that some immigrants with 12 years of schooling may have obtained a GED, or, in response to cultural pressure, may overstate their educational attainment. Again, these results are very similar to those reported.²⁵

There remains the concern that education may be correlated with unobserved characteristics that affect the migration decision, in which case our results might exaggerate the extent of positive selection. Following the discussion in section 3, we examine the importance of unobservables by restricting the sample of Mexican residents to whom we compare Mexican immigrants. In Figure 8b, we construct immigrant-resident density differences (evaluated at 1990 skill prices) using the sample of Mexican residents who live in high-migration states (see note 18). Migration rates in these states are 3.5 times those in the rest of the country, suggesting the presence of regional migration networks. Relative to Figures 4 and 5, Figure 8b shows stronger evidence of positive selection for both men and women. Given Table 3, which shows that residents of high-migration states have low schooling levels relative to either Mexican immigrants in the U.S. or to residents in Mexico overall, this does not come as a surprise.

In Figure 8c, we limit the sample of Mexican residents to individuals who moved

²⁴ Other results based on data in which illegal immigrants are over-represented tend to support our findings. Using the MMP, Orrenius and Zavodny (2004) find that migrants tend to come from the middle of the schooling distribution.

²⁵ Results are also very similar when we expand the immigrant population to those at least 16 years old at U.S. entry.

between states in the previous five years. Similar to external migrants, internal migrants may be highly driven or motivated, which may be important unobserved determinants of the migration decision. Relative to Figures 4 and 5, there is somewhat weaker evidence of intermediate selection for men. Immigrant men are still over-represented in the middle of the wage distribution, but are now more under-represented in the upper tail. For women, positive selection is modest in 1990, but appears quite strongly in 2000. Overall, the qualitative patterns are broadly similar to previous results. Immigrants remain concentrated in the middle or upper-middle of Mexico's wage distribution.²⁶

We have argued that it is important to hold constant how skill prices affect labor-force participation when comparing wage distributions across workers in different countries. So far, we have used skill prices and labor-force participation in Mexico as the basis for these comparisons. For evaluating immigrant selection, it is no less valid to use U.S. skill prices and labor-force participation. As a consistency check on our results, we estimated the distribution of wages that would obtain if residents of Mexico were paid according to U.S. skill prices and participated in the labor force as do Mexican immigrants and then compared this to the actual wage distribution for Mexican immigrants. In unreported results, we find that neither for males nor for females is there support for negative selection of Mexican immigrants in terms of observable skills. Resident males are under-represented in the middle and upper middle of the immigrant wage distribution and over-represented in the upper tail, consistent with intermediate selection of immigrants. Resident females are under-represented in the upper middle part of the wage distribution, consistent with moderate positive selection of immigrants.

²⁶ U.S. return migrants are another potential sample to whom to compare Mexican immigrants. However, sample sizes for this group (see Table 3) are very small, complicating estimation of wage densities.

6. Discussion

In this paper, we use data on residents of Mexico and Mexican immigrants in the U.S. to test Borjas' (1987) negative-selection hypothesis that the less skilled are those most likely to migrate from countries with high returns to skill and high earnings inequality to countries with low returns to skill and low earnings inequality. Our results are inconsistent with the negative selection of Mexican immigrants in the U.S. For Mexican-born males, there is evidence of intermediate selection and for Mexican-born females there is evidence of positive selection. Those most likely to migrate are young adults with moderately high schooling. Were these immigrants to return to Mexico, they would tend to fall in the middle or upper portions of Mexico's wage distribution.

To arrive at these results, we construct counterfactual wage densities for Mexican immigrants in the U.S., in which we use their observed characteristics to project the wages they would earn in Mexico and under current patterns of wage determination in the country. The results are robust to controlling for undercounts of illegal immigrants in the U.S. census, for opportunities to gain education in the U.S., for changes in skill prices over time, and for access to regional migration networks.

There are several important caveats to our results. We cannot say how the return of Mexican immigrants in the U.S. would affect Mexico's wage structure. Other work gives some guidance on this issue. Using data for 1970-2000, Mishra (2003) estimates an elasticity of wages with respect to emigration in Mexico of 0.4. Given the concentration of emigrants among moderately well-educated young adults, wage gains in Mexico have been largest among 25 to 40 year olds with 12 to 15 years of schooling. Wage changes are not the only consequence of emigration. In 2003, remittances by immigrants in the

U.S. were 2% of Mexico's GDP. In high-migration regions, remittances appear to have raised investments in small businesses (Woodruff and Zenteno, 2001).

Another caveat is that our findings against negative selection and in favor of intermediate or positive selection are in terms of observable characteristics only. We cannot say whether the unobserved skills of Mexican immigrants in the U.S. are high or low relative to those who remain in Mexico. There is some evidence on the role of unobservables in the migration decision. When we limit the comparison to external and internal migrants, individuals who may possess similar unobserved characteristics, we continue to find evidence against the negative selection of Mexican immigrants.

That immigrants from Mexico appear to be relatively high-wage individuals is surprising. The estimated returns to education are higher in Mexico than in the U.S., suggesting that low-wage individuals from Mexico would have most to gain from migrating to the U.S. Heterogeneity in migration costs is one way to reconcile these facts. The more educated may be better able to negotiate the migration process, they may have better access to migration networks in the U.S., or they may be less subject to credit constraints in financing migration. Also, higher discount rates or greater risk aversion among the low-skilled may make migration abroad relatively less attractive for this group. Finally, a "Washington apples" effect (Alchian and Allen, 1964) may also contribute to positive selection of migrants. Given long queues for U.S. legal admission, two-thirds of Mexicans immigrate illegally on their first attempt. Enforcement against illegal immigration may act as a head tax, penalizing the less skilled. If more-skilled and less-skilled illegal immigrants compete for jobs in the U.S., it will be efficient, given fixed migration costs, to fill jobs with more skilled individuals first.

Appendix

A.1 Logit Estimation of the Probability of Migration to the U.S.

Variable		Males 1990		Males 2000	
		Coeff.	St. Error	Coeff.	St. Error
Years	1 to 4	-1.713	0.37	-1.206	0.392
	5 to 8	-3.232	0.329	-1.233	0.302
Schooling	9	-3.844	0.501	-3.443	0.409
	10 to 11	-3.756	0.604	-1.663	0.44
	12	-3.208	0.443	-0.907	0.339
	13 to 15	-5.88	0.596	-4.363	0.471
	16+	-3.537	0.679	-1.582	0.471
	Age		0.164	0.019	0.207
Age^2		-0.28	0.026	-0.328	0.022
Married		3.584	0.265	4.734	0.204
Age*	1 to 4	0.042	0.02	-0.022	0.021
	5 to 8	0.158	0.018	0.037	0.016
	9	0.17	0.03	0.122	0.024
	10 to 11	0.198	0.037	0.058	0.025
	12	0.22	0.026	0.059	0.019
	13 to 15	0.331	0.037	0.224	0.028
	16+	0.118	0.038	0	0.026
Age^2*	1 to 4	-0.025	0.025	0.044	0.026
	5 to 8	-0.167	0.024	-0.031	0.021
	9	-0.179	0.043	-0.145	0.033
	10 to 11	-0.197	0.053	-0.016	0.035
	12	-0.256	0.037	-0.055	0.025
	13 to 15	-0.39	0.054	-0.262	0.038
	16+	-0.11	0.05	0.023	0.034
Married*	1 to 4	-0.147	0.068	-0.255	0.072
	5 to 8	-0.403	0.057	-0.415	0.054
	9	-0.492	0.076	-0.573	0.063
	10 to 11	-0.877	0.087	-0.869	0.074
	12	-0.62	0.067	-0.568	0.059
	13 to 15	-0.356	0.085	-0.311	0.078
	16+	-0.193	0.107	-0.324	0.08
Pseudo R ²		0.046		0.065	

Notes: This table shows logit estimation results in which the dependent variable is 1 if an individual lives in the U.S. and 0 if an individual lives in Mexico. The sample is Mexico-born men 21-65 years of age in the U.S. and Mexico population censuses in 1990 or

2000. Regressors are age, age squared, dummy variables for schooling and marital status, and interactions among these variables. Unreported results for women are similar. For females, we also include as regressors the number of children born to the individual and its interactions with age and schooling.

