CCIS

THE CENTER FOR
COMPARATIVE IMMIGRATION STUDIES

Does Border Enforcement Protect U.S. Workers From Illegal Immigration?

By Gordon H. Hanson
University of Michigan and National Bureau of Economic Research

Raymond Robertson
Macalester College

Antonio Spilimbergo
International Monetary Fund

Working Paper No. 31
February, 2001

University of California-San Diego
La Jolla, California 92093-0510

Does Border Enforcement Protect U.S. Workers from Illegal Immigration?

Gordon H. Hanson
Department of Economics and School of Business Administration
University of Michigan and
National Bureau of Economic Research

Raymond Robertson
Department of Economics
Macalester College

Antonio Spilimbergo
Research Department
International Monetary Fund

December 2000

Abstract In this paper, we examine the impact of enforcement of the U.S.-Mexico border on wages in U.S. and Mexican border regions. The U.S. Border Patrol polices U.S. boundaries, seeking to apprehend any undocumented entrants. It concentrates its efforts on the Mexican border. We examine labor markets in border areas of California, Texas, and Mexico. For each region, we have high-frequency data on wages and person hours the U.S. Border Patrol spends policing the border. For a range of empirical specifications and definitions of regional labor markets, we find little impact of border enforcement on wages in U.S. border cities and a moderate negative impact of border enforcement on wages in Mexican border cities. These findings are consistent with two hypothesis: (1) border enforcement has a minimal impact on illegal immigration, or (2) illegal immigration from Mexico has a minimal impact on wages in U.S. border areas.

We thank seminar participants at the University of Texas, Texas A&M University, and the Midwest International Trade Meetings for comments. Hanson acknowledges financial support from the National Science Foundation (SBR-9617578) and the Russell Sage Foundation.

I. Introduction

A central tenet of U.S. immigration policy is the control of national borders. The U.S. Border Patrol polices international boundaries, seeking to apprehend any individual attempting to enter the United States illegally. These efforts are concentrated on the Mexican border, where most attempts at illegal entry occur. During the last two decades, repeated economic downturns in Mexico have contributed to surges in attempts at illegal entry (Hanson and Spilimbergo 1999). In response to these circumstances, and to growing political sensitivity about illegal immigration and control of borders more generally, the U.S. government has dramatically increased efforts to enforce the U.S.-Mexico border.[1] The number of hours Border Patrol officers spent policing the Mexican border rose from 1.8 million in 1977 to 5.1 million in 1997.

In this paper, we examine the impact of border enforcement on wages in border regions of the United States and Mexico. We study border areas as they are the regions most directly affected by illegal immigration. Most illegal immigrants embark from a Mexican border city and choose a U.S. border state as their final destination (Bustamante 1990; Warren 1995). Whatever the impact of illegal immigration, it is likely to be strongest in border labor markets. The regions we examine are southern California, southwestern Texas, and Mexican cities on the U.S.-Mexico border. For each of these regions, we have monthly (or quarterly) data on wages and on the number of person hours that the U.S. Border Patrol spends policing border areas and the number of apprehensions its officers make while on patrol. If border enforcement is effective at impeding illegal immigration from Mexico, then its effects should be apparent in border communities. Since the intensity of

[1] The availability of public assistance may also influence illegal immigration (Borjas and Hinton 1996). For an

border enforcement is likely to be influenced by labor-market conditions in the United States and Mexico, we treat it as an endogenous variable in the empirical analysis.

We add to a small but growing literature on illegal immigration. Hanson and Spilimbergo (1999), building on earlier papers by Bean et al. (1990) and Borjas, Freeman, and Lang (1991), find that illegal immigration from Mexico, as proxied by apprehensions at the U.S.-Mexico border, is highly responsive to changes in Mexican wages and, to a lesser extent, changes in U.S. wages.[2] Related papers include case studies of illegal immigration from Mexico (Cornelius 1992; Donato, Durand, and Massey 1992), estimates of the undocumented immigrant population in the United States (Warren 1995, Van Hook and Bean 1998), estimates of the substitutability in labor demand between Mexican immigrants and other workers (Bean, Lowell, and Taylor 1988), and estimates of the sensitivity of Mexican regions to U.S. labor-market shocks (Robertson 2000).[3] There is very little work on whether border enforcement affects labor-market outcomes in the United States or Mexico.[4] This gap in the literature is unfortunate, given the importance of border enforcement in U.S. efforts to control illegal immigration.

Our work also relates to a broader literature on whether immigration lowers the wages of U.S. workers.[5] This subject has attracted attention due to the coincidence of two events -- rising immigration of low-skilled individuals (Borjas 1994) and a relative decline in the earnings of low-skilled U.S. workers (Levy and Murnane 1992; Katz and Murphy 1992). The standard approach in

---

overview of Mexican immigration in the United States, see Mexico-United States Binational Migration Study (1998).

[2] See Espenshade (1994) and Orrenius (1997) for related work.

[3] Durand and Massey (1992), Espenshade (1995), and Mexico-United States Binational Migration Study (1998) review the literature on illegal immigration.

[4] One exception is Bean et al. (1994), who examine "Operation Hold the Line" by the U.S. Border Patrol in El Paso.

[5] See Borjas (1994) and Friedberg and Hunt (1995) for surveys of this literature.

the literature is to examine the correlation between changes in the wages of native U.S. workers and changes in the stock of immigrants in a cross section of U.S. metropolitan areas.[6] Most studies find that immigration has, at most, a small negative effect on the earnings of native workers.

There is doubt about whether existing research identifies the true effect of immigration on wages. Borjas, Freeman, and Katz (1992, 1997) find three problems with using cross-section data to identify the wage effects of immigration. First, wage growth varies across regions for reasons that are unrelated to immigration. Regions that, for whatever reason, attract immigrants may have exceptional wage growth over certain periods. Without exogenous controls for other factors that contribute to regional wage growth, the cross-sectional correlation between changes in immigration and wages may be uninformative. Second, native workers may respond to an influx of immigrants in their locale by migrating to other regions, mitigating the effect of immigration on local wages. The literature is divided about whether immigrant inflows contribute to native outmigration. Filer (1992) and Borjas, Freeman, and Katz (1997) find that it does, while Card (1997) finds that it does not. Third, regions may absorb immigrants without changes in wages by shifting into industries that use immigrant labor relatively intensively. In California, the arrival of immigrants from Mexico and other low-wage countries has been followed by rapid growth in apparel, textiles, food products, and other labor-intensive industries (Hanson and Slaughter 2000).

This paper helps assess the severity of the shortcomings in previous literature. Though our analysis of illegal immigration is indirect -- border enforcement influences the cost of entering the United States illegally but is not the sole determinant of illegal immigration -- there are several

[6] Grossman (1982) is an early contribution. Recent work includes Borjas (1987), Altonji and Card (1991), LaLonde

advantages to our approach. In contrast to existing studies, which mostly use cross-section data for U.S. regions at long time intervals, we have high-frequency time-series data on wages and border enforcement in regions on both sides of the U.S.-Mexico border. This allows us to control for the fact that long-run trends in wage growth may vary across regions. It also means that we are able to examine both the short-run and long-run effects of border enforcement on wages, thus controlling for the possibility that the arrival of illegal immigrants in border regions may cause an outmigration of native workers or a change in the mix of production activities in local industry.

In section II we describe the data used in the analysis, in section III we derive the empirical model, in section IV we present results, and in section V we discuss the findings. For a range of specifications and definitions of regional labor markets, we find only a weak positive correlation between border enforcement and wages in U.S. border regions and a moderate negative correlation between border enforcement and wages in Mexican border cities. These findings are consistent with two hypotheses: (1) border enforcement largely fails to deter illegal immigration, or (2) illegal immigration from Mexico has a minimal impact on wages in U.S. border areas.