A.2 Educational Attainment for Mexican Illegal Immigrants

Years of Education	Mexico Migration Project		Survey of Newly Legalized Persons	
	Migrants	Non-migrants	Years of Education	Immigrants
0 to 1	27.1	23.3	0	5.6
2 to 4	32.6	22.1	1 to 3	14.6
5 to 6	23.1	22.5	4 to 6	41.6
7 to 9	8.9	11.7	7 to 9	22.2
10 to 12	4.3	8.1	10 to 12	12.8
13+	4.1	12.3	13+	3.2
% of trips to U.S. involving illegal entry	60.8	--		

Notes: Columns 1-3 are from Orrenius (1999). The sample is 5,478 head of household males between 15 and 65 years of age, surveyed between 1987-1995 in 35 communities in western Mexico. Columns 4 and 5 are based on California Health and Welfare Agency (1989). The sample is 4,091 Mexico-born individuals (men and women) residing in California in 1989 who arrived in the U.S. as illegal immigrants and who were granted permanent legal residence under the amnesty provision of the 1986 Immigration Reform and Control Act. Reported education levels are a weighted average of those granted amnesty based on having arrived in the U.S. prior to 1982 (60% of those legalized) and those granted amnesty as special agricultural workers (40% of those legalized).

The education categories shown above are as reported in the original data sources, which do not exactly match the categories we report in Table 2. Since the Mexican census reports the exact number of years of schooling completed, we are able to use the above figures to re-weight the samples, as described in section 5.3.

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Table 1:
Share of U.S. Immigrants from Mexico in Population of Mexico, 1990 and 2000
 (percent)

Age Cohort		Males			Females		
		% Residing in U.S.			% Residing in U.S.		
Age in 1990	Age in 2000	1990	2000	Change	1990	2000	Change
--	16 to 25	--	11.99	--	--	7.68	--
16 to 25	26 to 35	7.57	17.53	9.96	4.89	12.62	7.73
26 to 35	36 to 45	10.87	15.49	4.62	7.69	11.90	4.21
36 to 45	46 to 55	9.18	12.21	3.03	7.47	10.44	2.97
46 to 55	56 to 65	7.00	8.64	1.64	6.44	8.36	1.92
56 to 65	--	5.70	--	--	5.84	--	--

Notes: For 1990 and 2000, this table shows Mexican immigrants in the U.S. as a percentage of the population of individuals born in Mexico (equal to the sum of the Mexico-born residing in Mexico and the Mexico-born residing in the U.S.) by age and sex categories.

Table 2a: Summary Statistics for Males, 1990

Variable		Mexico Residents	U.S. Residents			
			Mex. Immigrants Recent	All	Other Immigrants	U.S. Natives
Age		36.8	33.2	39.1	42.7	40.0
Highest Grade of Schooling Completed (%)	0	0.138	0.133	0.146	0.040	0.005
	1 to 4	0.223	0.125	0.167	0.029	0.005
	5 to 8	0.276	0.289	0.302	0.095	0.039
	9	0.115	0.081	0.068	0.028	0.024
	0 to 9	0.752	0.628	0.683	0.192	0.073
	10 to 11	0.048	0.059	0.050	0.041	0.069
	12	0.066	0.178	0.152	0.234	0.333
	13 to 15	0.049	0.087	0.077	0.200	0.284
	10 to 15	0.163	0.324	0.279	0.475	0.686
	16+	0.084	0.048	0.038	0.334	0.242
Wage Earners (%)		0.726	0.832	0.830	0.792	0.833
Hourly wage		1.39	7.17	8.23	14.57	14.27
N		163798	22207	39780	152047	609786

Table 2b: Summary Statistics for Females, 1990

Variable		Mexico Residents	U.S. Residents			
			Mex. Immigrants Recent	All	Other Immigrants	U.S. Natives
Age		36.7	34.3	40.4	43.8	40.2
Highest Grade of Schooling Completed (%)	0	0.188	0.138	0.146	0.048	0.004
	1 to 4	0.228	0.142	0.169	0.036	0.003
	5 to 8	0.274	0.298	0.318	0.107	0.031
	9	0.100	0.074	0.064	0.031	0.023
	0 to 9	0.790	0.652	0.697	0.222	0.061
	10 to 11	0.044	0.047	0.044	0.045	0.073
	12	0.077	0.174	0.156	0.298	0.370
	13 to 15	0.045	0.084	0.073	0.207	0.299
	10 to 15	0.166	0.305	0.273	0.550	0.742
	16+	0.044	0.042	0.031	0.229	0.197
Wage Earners (%)		0.207	0.440	0.465	0.597	0.709
Hourly wage		1.34	6.08	6.57	10.19	9.98
N		178726	18640	34381	168222	650229

Table 2c: Summary Statistics for Males, 2000

Variable		Mexico Residents	U.S. Residents			
			Mex. Immigrants Recent	All	Other Immigrants	U.S. Natives
Age		37.2	33.2	39.5	43.5	41.4
Highest Grade of Schooling Completed (%)	0	0.069	0.096	0.127	0.035	0.005
	1 to 4	0.166	0.057	0.080	0.013	0.002
	5 to 8	0.270	0.300	0.307	0.071	0.021
	9	0.189	0.105	0.087	0.025	0.017
	0 to 9	0.694	0.558	0.601	0.144	0.045
	10 to 11	0.045	0.064	0.055	0.036	0.053
	12	0.101	0.245	0.212	0.240	0.328
	13 to 15	0.047	0.079	0.083	0.186	0.308
	10 to 15	0.193	0.388	0.350	0.462	0.689
	16+	0.113	0.054	0.050	0.394	0.267
Wage Earners (%)		0.740	0.789	0.800	0.800	0.824
Hourly wage		1.21	7.90	8.72	15.23	14.88
N		215804	39073	80453	222605	652895

Table 2d: Summary Statistics for Females, 2000

Variable		Mexico Residents	U.S. Residents			
			Mex. Immigrants Recent	All	Other Immigrants	U.S. Natives
Age		37.0	34.8	40.5	44.0	41.5
Highest Grade of Schooling Completed (%)	0	0.092	0.113	0.133	0.042	0.004
	1 to 4	0.179	0.066	0.087	0.017	0.001
	5 to 8	0.28	0.301	0.315	0.079	0.016
	9	0.174	0.101	0.085	0.025	0.015
	0 to 9	0.725	0.581	0.620	0.163	0.036
	10 to 11	0.04	0.054	0.049	0.037	0.050
	12	0.112	0.228	0.204	0.272	0.323
	13 to 15	0.042	0.079	0.079	0.209	0.337
	10 to 15	0.194	0.361	0.332	0.518	0.710
	16+	0.080	0.058	0.048	0.320	0.255
Wage Earners (%)		0.321	0.418	0.463	0.605	0.739
Hourly wage		1.24	6.90	7.30	11.57	11.28
N		235086	35277	72967	247970	693483

Table 3: Educational Attainment for Subsamples of the Mexico Born

		Mexico Residents								Mexican Immigrants in US, 26-35 Yrs Old			
		High Emig. States		Internal Migrants		Return Emigrants		26-35 Year Olds		0-3 Yrs	4+ Yrs	0-3 Yrs	4+ Yrs
		1990	2000	1990	2000	1990	2000	1990	2000	1990	1990	2000	2000
Males													
	0	0.190	0.093	0.087	0.042	0.094	0.039	0.086	0.036	0.113	0.113	0.076	0.078
	1-4	0.264	0.203	0.141	0.106	0.211	0.135	0.172	0.103	0.103	0.112	0.045	0.043
Highest	5-8	0.263	0.286	0.262	0.238	0.368	0.372	0.297	0.263	0.278	0.309	0.303	0.275
Grade of	9	0.096	0.169	0.130	0.203	0.139	0.222	0.129	0.246	0.082	0.081	0.114	0.116
Schooling	0-9	0.813	0.751	0.620	0.589	0.812	0.768	0.684	0.648	0.576	0.615	0.538	0.512
(%)	10-11	0.034	0.034	0.061	0.052	0.039	0.041	0.058	0.059	0.061	0.057	0.064	0.067
	12	0.055	0.081	0.090	0.124	0.057	0.093	0.082	0.129	0.188	0.189	0.260	0.278
	13-15	0.037	0.037	0.075	0.063	0.022	0.035	0.057	0.044	0.103	0.096	0.075	0.098
	10-15	0.126	0.152	0.226	0.239	0.118	0.169	0.197	0.232	0.352	0.342	0.399	0.443
	16+	0.063	0.096	0.154	0.171	0.070	0.062	0.118	0.121	0.073	0.043	0.062	0.046
N		54,778	78,330	8,913	9,694	459	1,695	52,864	68,206	3,599	9,121	9,358	15,839
Females													
	0	0.233	0.113	0.123	0.051	0.093	0.019	0.121	0.047	0.097	0.109	0.070	0.078
	1-4	0.265	0.213	0.159	0.117	0.173	0.109	0.196	0.116	0.113	0.121	0.041	0.043
Highest	5-8	0.259	0.297	0.278	0.270	0.360	0.336	0.309	0.278	0.278	0.348	0.269	0.294
Grade of	9	0.084	0.157	0.122	0.198	0.121	0.225	0.109	0.219	0.076	0.082	0.112	0.125
Schooling	0-9	0.841	0.780	0.682	0.636	0.747	0.689	0.735	0.660	0.564	0.660	0.492	0.540
(%)	10-11	0.031	0.030	0.063	0.055	0.033	0.053	0.053	0.054	0.052	0.045	0.056	0.062
	12	0.061	0.090	0.106	0.141	0.117	0.163	0.090	0.145	0.205	0.170	0.276	0.253
	13-15	0.035	0.036	0.073	0.055	0.065	0.046	0.056	0.039	0.106	0.088	0.083	0.090
	10-15	0.127	0.156	0.242	0.251	0.215	0.262	0.199	0.238	0.363	0.303	0.415	0.405
	16+	0.032	0.064	0.075	0.112	0.037	0.049	0.065	0.103	0.074	0.038	0.093	0.055
N		61,297	88,818	9,491	10,141	214	733	58,069	75,625	3,211	7,057	6,575	16,173

Table 4: Labor-Force Participation Rates

Years of Schooling	Residents of Mexico				Recent Mex. Immigrants			
	Age Category				Age Category			
	26-35	36-45	46-55	56-65	26-35	36-45	46-55	56-65
(a) Males, 1990								
0	0.63	0.65	0.61	0.50	0.81	0.83	0.81	0.67
1 to 4	0.72	0.72	0.66	0.54	0.86	0.85	0.82	0.70
5 to 8	0.79	0.81	0.75	0.58	0.86	0.85	0.82	0.65
9	0.84	0.85	0.78	0.59	0.85	0.86	0.79	0.66
10 to 11	0.87	0.88	0.77	0.60	0.85	0.85	0.74	0.72
12	0.85	0.88	0.81	0.59	0.86	0.84	0.81	0.66
13 to 15	0.85	0.89	0.83	0.60	0.87	0.87	0.76	0.70
16+	0.86	0.91	0.85	0.67	0.87	0.83	0.89	0.72
(b) Males, 2000								
0	0.60	0.61	0.57	0.45	0.73	0.77	0.74	0.59
1 to 4	0.70	0.69	0.64	0.49	0.77	0.82	0.72	0.55
5 to 8	0.78	0.78	0.75	0.54	0.82	0.79	0.76	0.66
9	0.84	0.84	0.79	0.56	0.81	0.81	0.82	0.75
10 to 11	0.87	0.88	0.81	0.60	0.80	0.79	0.80	0.63
12	0.86	0.87	0.78	0.51	0.83	0.82	0.79	0.58
13 to 15	0.82	0.91	0.82	0.54	0.85	0.88	0.86	0.55
16+	0.86	0.90	0.87	0.66	0.86	0.87	0.78	0.69
(c) Females, 1990								
0	0.09	0.09	0.08	0.07	0.41	0.43	0.36	0.13
1 to 4	0.10	0.11	0.09	0.07	0.44	0.52	0.42	0.20
5 to 8	0.16	0.19	0.16	0.10	0.46	0.50	0.44	0.23
9	0.28	0.29	0.27	0.10	0.46	0.52	0.53	0.28
10 to 11	0.36	0.40	0.33	0.14	0.46	0.46	0.47	0.43
12	0.47	0.48	0.40	0.20	0.47	0.57	0.45	0.24
13 to 15	0.57	0.56	0.48	0.27	0.52	0.53	0.58	0.30
16+	0.57	0.63	0.53	0.31	0.53	0.62	0.50	0.34
(c) Females, 2000								
0	0.16	0.19	0.16	0.13	0.36	0.44	0.34	0.19
1 to 4	0.21	0.22	0.20	0.12	0.41	0.44	0.40	0.18
5 to 8	0.25	0.29	0.27	0.17	0.38	0.46	0.41	0.19
9	0.33	0.39	0.36	0.19	0.41	0.51	0.45	0.23
10 to 11	0.41	0.48	0.43	0.22	0.40	0.51	0.35	0.25
12	0.47	0.51	0.45	0.27	0.43	0.50	0.48	0.24
13 to 15	0.57	0.67	0.52	0.23	0.53	0.55	0.56	0.34
16+	0.67	0.71	0.63	0.35	0.50	0.46	0.54	0.22