II. Data

As motivation for our focus on border labor markets, we briefly describe the spatial distribution of legal and illegal Mexican immigrants in the United States. To examine the impact of border enforcement on the U.S.-Mexico border region, we use a combination of industry data and survey data to construct time series of wages in U.S. and Mexican border regions.

---

and Topel (1991), Schoeni (1996), and Card (1997). See Bean, Lowell, and Taylor (1988) for work that focuses

A. Border Labor Markets: Immigration and Enforcement

Mexican immigrants in the United States tend to congregate in regions near the Mexican border. Data from the 1990 *U.S. Census of Population and Housing* show that 46.5% of Mexican-born individuals that had immigrated within the previous five years resided in the border region of California and 8.6% resided in the border region of Texas. Of all Mexican immigrants, 41.6% resided near the California border and 13.1% resided near the Texas border.[7,8] The direct labor-market consequences of Mexican immigration are thus likely to be concentrated in border areas.

Recent Mexican immigrants tend to have low levels of education relative to U.S. workers. In 1990 Mexican-born individuals in the United States who had immigrated within the previous five years had an average of 9 years of education, compared to more than 13 years for U.S. natives. Unsurprisingly, workers who are recent immigrants are most prevalent in industries that are relatively intensive in the use of less-skilled labor. Table 1 shows the share of workers who are Mexican immigrants for selected industries in California, Texas, and the rest of the United States in 1980 and 1990. We focus on manufacturing, as it is this sector for which we have wage data, but we also show figures for other high-immigrant industries. For the border region of California in 1990, over 32% of workers in the apparel, textile, food products, lumber, and furniture industries were Mexican immigrants, and a substantial fraction of these were recent arrivals. In the state as a

---

specifically on the U.S. labor-market impact of undocumented Mexican labor.

[7] We define the California border region to include the Anaheim-Santa Ana, Los Angeles-Long Beach, Riverside-San Bernadino, and San Diego MSAs, and the Texas border region to include the Austin, Brownsville-Harlingen, Corpus Cristi, El Paso, Houston, McAllen-Edinburg, and San Antonio MSAs.

[8] In 1980, 45.6% (40.3%) of recently arrived (total) Mexican immigrants resided in the California border region and 11.9% (14.3%) resided in the Texas border region.

whole, the shares of workers who are Mexican immigrants are somewhat smaller. For the border region of Texas in 1990, the fraction of workers who were Mexican immigrants was 45% in apparel, 27% in textiles, 21% in food products and lumber, and 15% in furniture. Again, immigrant shares in the state as a whole are smaller. In contrast to the border, Mexican immigrants account for a small fraction of workers in these industries for the rest of the United States.

Recent Mexican immigrants include both legal and illegal aliens. Over the period 1980-1995, legal admissions of Mexican nationals by the U.S. Immigration and Naturalization Service (INS) averaged 62,600 individuals per year.[9] Warren (1995) estimates that over the period 1982-1992 the average annual net inflow of illegal Mexican immigrants was 158,600 individuals per year. Given the legal predicament of undocumented immigrants, we expect these individuals to be even more concentrated in U.S. border cities than legal immigrants. Nearly all illegal Mexican immigrants enter the United States by crossing the U.S.-Mexico border over land, which requires them to spend at least some time in a U.S. border region. Relatively large populations of Mexican nationals in U.S. border cities may make these areas relatively attractive for undocumented arrivals. Warren (1995) estimates that in 1992 59.5% of undocumented Mexican immigrants in the United States resided in California and 17.2% resided in Texas.

Illegal attempts to enter the United States are concentrated along the U.S.-Mexico border. Available data are from unpublished records of the INS, which contain monthly figures for 1977-1997 on the number individuals apprehended attempting to cross the U.S-Mexico border illegally

[9] This figure excludes individuals admitted under the Immigration Reform and Control Act of 1986, which gave legal status to large numbers of long-term illegal aliens.

and the number of person hours the U.S. Border Patrol spends policing the border.[10] Both series are broken down by nine geographic regions.[11] Apprehensions are an indirect indication of attempted illegal immigration from Mexico. Over the sample period, more than 95.0% of those apprehended by U.S. Border Patrol were Mexican nationals, and over 99.0% of apprehensions by the U.S. Border Patrol occurred at the U.S.-Mexico border (INS 1996).

Figure 1 shows border apprehensions by state over the sample period. There is a clear seasonal pattern in apprehensions (high in the summer, low in the winter), which mirrors seasonal variation in U.S. labor demand (Hanson and Spilimbergo 1999). Most apprehensions occur in California; San Diego alone accounts for an average of 49.5% of all border apprehensions. El Paso is the second most important site for apprehensions, accounting for an average of 18.2% of apprehensions. These two locations are near large U.S. population centers and sites where the U.S.-Mexico border is relatively easy to cross. Late in the period, apprehensions rise in Arizona, following increased enforcement of the border in California and Texas which may have encouraged those attempting illegal entry to seek out less-enforced crossing points (Bean et al. 1994).

Figure 2 shows monthly border enforcement hours by U.S. border state over the sample period. In contrast to apprehensions, enforcement shows no seasonal pattern and is spread more evenly across regions. San Diego accounts for an average of 28.1% of enforcement hours and El

[10] Data on enforcement and apprehensions are based on the "linewatch" activities of the U.S. Border Patrol. These activities occur at international borders; other enforcement activities, such as traffic checkpoints or raids on businesses, occur in the U.S. interior. Individuals apprehended by Border Patrol officers on linewatch duty are foreign residents attempting to enter the United States illegally; individuals apprehended by officers on non-linewatch duty have been residing in the United States for an unknown period of time. For most of our work, we use data on linewatch enforcement, since this measure captures enforcement efforts targeted at new illegal immigrants. To check the sensitivity of our empirical results to this choice, we re-estimated all specifications replacing linewatch enforcement with total enforcement (linewatch plus non-linewatch) and found very little impact on our results.

[11] The regions, in order from west to east, are San Diego and El Centro (California); Yuma and Tucson (Arizona); and

Paso accounts for an average of 16.0% of enforcement hours. There are differences in the time path of enforcement across locations, which reflects regional variation in enforcement strategies. All locations show a rise and then fall in enforcement surrounding the implementation of the Immigration Reform and Control Act (IRCA) of 1986, which mandated an increase in expenditure on border enforcement. There is a sudden rise in enforcement in Texas in early 1993. This increase is due mainly to "Operation Hold the Line" in El Paso, during which enforcement hours more than doubled in a three-month period.[12] Following this increase, enforcement hours in Texas decline somewhat over the next three years. Enforcement hours are stable in California between 1988 and 1993 and then rise dramatically in 1994 and 1995, as attempted illegal entry increased following a currency crisis and a severe recession in Mexico and as the INS increased border patrols in San Diego as part of "Operation Gatekeeper."

B. Wages in U.S. and Mexican Border Regions

We use several sources to measure U.S. and Mexican wages. The concentration of immigrants in border regions and in specific industries suggests that the impact of immigration, and hence the impact of border enforcement, will be strongest in these regions and industries. To allow the short-run effects of border enforcement to differ from the long-run effects, it is important to use high-frequency data. It is also important to adjust for variation in worker characteristics (age, education, etc.) across regions and industries, which requires household-level data. Unfortunately, no data set has high-frequency observations on households with sample sizes that are large enough

---

El Paso, Marfa, Del Rio, Laredo, and McAllen (Texas).

to allow disaggregation by education level, region, *and* industry. We use household-level data to measure wages by education level and region and industry-level data to measure wages by industry and region. Though neither data set is ideal, we aim to eliminate the possibility that our findings are an artifact of a particular data set by using multiple wage measures.

For data on wages in high-immigrant industries in California and Texas, we use the Current Employment Statistics Survey from the Bureau of Labor Statistics (BLS), which gives the average hourly wage for production workers in selected industries and regions at a monthly frequency. As production workers tend to have much lower education and pay levels than nonproduction workers, they are the workers most vulnerable to competition from illegal immigrants and hence the workers most likely to benefit from border enforcement. We examine the apparel, textile, food products, lumber, and furniture industries in California and Texas over the period 1980-1997. While data are available for individual cities within these states, gaps in BLS data collection for individual MSAs make the available city-level time series very short. For California, most employment in high-immigrant industries occurs in the Los Angeles area, so that California employment in these industries is a reasonable proxy for industry employment in Los Angeles.[13] We confirm that our results hold for industries in individual MSAs over given subperiods.

For data on wages in U.S. border regions by education group, we use monthly data from the Current Population Survey (CPS), which covers approximately 60,000 households nationwide. The CPS identifies the state of residence for all households and the city of residence for all households

[12] Following Operation Hold the Line there was an apparent change in border-crossing strategies by illegal immigrants from Mexico trying to enter Texas. For a detailed discussion, see Bean et al. (1994).

[13] Over the sample period, the share of California employment in the Los Angeles-Long Beach MSA is 72% in the apparel industry, 66% in the textile industry, 63% in the furniture industry, 28% in the food products industry, and 19%

in a metropolitan statistical area (MSA). For the border region of California, we include households in the Anaheim-Santa Ana, Los Angeles-Long Beach, Riverside-San Bernadino, and San Diego MSAs; for the border region of Texas, we include households in the Austin, Brownsville-Harlingen, Corpus Cristi, El Paso, Houston, McAllen-Edinburg, and San Antonio MSAs. While it might be preferable to examine wage movements in each city separately, small sample sizes for individual MSAs require us to aggregate across border cities within a state.[14] Data are available for the period January, 1986 to May, 1995.[15]

For data on wages in Mexican border regions, we use quarterly data from the Mexican National Urban Employment Survey (ENEU), which covers approximately 96,000 households in eight major urban areas. Included in the sample are Mexico's two largest border cities, Ciudad Juarez, which neighbors El Paso, and Tijuana, which neighbors San Diego, both of which are major crossing points for illegal immigrants. Data are available for the period 1987-1997.

Given the relatively low education levels of recent immigrants, the effects of immigration are likely to differ across skill groups for workers in both the United States and Mexico. To control for this possibility, we follow recent literature (see note 6) by calculating the age-adjusted mean wage for four education categories in each border region, in each time period. To do so, we estimate the following regression separately for each time period:

---

in the lumber industry.

[14] In 1990 the share of Mexican-born individuals in the population varies in California from 7.6% in San Diego to 13.5% in Los Angeles-Long Beach, and in Texas from 2.7% in Austin to 25.8% in McAllen.

[15] Monthly CPS data are available for the period January, 1979 to December, 1996. Due to changes in classification codes for MSAs, there are no MSA identifiers in the data for the periods July-December, 1985 or June-August, 1995. In order to use a continuous time series, we are limited to the intervening period. State identifiers exist in CPS data for all months. We use both samples in our analysis.

$$(1) \qquad w_{ht} = \sum_{i=2}^{T} \beta_{it} D_{hit} + \sum_{j=1}^{J} \sum_{k=1}^{K} \gamma_{jkt} E_{hjkt} + \varepsilon_{ht}$$

where w_{ht} is log real earnings for individual h in period t, D_{hit} is a dummy variable for whether individual h belongs to age group i, E_{hjkt} is a dummy variable for whether individual h has education level j and resides in region k, the β_{it}'s and the γ_{jkt}'s are parameters to be estimated, and ε_{ht} is an i.i.d. error term.[16] The γ_{jkt}'s are age-adjusted mean wages for different education groups in different regions, which we use as dependent variables in subsequent analysis.

For both the CPS and the ENEU, the individuals included in the sample are non-self-employed, non-military males aged 16-64 who worked at least twenty hours in the survey week. We include dummy variables for five age groups, 16-24, 25-34, 35-44, 45-54, and 55-64. For CPS data, we estimate region-education dummy variables for five regions, border cities in California, non-border areas in California, border cities in Texas, non-border areas in Texas, and the rest of the United States, and four education categories, high-school dropout, high-school graduate, some college, and college graduate. For ENEU data, we estimate region-education dummy variables for four regions, Ciudad Juarez, Tijuana, other border cities, and interior cities,[17] and four education categories, 0-6 years (primary), 7-11 years (secondary), 12-15 years, and greater than 15 years.[18]

Figures 3 and 4 show average hourly wages for high-immigrant industries in California and

[16] For CPS data, the wage is usual weekly earnings, deflated by the U.S. CPI for the current month; for ENEU data, the wage is usual monthly earnings, deflated by the Mexican CPI for the current month.

[17] The other border cities are Matamoros and Nuevo Laredo. The interior cities are the country's three largest cities, Guadalajara, Mexico City, and Monterrey.

[18] The education categories for Mexico group individuals with similar skill levels, as indicated by average earnings. There are spikes in the distribution of schooling at 6 years (primary school), 9 years (secondary school), and 12 years (preparatory school). Relatively few individuals complete 16 or more years of schooling.

Texas, relative to wages for the same industries in the United States as a whole.[19] While real wages decline in each industry, there are also relative wage declines in California textiles and lumber and Texas food products. Figures 5 and 6 show age-adjusted mean wages of high-school dropouts and high-school graduates in California and Texas border cities, relative to those for the corresponding education group in the rest of the United States. Wages for both high-school dropouts and high-school graduates in California tend to be higher than in the rest of the nation, but they decline in relative terms over the period. Wages for both education groups in Texas are below those for the rest of the nation, and, though variable, show no time trend. Figure 7 shows age-adjusted mean wages for individuals with primary (0-6 years) education and secondary (7-11 years) education for Ciudad Juarez and Tijuana; wages are relative to those for the corresponding education group in interior Mexico. Wages are high relative to interior cities, but decline over time.

III. Empirical Specification

A. Empirical Model

In this section, we present a simple model of how border enforcement influences labor markets in border regions. We use the model to derive a reduced-form specification for border wages as a function of border enforcement and national labor-market conditions. The starting point for the analysis is the idea that wages in border regions will be affected by three factors: the migration of labor between regions within a country, the immigration of labor from neighboring countries, and local shocks. We assume that labor markets are competitive, labor is mobile across

[19] Given age-adjusted mean wages are estimated coefficients from log-wage regressions, the relative wages we show in

regional and national boundaries, and workers migrate towards regions with higher wages. For simplicity, the model treats labor as homogeneous, though we relax this assumption in the estimation. All variables are expressed in logs and time subscripts are suppressed.

We imagine that wages in U.S. border region *b*, w_b, are related to employment in the region, N_b, and an unobserved i.i.d. local disturbance to labor demand, ε^w_b as follows:

$$(2) \qquad w_b = \alpha_0 + \alpha_1 N_b + \varepsilon_b^w .$$

Employment is U.S. border region *b* will be the sum of locally employed workers who are legal residents, L_b, and locally employed workers who are illegal immigrants from Mexico, M_b,

$$(3) \qquad N_b = L_b + M_b .$$

Legal workers migrate towards U.S. regions that offer higher wages, such that their employment in border region *b* is a function of local wages, national U.S. wages, w_n, and an unobserved i.i.d. local disturbance to the supply of legal workers in region *b*, ε^L_b,

$$(4) \qquad L_b = \delta_0 + \delta_1 w_b + \delta_2 w_n + \varepsilon_b^L .$$

We assume illegal immigrants from Mexico enter the U.S. labor market through the border region. Border enforcement partially impedes illegal immigration. Potential illegal immigrants view apprehension by the U.S. Border Patrol as costly because detention by U.S. authorities implies time out of the labor force and may impose other material or psychic costs (Hanson and Spilimbergo 1999). [20] The supply of illegal workers to border region *b* then depends on wages in

---

Figures 3-6 are the log difference of the two relevant series.