Table 5: OLS Wage Regressions for Men, 1990 and 2000

Variable		Mexico	Mexican Immigrants		Other	Mexican	Mexican Immigrants		Other
		Resident	Recent	All	Immigrant	Resident	Recent	All	Immigrant
		1990	1990	1990	1990	2000	2000	2000	2000
High Grade of Schooling	5 to 8	0.202	0.038	0.070	0.022	0.196	0.006	0.039	0.017
		(0.006)	(0.011)	(0.008)	(0.010)	(0.007)	(0.011)	(0.007)	(0.010)
	9 to 11	0.359	0.071	0.130	0.080	0.358	0.033	0.079	0.100
		(0.008)	(0.014)	(0.011)	(0.010)	(0.007)	(0.012)	(0.008)	(0.010)
	12	0.551	0.115	0.163	0.202	0.605	0.112	0.154	0.202
		(0.010)	(0.013)	(0.010)	(0.008)	(0.009)	(0.011)	(0.007)	(0.009)
	13 to 15	0.741	0.182	0.257	0.339	0.960	0.209	0.283	0.358
		(0.012)	(0.016)	(0.012)	(0.009)	(0.013)	(0.014)	(0.009)	(0.009)
	16+	1.096	0.416	0.487	0.690	1.328	0.460	0.493	0.783
		(0.009)	(0.020)	(0.016)	(0.008)	(0.009)	(0.016)	(0.011)	(0.008)
Age	26 to 35	0.110	0.060	0.059	0.116	0.126	0.068	0.069	0.154
		(0.007)	(0.012)	(0.012)	(0.010)	(0.006)	(0.010)	(0.010)	(0.011)
	36 to 45	0.210	0.081	0.094	0.208	0.207	0.106	0.107	0.166
		(0.008)	(0.015)	(0.014)	(0.011)	(0.007)	(0.012)	(0.011)	(0.011)
	46 to 55	0.240	0.075	0.055	0.194	0.242	0.079	0.086	0.118
		(0.009)	(0.019)	(0.015)	(0.011)	(0.008)	(0.015)	(0.012)	(0.011)
	56 to 65	0.168	0.092	-0.007	0.095	0.195	0.076	0.023	0.046
		(0.011)	(0.029)	(0.019)	(0.012)	(0.011)	(0.023)	(0.014)	(0.012)
R Sqd.		0.233	0.063	0.140	0.248	0.354	0.062	0.098	0.212
N		112,111	17,939	32,011	112,552	142,113	30,036	62,551	164,864

Notes: See notes to Table 5, below.

Table 6: Counterfactual Wage Deciles

Decile	Males 1990	Males 2000	Females 1990	Females 2000
(a) Main Sample				
1	0.090 [0.089, 0.092]	0.096 [0.094, 0.097]	0.080 [0.077, 0.083]	0.085 [0.083, 0.088]
2	0.092 [0.091, 0.094]	0.097 [0.096, 0.099]	0.083 [0.080, 0.086]	0.087 [0.085, 0.089]
3	0.095 [0.094, 0.097]	0.100 [0.099, 0.102]	0.088 [0.085, 0.091]	0.090 [0.087, 0.092]
4	0.099 [0.097, 0.100]	0.102 [0.100, 0.103]	0.093 [0.090, 0.097]	0.093 [0.091, 0.095]
5	0.102 [0.101, 0.104]	0.104 [0.103, 0.106]	0.099 [0.096, 0.102]	0.099 [0.097, 0.102]
6	0.105 [0.103, 0.106]	0.104 [0.103, 0.106]	0.109 [0.106, 0.112]	0.105 [0.103, 0.108]
7	0.107 [0.105, 0.108]	0.110 [0.108, 0.112]	0.111 [0.108, 0.114]	0.115 [0.113, 0.118]
8	0.110 [0.108, 0.112]	0.108 [0.106, 0.109]	0.115 [0.112, 0.119]	0.111 [0.109, 0.114]
9	0.106 [0.104, 0.108]	0.099 [0.097, 0.100]	0.117 [0.114, 0.120]	0.110 [0.107, 0.112]
10	0.093 [0.092, 0.095]	0.081 [0.079, 0.082]	0.104 [0.101, 0.108]	0.104 [0.101, 0.106]
(b) Correcting for Illegal Immigrant Undercount				
1	0.096 [0.094, 0.098]	0.093 [0.091, 0.094]	0.089 [0.086, 0.092]	0.082 [0.080, 0.084]
2	0.097 [0.095, 0.098]	0.095 [0.094, 0.097]	0.089 [0.086, 0.092]	0.085 [0.083, 0.087]
3	0.098 [0.096, 0.100]	0.099 [0.098, 0.101]	0.093 [0.090, 0.096]	0.089 [0.086, 0.091]
4	0.100 [0.098, 0.102]	0.101 [0.100, 0.103]	0.096 [0.093, 0.100]	0.092 [0.090, 0.094]
5	0.102 [0.101, 0.104]	0.104 [0.102, 0.105]	0.099 [0.096, 0.102]	0.099 [0.097, 0.101]
6	0.104 [0.102, 0.106]	0.105 [0.103, 0.106]	0.106 [0.103, 0.109]	0.107 [0.105, 0.109]
7	0.105 [0.103, 0.107]	0.111 [0.110, 0.113]	0.106 [0.103, 0.110]	0.116 [0.114, 0.119]
8	0.106 [0.105, 0.108]	0.109 [0.108, 0.111]	0.109 [0.106, 0.113]	0.113 [0.111, 0.115]
9	0.102 [0.100, 0.104]	0.101 [0.099, 0.102]	0.110 [0.107, 0.114]	0.112 [0.110, 0.115]
10	0.090 [0.088, 0.092]	0.083 [0.081, 0.084]	0.101 [0.098, 0.104]	0.105 [0.103, 0.108]

Notes: 95% confidence intervals are in brackets. See notes to Table 6 for other details.

Notes to Tables 2a-2d, 3: The sample is individuals 21-65 years old (in the U.S., excluding group quarters; in Mexico, excluding those not born in the country). Residents of Mexico in 1990 are the 1% microsample of the *XII Censo General de Poblacion y Vivienda, 1990*, and in 2000 are a 10% random sample of the 10% microsample of the *XIII Censo General de Poblacion y Vivienda, 2000*. Mexican and other immigrants are from the 1990 and 2000 5% U.S. PUMS; U.S. natives are from the 1990 and 2000 1% U.S. PUMS. Immigrants in the U.S. are restricted to be individuals 21 years or older at time of entry into the country. Recent immigrants are individuals who entered the U.S. during the period 1981-1990 for 1990 and 1991-2000 for 2000. Schooling variables show the percentage of individuals whose high grade completed is that indicated and wage earners shows the percentage of individuals with positive labor earnings. Wage levels are in 1990 U.S. dollars (see note 11 on how wages are constructed). Average wages in Mexico are for those individuals with average hourly earnings between \$0.05 and \$20 and in the U.S. are for those individuals with average hourly earnings between \$1 and \$100. See note 18 for the list of high-emigration states. Internal (return) migrants are individuals who lived in a different state (in the U.S.) five years previously.

Notes to Table 4: The table shows the percentage of the population that reported positive labor earnings by year, age, and high year of schooling completed for residents of Mexico and for recent Mexican immigrants in the U.S. (individuals who arrived in U.S. during the previous ten years). Immigrants are those 21 years or older at time of U.S. entry.

Notes to Table 5: The table reports OLS results for the log average hourly wage (see note 11 for details on wages). Heteroskedasticity-consistent standard errors are in parentheses. Samples are men 21-65 years of age, whose usual or average weekly hours of work are 10-80, and who are residents of Mexico (columns 1 and 5), Mexican immigrants in the U.S. who arrived during the previous ten years (columns 2 and 6), all Mexican immigrants in the U.S. (columns 3 and 7), or non-Mexico-born U.S. immigrants (columns 4 and 8). Immigrant samples exclude individuals aged 20 years or less at time of U.S. entry. The Mexican-resident sample includes individuals with hourly wages between \$0.05 and \$20 and U.S.-resident samples include individuals with hourly wages between \$1 and \$100 (in 1990 U.S. dollars). Regressors not shown are dummy variables for marital status, metro residence, and region (all columns); dummy variables for race (column 4 and 8); and dummy variables for year of U.S. entry (columns 2-4, 6-8).