[20] Border enforcement may reduce illegal immigration directly, by leading to the apprehension of those that attempt illegal immigration, or indirectly, by deterring individuals in Mexico from attempting to enter the United States illegally.

region *b*, wages in Mexico, w_m, the level of enforcement of the U.S.-Mexico border, *E*, and an unobserved i.i.d. local disturbance to the supply of illegal immigrants in region *b*, ε^M_b,

$$(5) \qquad M_b = \phi_0 + \phi_1 w_b + \phi_2 w_m + \phi_3 E + \varepsilon_b^M .$$

U.S. authorities are likely to set border enforcement taking expected illegal immigration into account. For instance, the U.S. Border Patrol may raise (lower) border enforcement when U.S. wages rise (fall) relative to Mexican wages, since these wage movements would be expected to generate more (less) illegal attempts to cross the border. Other factors are also likely to influence border enforcement, such as the U.S. political climate and other demands on border-enforcement resources (e.g., enforcement against smuggling of contraband). Border enforcement can then be expressed as a function of expected illegal immigration from Mexico, M^E, political and resource constraints on enforcement, *Z*, and an unobserved disturbance, ε^E,

$$(6) \qquad E = \gamma_0 + \gamma_1 M^E + \gamma_2 Z + \varepsilon^E$$

The goal of the empirical estimation is to uncover the impact of border enforcement on labor-market conditions in border regions. Since we lack repeated observations on the supply of illegal immigrants in U.S. border regions, M_b, we cannot estimate the full system of equations (2)-(6). An alternative approach is to combine equations (2)-(5) to obtain a reduced-form expression for wages in U.S. border region *b*,

$$(7) \qquad w_b = \frac{1}{1-\alpha_1(\delta_1+\phi_1)}[\varphi + \alpha_1(\delta_2 w_n + \phi_2 w_m + \phi_3 E) + \varepsilon_b^w + \alpha_1(\varepsilon_b^L + \varepsilon_b^M)]$$

where φ is a constant. By estimating (7), we can identify the reduced-form effect of border enforcement of wages in U.S. border regions,

$$(8) \qquad \frac{\alpha_1 \phi_3}{1-\alpha_1(\delta_1+\phi_1)}$$

Under standard assumptions, the coefficient in (8) would be unambiguously positive -- stronger border enforcement would raise U.S. border wages. These assumptions are that labor is subject to diminishing returns ($\alpha_1<0$), border enforcement lowers the supply of illegal immigrants in U.S. border regions ($\phi_3<0$), and the own-price elasticity of labor supply is positive ($\delta_1>0$ and $\phi_1>0$).

One obvious concern about estimating equation (7) is that, by equation (6), border enforcement is likely to be correlated with unobserved shocks to border wages (ε^w_b, ε^L_b, and ε^M_b). This raises the possibility that the OLS estimate of the border-enforcement effect in (8) would be inconsistent.[21] We deal with this problem by instrumenting for border enforcement in the estimation of (7). We discuss instrument selection in the next section.

In the absence of valid instruments, an alternative would be to take a less structural approach and estimate a vector autoregression (VAR) for border wages, border enforcement, and Mexican wages (under the testable assumption that labor-market conditions in the rest of the United States are not influenced by these variables). We could then see whether future realizations of border wages are correlated with past realizations of border enforcement. In unreported results, we implemented this strategy and obtained results which are consistent with those below. We do not report these results in the paper since we have doubts about the assumptions required for a VAR to uncover the impact of border enforcement on labor-market outcomes in border regions.

In a manner analogous to that specified in equation (7), wages in Mexican border regions

[21] Unfortunately, it is difficult to sign the bias since enforcement is likely to be positively correlated with labor-demand shocks (ε^w_b) and migration shocks (ε^M_b) but negatively correlated with labor-supply shocks (ε^L_b).

are likely to be influenced by wages elsewhere in Mexico, wages in the United States, or enforcement of the U.S.-Mexico border. Increased border enforcement is expected to put downward pressure on wages in Mexican border cities because Mexican border regions are the point of departure for illegal emigration to the United States. Stronger border enforcement would increase the supply of labor in Mexican border cities and thus depress wages. We also estimate a specification of wages in Mexican border cities, similar to that in equation (7).

B. Estimation Issues

There are several estimation issues to be addressed. A first issue is that the model in equation (7) is static but, given moving costs or other frictions, adjustment to labor-market shocks is likely to take several periods (especially with observations at monthly frequencies). We deal with this issue by estimating a dynamic extension of equation (7) in which we include lagged dependent variables and lagged values of control variables as regressors.

A second estimation issue relates to the selection of instruments for border enforcement. We instrument for enforcement using the following variables: a dummy for whether there is a U.S. congressional election in the upcoming calendar year, the value of the U.S. Customs user fee, boat arrivals at the Los Angeles-Long Beach International Port, the number of travelers entering the United States from Canada (by land, air, or sea), and the estimated value of illegal drug seizures by the U.S. Border Patrol in the given fiscal year. The first four variables are at a monthly frequency; the fifth variable is at an annual frequency.

It is worth discussing the rationale for each instrument. The timing of congressional

elections would be correlated with border enforcement if politicians manipulate the allocation of public spending in election years to improve their electoral prospects. In this case, the budgeted resources available to the U.S. Border Patrol would follow a political cycle. The customs user fee is an ad valorem duty on the value of imports, which ranges from 0 to 0.21% over the sample period. A higher fee may induce some individuals to smuggle goods into the United States rather than importing them legally. All else equal, more smuggling may lead the Border Patrol to substitute resources away from apprehending illegal immigrants and towards catching smugglers. More Los Angeles-Long Beach port activity implies fewer resources available for enforcement of the U.S.-Mexico border if, all else equal, more boat arrivals mean more inspections to be performed by the Border Patrol. A similar logic applies to the number of travelers going to and from Canada. Finally, more illegal drug seizures may imply more resources devoted to searching for illegal drug shipments and fewer resources available for border enforcement. As additional instruments, we use lagged values of control variables (U.S. wages, Mexican wages, U.S. unemployment rate).[22]

We check the validity of the instruments in two ways. To verify that the instruments are correlated with border enforcement, we report the results of F-tests on the instruments in the first-stage regression (of enforcement on the instruments and the exogenous regressors in equation (7)). To verify that the instruments are uncorrelated with shocks to border wages, we also report tests of over-identifying restrictions on the instruments (Newey 1985).

A third estimation issue is that in equation (7) we implicitly assume that U.S. wages,

[22] We also experimented with using other variables as instruments which were plausibly correlated with border enforcement and uncorrelated with labor-market conditions in U.S. and Mexican border regions. These included electoral cycles in U.S. border states and cities, climatic conditions in U.S. border cities, and U.S. federal workdays. These variables did not have strong simple or partial correlations with border enforcement.

Mexican wages, and any other control variables are exogenous to wages in the U.S. border region and to border enforcement. This assumption is based on the idea that border labor markets are small in relation to the national economies of the United States and Mexico. To verify that this assumption of exogeneity is warranted, we estimated a VAR for the full set of variables included in the estimation and then performed tests of block exogeneity for U.S. national wages, Mexico national wages, and other control variables such as the U.S. unemployment rate, in which we tested the null hypothesis that lagged values of border wages and border enforcement are uncorrelated with the assumed exogenous variables (Hamilton 1994). For all measures of border wages, we failed to reject the null at any reasonable level of significance.[23]

A fourth estimation issue is that illegal immigration may create a spurious correlation between border enforcement and wages in U.S. border regions. To the extent illegal immigrants earn lower wages than residents of the United States, their entry into the U.S. labor force will lower measured *average* wages in the United States, even if they have no impact on the wages of existing U.S. residents. If lower levels of border enforcement allow higher levels of illegal immigration, there may be a spurious positive correlation between U.S. wages and border enforcement. While such compositional effects are likely to be small in high-frequency data, we still control for this problem by excluding potential illegal immigrants from the sample. In estimating equation (2) on CPS data, we exclude from the sample all individuals that describe themselves as born in Mexico and not U.S. citizens.[24] While this unfortunately eliminates some long-term Mexican residents,

[23] These results are available upon request from the authors.