Notes to Table 6: This table reports the weighted share of the Mexico resident population that occupies a given decile of the wage distribution (95% confidence intervals are in brackets). Unweighted shares are by definition 0.10. The weights used to calculate the reported shares are those defined in equation (16), which adjust the characteristics of the Mexican resident population to reflect the characteristics of the Mexican immigrant population in the U.S. Mexican residents are individuals 21-65 years of age with positive labor earnings. Mexican immigrants are individuals 21-65 years of age who arrived in the U.S. in the previous 10 years. The weights are calculated using the logit results shown in Appendix A1. Part (a) shows results corresponding to Figures 4 and 5 (with no adjustment for the illegal-immigrant undercount) and part (b) shows results that correspond to Figure 7b (the sample adjusted for the high illegal-immigrant undercount).

Figure 1

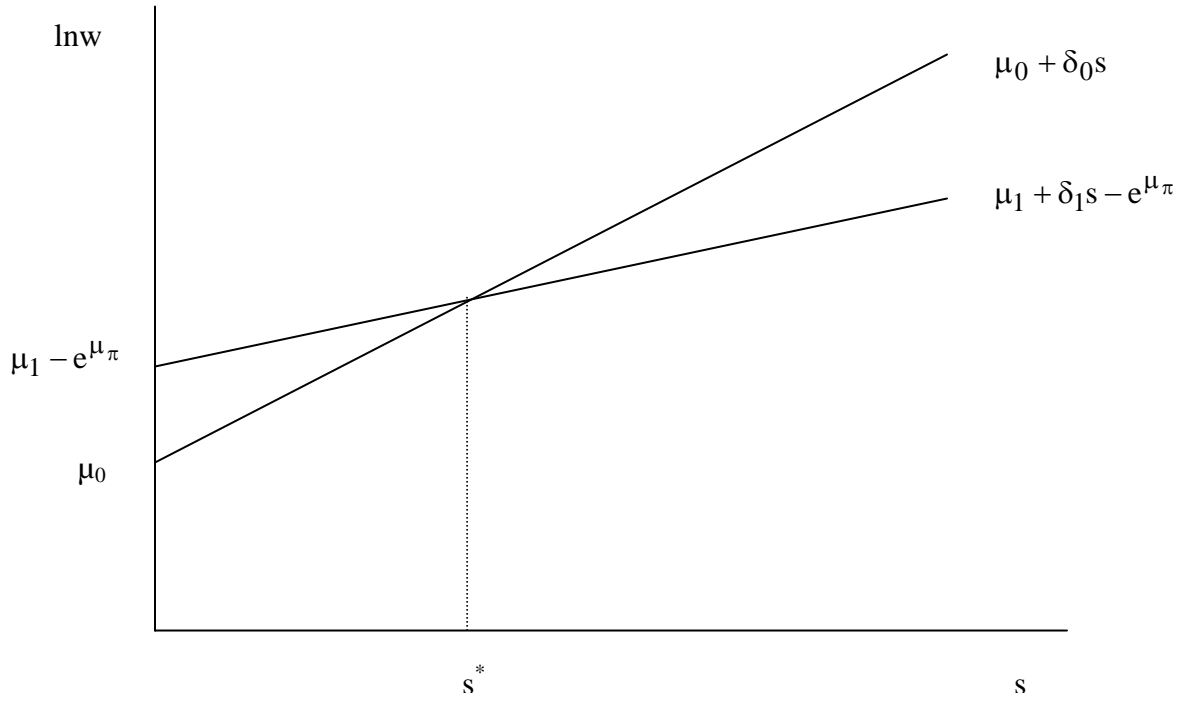


Figure 2

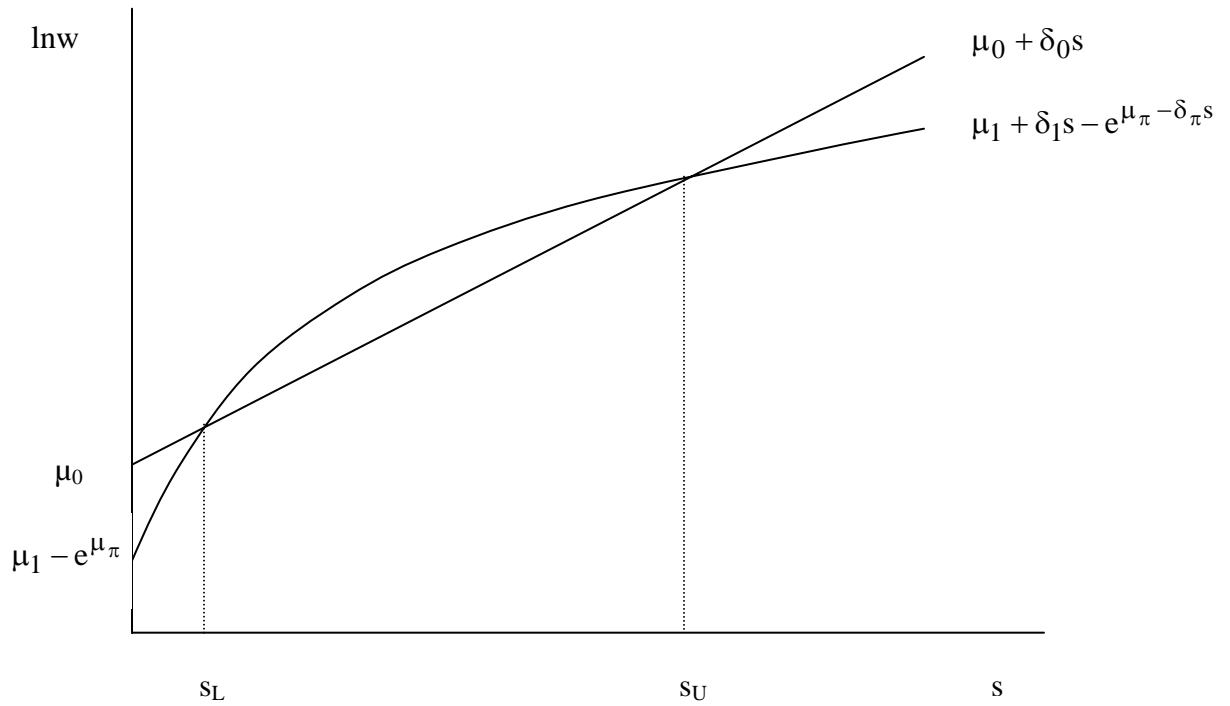
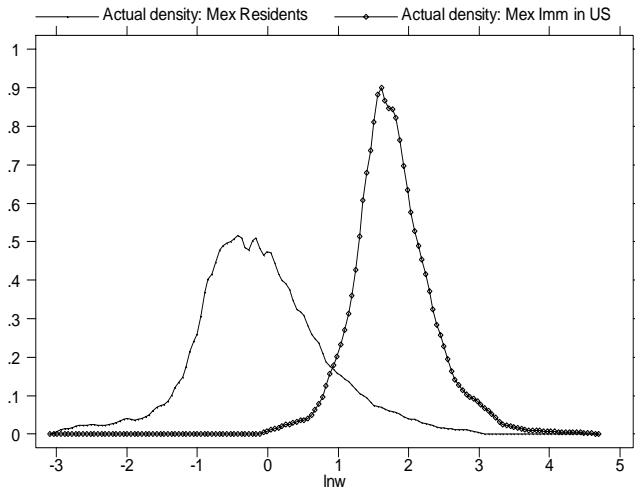


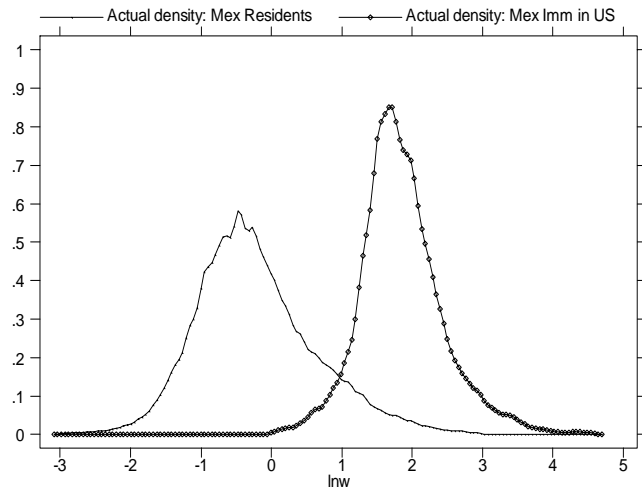
Figure 3:

Wage Densities for Residents of Mexico and Mexican Immigrants in the U.S.

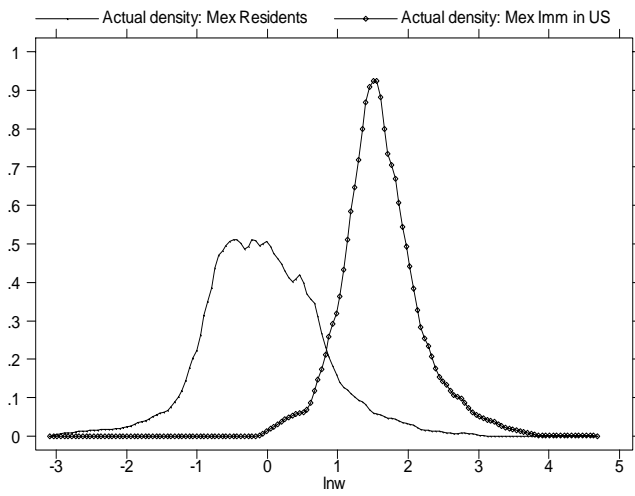
(a) Males, 1990



(b) Males, 2000



(c) Females, 1990



(d) Females, 2000

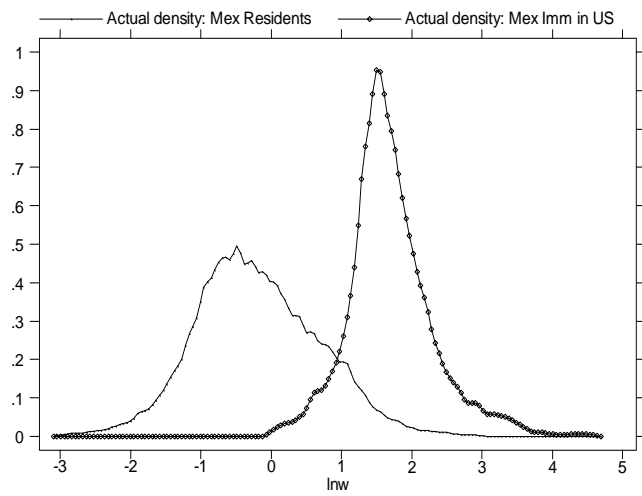
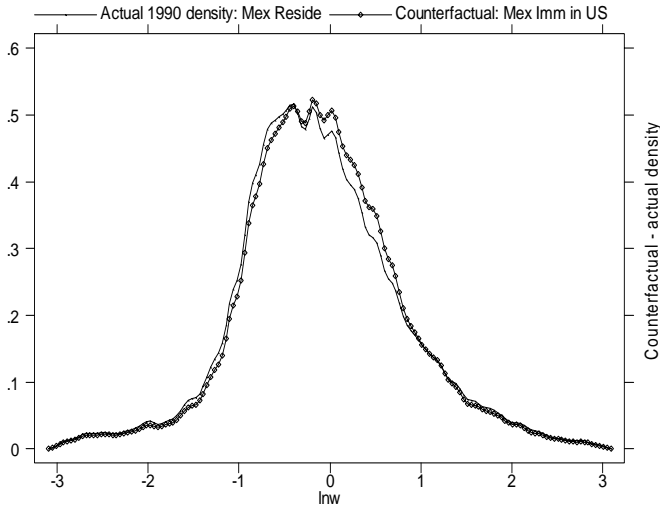
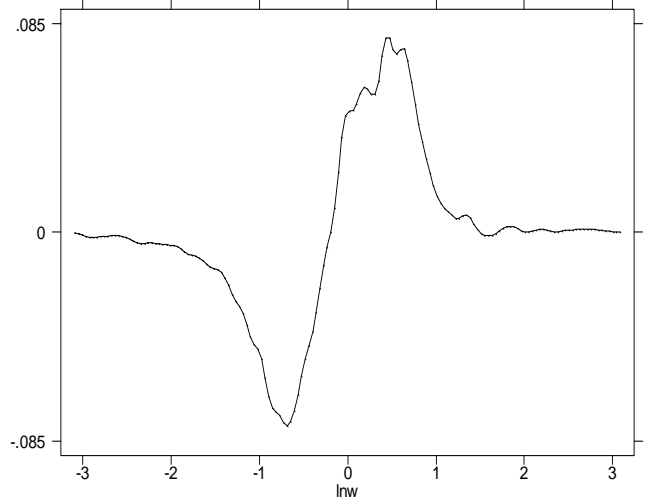
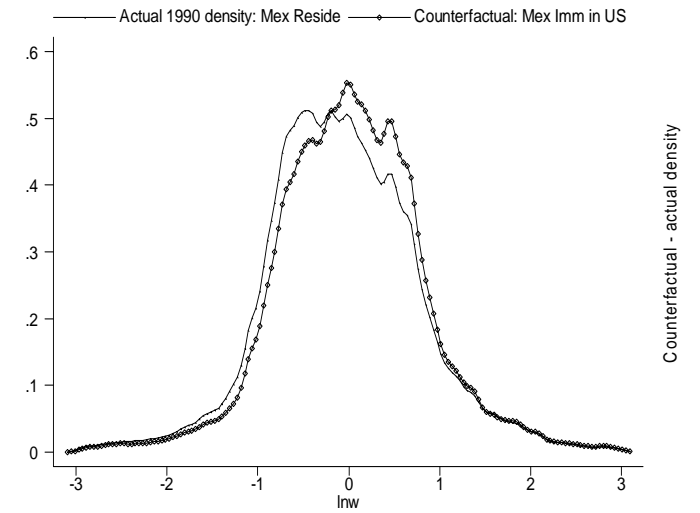
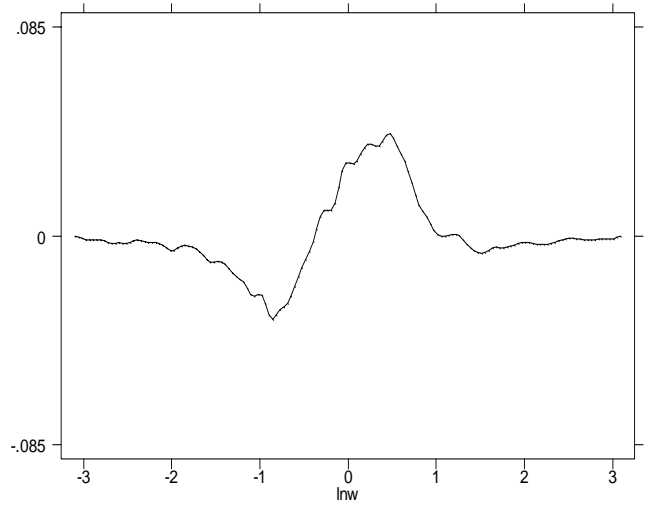