[24] We exclude individuals who define themselves as "Mexicanos" from the sample. (We recognize that it would be more desirable to exclude just recent Mexican immigrants from the data, as this class of individuals contains a relatively

both legal and illegal, from our data, it helps reduce the impact of compositional effects on our data.[25] We are unable to control for compositional effects in BLS industry wage data.

A final estimation issue arises from the fact that for some specifications (those relying on wage data from the CPS or ENEU) we measure wages using coefficient estimates from the regression in equation (1). These coefficient estimates appear as dependent variables in equation (7). By construction the disturbance term in equation (7) will include a sampling error that has a non-constant variance over time. We use the White (1980) estimator to obtain heteroskedasticity-consistent standard errors. A further problem is that some specifications include lagged values of the dependent variables as regressors. By using constructed regressors, we may introduce measurement error into the estimation. One solution would be to instrument for lagged dependent variables. Valid instruments, in this case, are difficult to find, since we need variables that are correlated with the first several lags of wages but uncorrelated with contemporaneous shocks to wages (at monthly frequencies).[26] We address this problem by examining the sensitivity of our results to changing the measure of wages that is used. Some specifications, notably those using BLS industry wage data, are not subject to the same concerns about errors in the regressors.

---

large fraction of undocumented workers, but our data unfortunately do not identify an individual's year of entry into the United States in all sample years.) The CPS uses three categories for persons of Mexican descent, Mexican-American, Chicano, and Mexicano. These are "write-in" categories and thus not necessarily subject to strict definitions. Nonetheless, Mexican-Americans are generally believed to be U.S. citizens of Mexican descent, Chicano is an alternative term for U.S. citizens of Mexican decent used mostly by the cohort of individuals who were young adults in the 1970s and 1980s, and Mexicano appears to be used mostly by Mexican-born individuals who are not U.S. citizens.

[25] In unreported regressions, we estimated wage equations in which the wage measures were based on samples of U.S. workers that included Mexicanos. These results are quite similar to those that we report in Table 5, suggesting that compositional effects are not too important in our data. These results are available on request.

[26] An alternative approach would be to use the variance of the estimated coefficients from the first-stage regression in equation (1) as an estimate of the variance on the measurement error on the generated regressors in the second-stage estimation of equation (7), which is similar to orthogonal regression. In unreported results, we applied such techniques to CPS data. Since the coefficient estimates we obtained were implausible (negative values for coefficients on the first

IV. Empirical Results

In this section, we examine the relationship between enforcement of the U.S.-Mexico border and wages in U.S. and Mexican border regions. Table 2 gives variable definitions and summary statistics for the regression variables. For the United States, we examine wages in high-immigrant industries in California and Texas, and wages of male high-school dropouts and high-school graduates in California and Texas border cities; for Mexico, we examine wages for males with primary and secondary education in the two largest border cities, Tijuana and Ciudad Juarez.

As an informal indication of the relationship between wages and enforcement, Figures 8-11 show cross-correlograms for border enforcement and each measure of border wages, where all series are detrended. These graphs plot the correlation between log border wages and leads and lags of log border enforcement. If enforcement does impact wages, we would expect to see a positive correlation between wages and lags of enforcement in U.S. border regions and a negative correlation between wages and lags of enforcement in Mexican border regions. Without additional controls, however, these raw correlations are only a rough indication.

Figure 8 shows that in the California food products, apparel, and lumber industries there is a positive correlation between wages and border enforcement, which peaks at two to four lags of enforcement. This is weakly consistent with the hypothesis that border enforcement leads border wages. For Texas border industries, shown in Figure 9, there is a similar relationship between wages and enforcement in lumber and furniture. There is also a positive correlation between wages

---

lag of dependent variables), we do not report them here.

and enforcement in apparel, but it peaks for the contemporaneous correlation. There is zero correlation between wages and enforcement in food products and textiles. Turning to wages for high-school dropouts and high-school graduates in California and Texas border cities, shown in Figure 10, we see zero or negative correlations between wages and enforcement. Finally, Figure 11 shows cross-correlograms for Mexican border cities. There is a negative correlation between wages and enforcement in all cases, which peaks at six to eight leads of enforcement suggesting that wages lead enforcement rather than the reverse. These figures fail to show consistent evidence that border enforcement influences wages. The regression results confirm this finding.

A. High-Immigrant Industries in California and Texas

Tables 3 and 4 report OLS and IV regression results, using industry wages in border states as the dependent variable. Data are monthly and the time period is March, 1980 to September, 1996. We examine whether there is a statistically significant correlation between wages in U.S. border industries and lagged values of border enforcement.

Wages are the log of average hourly real wages for production workers in the food products, textiles, apparel, lumber, or furniture industries in California or Texas. Border enforcement is the log of total enforcement hours in Border Patrol sectors along either the California or Texas-Mexico border. The additional control variables are log wages for the U.S. industry as a whole, log real average hourly wages for manufacturing workers in Mexico, and the state unemployment rate. We instrument for border enforcement with contemporaneous and lagged values of months until a U.S. congressional election, the U.S. customs user fee, Los Angeles port activity, U.S. travelers to and

from Canada, and the value of U.S. drug seizures, as described in the previous section. All regressions include monthly dummy variables, a time trend, and two lags of the regressors.[27]

The top panels of Tables 3 and 4 report OLS results for California and Texas. Complete results for California are in Appendix Tables A1 and A2. For brevity, we do not report complete results for other samples; these are available on request. The first row of each panel shows the estimated long-run elasticity of wages with respect to border enforcement. The border-enforcement elasticity for wages is statistically insignificant in all cases but the Texas lumber industry. Since this elasticity depends on coefficient estimates for the lagged dependent variable as well as for border enforcement, the precision with which it is estimated may not accurately reflect the partial correlation between wages and enforcement. To address this issue the second row in each panel shows an F-test on the sum of coefficients for enforcement, which represents a test of the null hypothesis that there is no long-run correlation between wages and enforcement. In OLS regressions, we fail to reject this null in all cases.[28]

In the bottom panel of Tables 3 and 4 we present the results for instrumental variable regressions. We first discuss the validity of our instruments. The third row of the bottom panel in Tables 3 and 4 reports F-tests on the instruments in the first-stage regressions (where border enforcement is the dependent variable and the exogenous regressors and the instruments are the independent variables). The instruments appear to be correlated with border enforcement in both California and in Texas. They are jointly statistically significant at the 5% level. The fourth row

[27] Two lags on the regressors was generally the specification that minimized the value of the Schwarz criterion.

[28] In unreported results we examine the short-run impact of border enforcement on wages by testing the null that the coefficients on border enforcement are jointly zero. The results for this test are the same as for the long-run impact.

reports results for tests of over-identifying restrictions (Newey 1985). In all cases we fail to reject the null hypothesis that the instruments are uncorrelated with the error terms in the IV regressions at any reasonable significance level.

The first row in the IV panels of Tables 3 and 4 reports IV estimates of the long-run elasticity of border enforcement with respect to wages and the second row reports the F-test on the sum of coefficients for border enforcement. Similar to the OLS regressions border enforcement is statistically insignificant in most cases, the exceptions being lumber in California and Texas. The precision of the estimates aside, it is worth noting that the estimated effect of enforcement is *negative* in three of five industries in California and in one of five industries in Texas. For the cases where border enforcement is precisely estimated, it is important to ask whether its impact on industry wages is economically important. The long-run elasticity of wages with respect to border enforcement is 0.088 in California lumber and 0.131 in Texas lumber. This impact is small, and the economic impact is also likely to be small given that lumber is one of the smallest manufacturing industries in either state.

In unreported regressions, we examine the sensitivity of the results to alternative specifications and sample periods. We experiment with altering lag lengths on the regressors, using national in place of regional measures of border enforcement, replacing California industry wages with industry wages for the Los Angeles-Long Beach MSA (where Mexican immigrants are highly concentrated), dropping observations after the devaluation of the peso in 1994 (which was followed by a severe recession in Mexico), adding apprehensions of individuals at the border as a regressor,

and using additional instruments. None of these changes impact the results. Border enforcement has at most a small, positive, and imprecisely-estimated impact on border industry wages.

For completeness, we also estimated wage equations similar to those reported in Tables 3 and 4 for the California and Texas chemical and transportation equipment industries, which are relatively intensive in skilled labor and appear to employ relatively few undocumented workers.[29] Using either OLS or instrumental variables, we fail to reject the null that state wages are uncorrelated with border enforcement in any of these industries.

B. California and Texas Border Cities

In the preceding section, the unit of analysis was high-immigrant industries in U.S. border states. While these are the industries for which illegal immigration is most likely to have an observable impact, using average industry wages may smooth over variation across workers, making the impact of border enforcement on wages difficult to detect. In this section, we adopt an alternative definition of border labor markets. We examine low-education males in California and Texas border cities. We perform a similar series of regressions as those in Tables 3 and 4, except that now wages are the age-adjusted mean wage for either high-school dropouts or high-school graduates in a given region. All other variable definitions, including border enforcement, remain the same. Data limitations restrict the analysis to monthly data for the period from March, 1986 to May, 1995. Tables 5a and 5b report the results.

Beginning with OLS regressions, the long-run elasticity of wages with respect to border

[29] In 1990, the employment share of recent Mexican immigrants was 4.0% in California chemicals, 1.5% in California

enforcement, shown in the first row, is negative in California, small and positive in Texas, and imprecisely estimated in all cases. As seen in the second row, we fail to reject the null that there is no long-run correlation between enforcement and wages in all regressions.

Turning to the IV regressions, we first examine the validity of the instruments. In all cases, the instruments are jointly different from zero in the first-stage regression at the 5% level, and we fail to reject the null that the instruments are uncorrelated with the errors. Similar to the OLS results, in IV regressions the correlation between wages and border enforcement is negative in California, positive in Texas, and imprecisely estimated in all cases. To check the sensitivity of these results, we used several alternative specifications. The results are unaffected by changing lag lengths on the regressors, replacing regional border enforcement with national border enforcement, or including border apprehensions as a regressor.

One concern about the results in Table 5a is noise in the constructed wage measures. In order to increase the sample size and reduce noise in the dependent variable, we performed similar regressions in which we used the age-adjusted mean wage for high-school dropouts or high-school graduates in either all of California or all of Texas as the dependent variable. The advantage of this approach is that we are able to extend the time period for the analysis to March, 1980 to June, 1996, which represents an increase of 85 observations. The results are reported in Table 5b. The OLS regressions show zero correlation between border enforcement and wages in Texas and a negative correlation in California. The results are confirmed in the IV regressions.

That we estimate a negative correlation between border wages and border enforcement

---

transportation equipment, 0.2% in Texas chemicals, and 0.4% in Texas transportation equipment (compare to Table 1).

using wages constructed from CPS data contrasts with the results we obtain using BLS industry average wages. As indicated earlier, one concern is that measurement error in the constructed wage measures from CPS data may contaminate the regression results and somehow lead to downward bias in the estimated impact of enforcement on wages, in which case the results in Tables 5a and 5b would *underestimate* the impact of enforcement on wages. Our concerns about compositional bias in average industry wages suggest that the results in Tables 3-4 may *overestimate* the impact of enforcement on wages. Taking either set of results, there is little evidence that border enforcement significantly raises wages in U.S. border regions.

In light of these results, we would expect there to be zero correlation between border wages and border enforcement for more-educated workers in California and Texas. In Appendix Table A3, we report regression results in which the dependent variable is the age-adjusted mean wage for workers with 13-15 years of education (some college) or 16 plus years of education (college graduates). For either OLS or IV regressions, we again fail to reject the null of zero long-run correlation between wages and border enforcement for these two categories of workers in either the border areas of California and Texas or in the states as a whole.

C. Mexican Border Cities

Although the effects of border enforcement are negligible in U.S. border regions, it is possible that U.S. border enforcement may have larger effects on labor markets in Mexican border regions. Mexican border cities are the transit point for most undocumented Mexican immigrants and changes in border enforcement could influence local labor supplies in these areas. We examine

the two largest Mexican border cities, which are also the major border crossing points for illegal immigrants: Tijuana, which neighbors San Diego, and Ciudad Juarez, which neighbors El Paso.

The empirical specification mirrors that in previous sections. The main difference is that the frequency is quarterly, rather than monthly, due to the availability of Mexican wage data. The dependent variable is the age-adjusted mean wage for Mexican males with either primary (0-6 years) or secondary (7-11 years) education. Enforcement is summed into quarters to match the frequency of the wage data. Additional control variables are the log U.S. average hourly real wage for the corresponding education group in the United States, the age-adjusted mean wage for the corresponding education group in interior Mexican cities, quarterly dummy variables, and a time trend.[30] The data cover the period 1987:1 to 1997:4. Table 6 reports OLS estimation results in the upper panel and IV estimation results in the lower panel.

The OLS results indicate that there is a negative correlation between U.S. border enforcement and Mexican wages. This effect is large but imprecisely estimated for all cases but workers with a primary education in Tijuana. For low-education workers in Tijuana, the long-run elasticity of wages with respect to border enforcement is -0.347 and is statistically significant at the 5% level. The elasticity estimates for the other groups range from -0.028 (secondary education, Ciudad Juarez) to -0.455 (primary education, Ciudad Juarez).

Turning to the IV results, the instruments we use for border enforcement are number of periods until a U.S. congressional election, number of periods until a U.S. presidential election, the U.S. customs user fee, Los Angeles port activity, U.S. travelers to and from Canada, and the

[30] National or regional unemployment rates are additional potential regressors, but we lack data on these variables for

number of U.S. federal workdays. All are at a quarterly frequency. In all cases, the instruments pass the F-test and the test of over-identifying restrictions. Applying instrumental variables reduces the magnitude of three of the four elasticity estimates. For low-education workers in Tijuana, the elasticity of wages with respect to enforcement is -0.307 and is significant at the 10% level. It is not surprising to find the largest effects of enforcement for low-education workers, as these workers appear to be the most likely to migrate. It is also sensible that the strongest effects are for Tijuana, which is the major crossing point for illegal immigrants over the sample period. That border enforcement is negatively correlated with wages in Mexican border cities is consistent with the idea that greater enforcement restricts immigration and increases the supply of labor in Mexican border cities, putting downward pressure on local wages.

Turning to robustness checks on the results, the magnitude of the long-run effect for Tijuana increases somewhat when additional lags on the regressors are added (though adding regressors also raises standard errors). We also experimented with including the real exchange rate as a regressor and examining results for other large Mexican border cities. Including the real exchange rate does not affect the results qualitatively. The other border cities we examine are Matamoros and Nuevo Laredo, which, over the sample period, were not primary points for illegal entry into the United States. Unsurprisingly, we find no significant correlation between border enforcement and Mexican wages in either city. We also analyzed the impact of border enforcement on the wages of high-education workers. Results for these regressions are given in Appendix Table A4. The long-run effect of border enforcement on wages is negative, but imprecisely estimated in all cases.