Figure 4: Actual and Counterfactual Wage Densities, 1990
 (Based on skill prices in Mexico)

(a) Males: Actual (Resident) and Counterfactual (Immigrant) Wage Densities



(b) Males: Immigrant Wage Density – Resident Wage Density

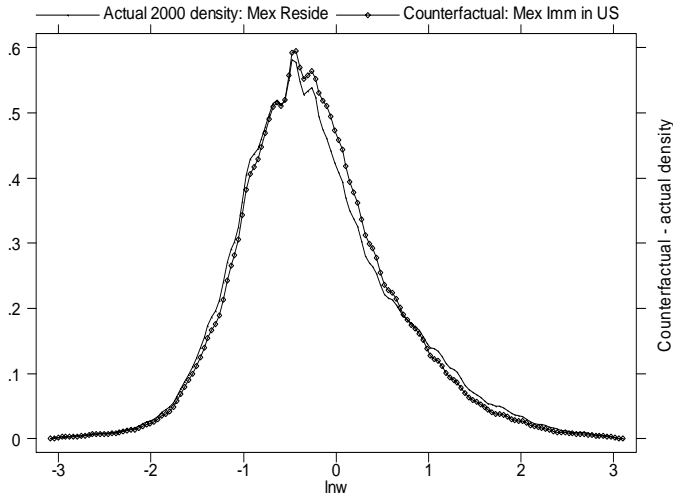


(c) Females: Actual (Resident) and Counterfactual (Immigrant) Wage Densities

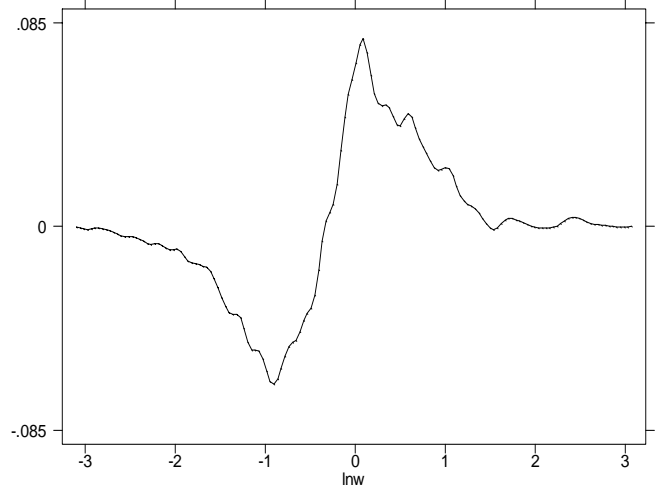
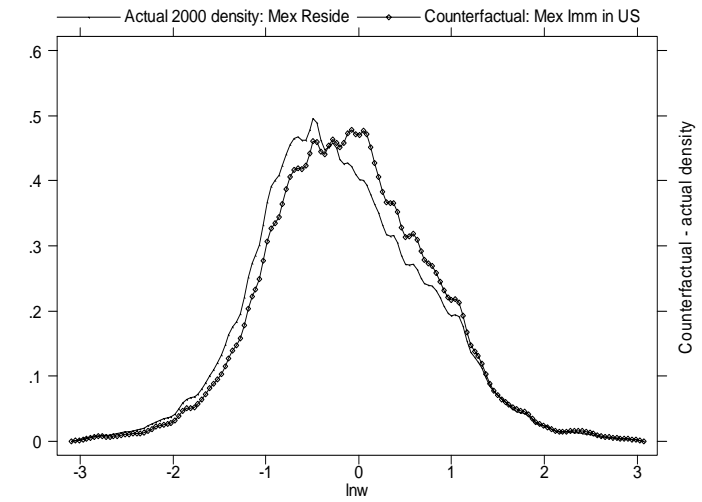
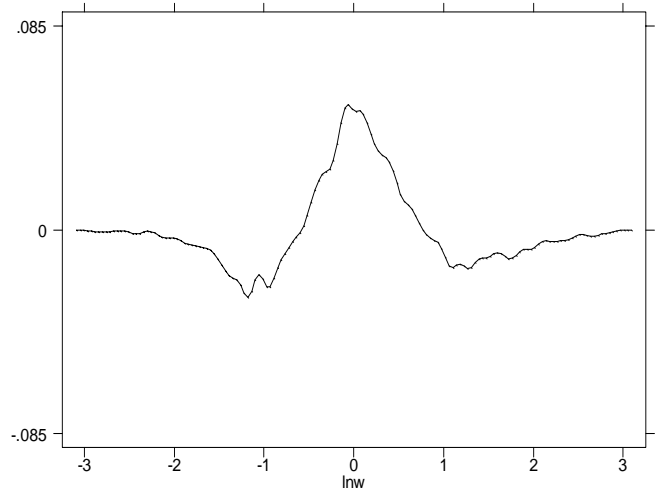
(d) Females: Immigrant Wage Density – Resident Wage Density

Figure 5: Actual and Counterfactual Wage Densities, 2000
 (Based on Skill Prices in Mexico)

(a) Males: Actual (Resident) and Counterfactual (Immigrant) Wage Densities



(b) Males: Immigrant Wage Density – Resident Wage Density



(c) Females: Actual (Resident) and Counterfactual (Immigrant) Wage Densities

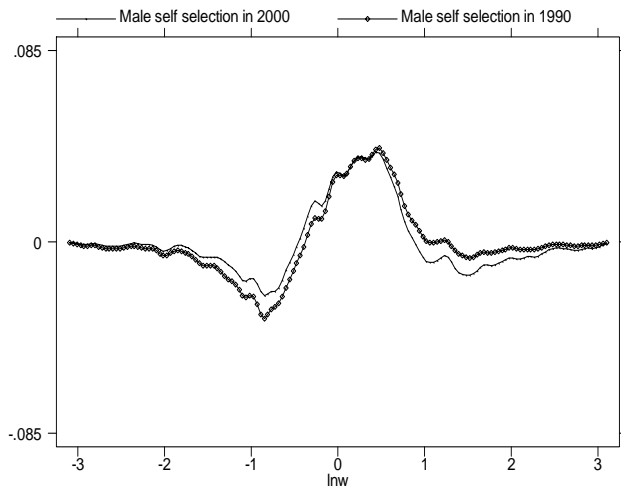
(d) Females: Immigrant Wage Density – Resident Wage Density