---

the entire sample period. So as not to reduce an already short time series, we exclude these variables from the analysis.

V. Discussion

In this paper, we examine the correlation between enforcement of the U.S.-Mexico border and wages in U.S. and Mexican border regions. For high-immigrant industries in California and Texas, we find a positive long-run impact of border enforcement on wages for one industry only, lumber, and even in this case the magnitude on the impact is quite small. We find no positive effects whatsoever for low-education males in the border regions of either state. For Mexico, the impact of U.S. border enforcement is larger. We find a moderate negative impact of border enforcement on wages for males with primary education in Tijuana, which is where a large fraction of attempts at illegal entry occur over the sample period.

Our results are consistent with two alternative hypotheses. One is that border enforcement has a minimal impact on illegal immigration. In this case, it would still be possible that illegal immigration puts downward pressure on wages in U.S. border regions, but, since border enforcement does not impede illegal immigration, we would find no correlation between enforcement and wages in U.S. border regions. We find this interpretation implausible. That wages in Tijuana decline following increases in border enforcement suggests that border enforcement does influence border labor markets, if only in Mexico and not the United States. Additionally, there is abundant evidence that when border enforcement increases at one part of the border, attempts at illegal entry, and hence apprehensions, increase along other parts of the border (see Figures 1 and 2). Substitution between border crossing sites indicates that at the margin prospective immigrants are deterred by higher levels of border enforcement (Bean et al. 1994).

Graphic illustrations of this fact are in unfortunate abundance. Following recent increases in border enforcement at the traditional crossing points of San Diego, El Centro, and El Paso, more immigrants have attempted to enter the United States by crossing the Sonoran desert into Arizona. There has been a corresponding surge in deaths among those attempting illegal entry.

A second interpretation of our results is that border enforcement does deter illegal immigrants but that illegal immigration has a minimal impact on labor markets in U.S. border regions. We believe this to be the more defensible conclusion. There are two ways in which border regions may adjust to influxes of illegal immigrants without large changes in wages. The first is that, given an immigrant influx, U.S. natives may leave border regions or be deterred from moving to border regions. Filer (1992) and Borjas, Freeman, and Katz (1997) provide evidence in support of this view. The second is that border economies over time may shift towards industries that are relatively intensive in the use of the skills of arriving immigrants. Hanson and Slaughter (2000) find evidence in support of this view for California.

Border enforcement remains the centerpiece of U.S. policy on illegal immigration. The costs and benefits of this strategy are currently the subject of intense debate. The results in this paper suggest that concerns about the wage impact of illegal immigration have been exaggerated. While our results do not imply that eliminating border enforcement would leave labor markets in U.S. border areas unaffected, over the range of values for which we observe variation in border enforcement we detect no benefits for U.S. border communities in terms of higher wages.

References

Altonji, Joseph G., and David E. Card, "The Effects of Immigration on the Labor Market Outcomes of Less-Skilled Natives." In John M. Abowd, and Richard B. Freeman (Eds.), *Immigration, Trade, and the Labor Market*. (Chicago: University of Chicago Press, 1991), 201-59.

Bean, Frank D., B. Lindsay Lowell, and Lowell J. Taylor, "Undocumented Mexican Immigrants and the Earnings of Other Workers in the United States," *Demography* 25 (February 1988), 35-52.

Bean, Frank D., Thomas J. Espenshade, Michael J. White, and Robert F. Dymowski, "Post-IRCA Changes in the Volume and Composition of Undocumented Migration to the United States: An Assessment Based on Apprehensions Data," in Frank D. Bean, Barry Edmonston, and Jeffrey S. Passel (Eds.), *Undocumented migration to the United States: IRCA and the experience of the 1980's*. (Washington, DC: The Urban Institute, 1990), 111-58.

Bean, Frank D., Roland Chanove, Robert G. Cushing, Rodolfo de la Garza, Gary P. Freeman, Charles W. Haynes, and David Spener, "Illegal Mexican Migration and the United States/Mexico Border: The Effects of Operation Hold the Line on El Paso/Juarez," U.S. Commission on Immigration Reform Research Paper (July 1994).

Blanchard, Olivier, and Lawrence F. Katz, "Regional Evolutions," *Brookings Papers on Economic Activity* 1 (1992), 1-61.

Borjas, George J., "Immigrants, Minorities, and Labor Market Competition," *Industrial and Labor Relations Review* 40 (April 1987), 382-392.

Borjas, George J., "The Economics of Immigration," *Journal of Economic Literature* 32(4) (December 1994), 1667-1717.

Borjas, George J., Richard B. Freeman, and Lawrence F. Katz, "On the Labor Market Effects of Immigration and Trade." In George J. Borjas and Richard B. Freeman (Eds.), *Immigration and the Work Force*. (Chicago: University of Chicago Press, 1992), 213-44.

Borjas, George J., Richard B. Freeman, and Lawrence F. Katz, "How Much do Immigration and Trade Affect Labor Market Outcomes?" *Brookings Papers on Economic Activity* 1 (1997), 1-67.

Borjas, George J., Richard B. Freeman, and Kevin Lang, "Undocumented Mexican-Born Workers in the United States: How Many, How Permanent?" in John M. Abowd, and Richard B. Freeman (Eds.), *Immigration, Trade, and the Labor Market*. (University of Chicago Press, 1991) 77-100.

Borjas, George J., and Lynette Hilton, "Immigration and the Welfare State: Immigrant Participation in Means-Tested Entitlement Programs," *Quarterly Journal of Economics* 106 (1996), 575-604.

Bustamante, Jorge, "Undocumented Migration from Mexico to the United States: Preliminary Findings of the Zapata Canyon Project," in Frank D. Bean, Barry Edmonston, and Jeffrey S. Passel (Eds.), *Undocumented migration to the United States: IRCA and the experience of the 1980's*. (Washington, DC: The Urban Institute, 1990), 211-226.

Card, David E., "Immigrant Inflows, Native Outflows, and the Local Labor Market Impacts of Higher Immigration," NBER Working Paper No. 5927 (February 1997).

Cornelius, Wayne A., "From Sojourners to Settlers: The Changing Profile of Mexican Immigration to the United States," in Jorge A. Bustamente, Clark W. Reynolds, and Raul A. Hinojosa (Eds.), *U.S.-Mexico Relations: Labor-market Interdependence*. (Stanford University Press, 1992), 155-95.

Donato, Katherine M., Jorge Durand, and Douglas S. Massey, "Stemming the Tide? Assessing the Deterrent Effects of U.S. Immigration and Control," *Demography* 29(2) (May 1992), 139-57.

Donato, Katherine M., and Douglas S. Massey, "Mexican Migration to the United States: A Critical Review," *Latin American Research Review* 27 (1992), 3-43.

Espenshade, Thomas J., "Does the Threat of Border Apprehension Deter Undocumented U.S. Immigration?" *Population and Development Review* 20(4) (December 1994), 871-91.

Espenshade, Thomas J., "Unauthorized Immigration to the United States," *Annual Review of Sociology* 21 (1995), 195-216.

Filer, Randall K., "The Effect of Immigrant Arrivals on Migratory Patterns of Native Workers" in George J. Borjas, and Richard B. Freeman (Eds.), *Immigration and the Work Force*. (Chicago: University of Chicago Press, 1992).

Friedberg, Rachel M., and Hunt, Jennifer, "The Impact of Immigrants on Host-Country Wages, Employment, and Growth," *Journal of Economic Perspectives* 9(2) (Spring 1995), 23-44.