Figure 6: Immigrant – Resident Wage Densities at 1990 Skill Prices

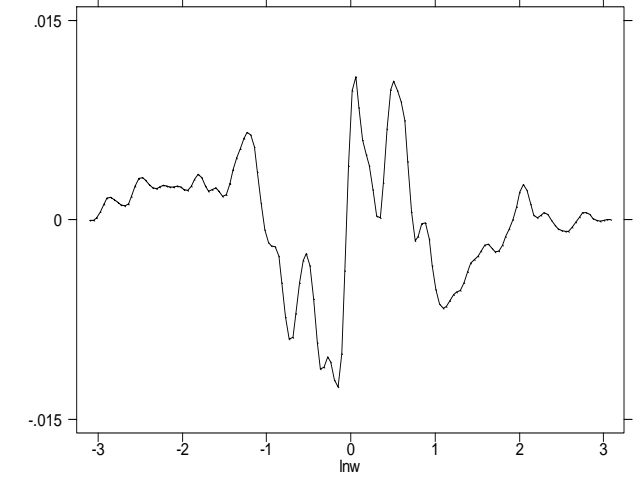
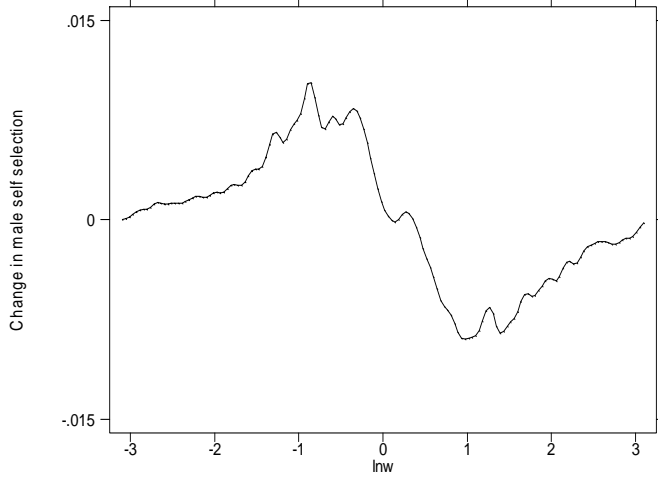
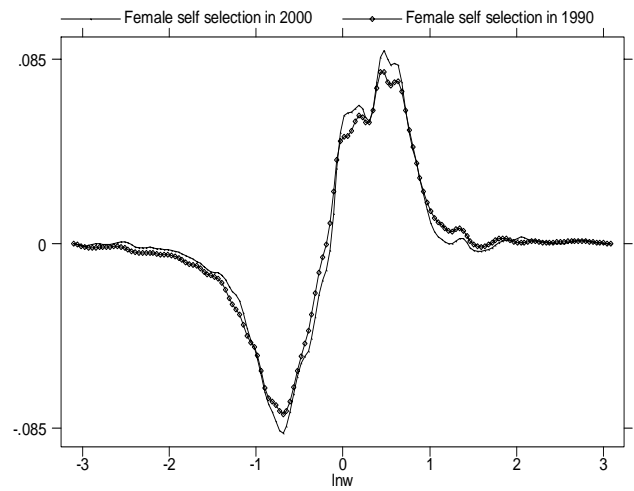
Row (I): Immigrant – Resident Wage Densities in 1990 and 2000

Row (II) (Immigrant – Resident Wage Density, 2000) – (Immigrant – Resident Wage Density, 1990)

(a) Males: Single Density Differences



(b) Females: Single Density Differences



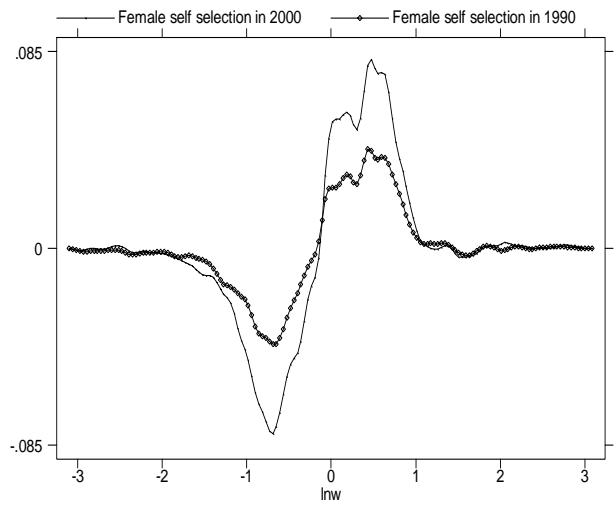
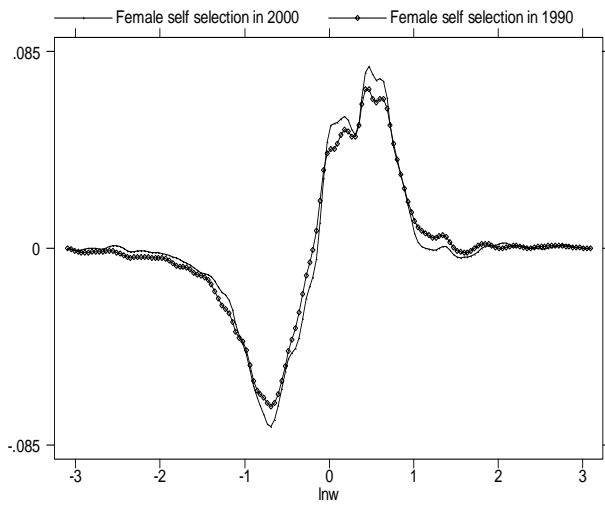
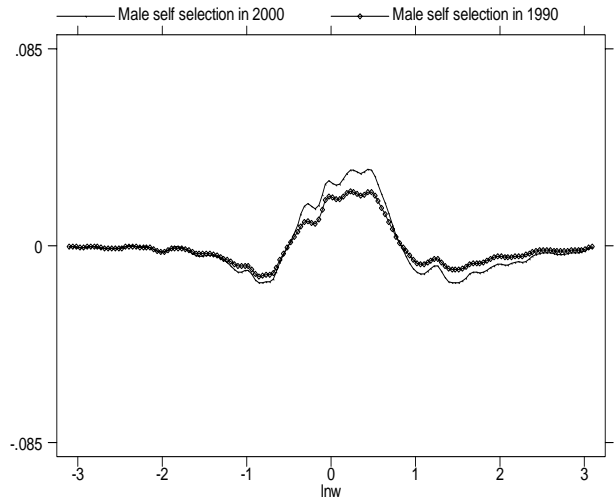
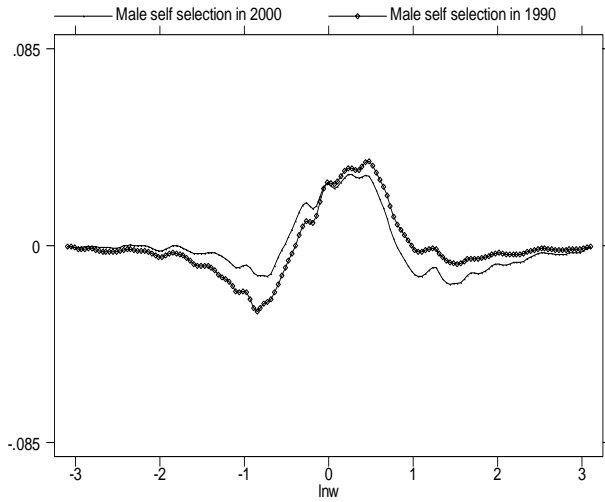
(c) Males: Double Density Difference

(d) Females: Double Density Difference

Figure 7: Actual – Counterfactual Wage Densities, Correcting for Illegal Immigrant Undercount (at 1990 Skill Prices)

(a) Density Difference with Low Undercount

(b) Density Difference with High Undercount



**Figure 8: Actual – Counterfactual Wage Densities, Additional Results for Restricted Samples
(at 1990 Skill Prices)**