Godfrey, Leslie G., "Testing for Serial Correlation by Variable Addition in Dynamic Models Estimated by Instrumental Variables," *The Review of Economics and Statistics* 76 (August 1994) 550-59.

Grossman, Jean B., "The Substitutability of Natives and Immigrants in Production," *Review of Economics and Statistics* 54 (November 1982), 596-603.

Hamilton, James D., *Time Series Analysis* (Princeton, NJ: Princeton University Press, 1994).

Hanson, Gordon H., and Antonio Spilimbergo, "Illegal Immigration, Border Enforcement, and

Relative Wages: Evidence from Apprehensions at the U.S.-Mexico Border," *American Economic Review* 89(5) (December 1999), 1337-57.

Hanson, Gordon H., and Matthew J. Slaughter "Labor-Market Adjustment in Open Economies: Evidence from U.S. States," mimeo (University of Michigan, 2000).

Katz, Lawrence F., and Kevin M. Murphy., "Changes in Relative Wages, 1963-1987: Supply and Demand Factors." *Quarterly Journal of Economics* 107 (February 1992), 35-78.

LaLonde, Robert J., and Robert H. Topel, "Labor Market Adjustments to Increased Immigration" in John M. Abowd, and Richard B. Freeman (Eds.), *Immigration, Trade, and the Labor Market* (Chicago: University of Chicago Press, 1991), 167-99.

Levy, Frank, and Richard J. Murnane, "U.S. Earnings Levels and Earnings Inequality: A Review of Recent Trends and Proposed Explanations," *Journal of Economic Literature* 30 (September 1992), 1333-82.

Mexico-United States Binational Migration Study, *Migration Between Mexico and the United States, Volumes 1, 2, and 3*. (Washington, D.C.: U.S. Commission on Immigration Reform and Mexican Ministry of Foreign Affairs, 1998).

Orrenius, Pia, "The Role of Income Shocks on Migration Behavior and Migrant Self-Selection: The Case of Return Migrants from Mexico, 1970-1988," mimeo (UCLA, 1987).

Robertson, Raymond, "Wage Shocks and North American Labor Market Integration." forthcoming, *American Economic Review* 90(4) (September 2000), 742-764.

Schoeni, Robert F, "The Effect of Immigrants on the Employment of Wages of Native Workers: Evidence from the 1970s and 1980s," mimeo (RAND, 1997).

Topel, Robert H., "Local Labor Markets," *Journal of Political Economy* 94 (June 1986), S111-43.

U.S. Immigration and Naturalization Service, Department of Justice. *1994 Statistical Yearbook of the Immigration and Naturalization Service*. (Washington:U.S. Government Printing Office, 1996).

Van Hook, Jennifer, and Frank D. Bean. “Estimating Unauthorized Mexican Migration in the United States,” in Mexico-United States Binational Migration Study (1998), 511-50.

Warren, Robert, "Estimates of the Undocumented Immigrant Population Residing in the United States, by Country of Origin and State of Residence: October 1992." (Washington, D.C.: U.S. Immigration and Naturalization Service, Department of Justice, 1995).

Table 1a: Mexican-born Shares of Industry Employment by Year and Region, Recent Arrivals

	California				Texas				Rest of U.S.	
Industry	Border		Entire State		Border		Entire State			
	80	90	80	90	80	90	80	90	80	90
Food	0.070	0.084	0.041	0.055	0.040	0.009	0.029	0.029	0.004	0.005
Textiles	0.129	0.132	0.105	0.117	0.033	0.027	0.023	0.015	0.000	0.001
Apparel	0.149	0.126	0.122	0.105	0.060	0.017	0.030	0.016	0.002	0.002
Lumber	0.104	0.131	0.029	0.057	0.018	0.046	0.018	0.020	0.001	0.001
Furn.	0.116	0.123	0.089	0.097	0.015	0.012	0.021	0.019	0.003	0.003
Constrn.	0.022	0.063	0.014	0.044	0.038	0.028	0.026	0.022	0.001	0.002
Restrnt.	0.047	0.078	0.008	0.058	0.008	0.020	0.005	0.017	0.000	0.006
Ret.	0.012	0.026	0.030	0.019	0.019	0.009	0.014	0.006	0.001	0.001

Table 1b: Mexican-born Shares of Industry Employment by Year and Region, All Mexican Born

	California				Texas				Rest of U.S.	
Industry	Border		Entire State		Border		Entire State			
	80	90	80	90	80	90	80	90	80	90
Food	0.237	0.325	0.167	0.261	0.157	0.208	0.089	0.194	0.010	0.025
Textiles	0.413	0.470	0.352	0.386	0.150	0.273	0.097	0.183	0.002	0.006
Apparel	0.403	0.416	0.335	0.354	0.295	0.448	0.153	0.285	0.005	0.008
Lumber	0.238	0.388	0.087	0.178	0.109	0.207	0.074	0.136	0.003	0.006
Furn.	0.411	0.444	0.320	0.354	0.103	0.148	0.069	0.122	0.007	0.011
Constrn.	0.085	0.180	0.055	0.131	0.112	0.199	0.072	0.138	0.003	0.008
Restrnt.	0.111	0.235	0.073	0.173	0.044	0.119	0.026	0.095	0.002	0.011
Ret. Trd.	0.049	0.106	0.034	0.077	0.069	0.072	0.043	0.047	0.003	0.004

Source: Authors' calculations using data are from the 1980 and 1990 1% Public Use Micro Samples of the *U.S. Population and Housing Census*. Figures shown are the share of regional industry workers who are Mexican immigrants. Recent arrivals are those who immigrated within the five-year period preceding the census date. The Rest of the U.S. is all U.S. states except California and Texas. Individuals whose usual hours of weekly work are less than 10 or whose usual weekly earnings are less than $1 are excluded from the sample. Industries shown are food products, textiles, apparel, lumber, furniture, construction, restaurants/lodging, and retail trade.

Table 2: Summary Statistics
(a) Selected Variables for Wage Regressions in U.S. Border Regions

Variable Name	Variable Definition	Mean	Std.Error
California Wage-HS Dropout	Age-adjusted mean wage for male high-school dropouts in southern California MSAs.	4.896	0.223
California Wage-HS Graduate	Age-adjusted mean wage for male high-school graduates in southern California MSAs.	5.237	0.142
Texas Wage-HS Dropout	Age-adjusted mean wage for male high-school dropouts in southwestern Texas MSAs.	4.712	0.171
Texas Wage-HS Graduate	Age-adjusted mean wage for male high-school graduates in southwestern Texas MSAs.	5.051	0.129
US Wage-HS Dropout	Age-adjusted mean wage for male high-school dropouts in U.S., excluding California and Texas.	4.815	0.139
US Wage-HS Graduate	Age-adjusted mean wage for male high-school graduates in U.S., excluding California and Texas.	5.128	0.095
Mexico Wage	Average hourly real wage for production workers in manufacturing industries.	-0.056	0.108
Border Enforcement-California	Enforcement hours by U.S. Border Patrol in California Border Patrol sectors.	11.188	0.179
Border Enforcement-Texas	Enforcement hours by U.S. Border Patrol in Texas Border Patrol sectors.	11.563	0.182
Congr. Election	Months until a U.S. congressional election	12.345	7.119
User fee	U.S. custom user fee (% of import value)	0.164	0.016
Boat arrivals	Los Angeles/Long Beach boat arrivals	536.7	69.1
Canadian Travelers	U.S. travelers to and from Canada (in millions of travelers)	8.853	2.493
Drug seizures	Value of INS drug seizures (US$ millions)	16.44	0.519

All figures are in logs and at a monthly frequency for January, 1986 to May, 1995. For expositional ease, we exclude summary statistics on log wages for the food products, textiles, apparel, lumber, and furniture industries in California, Texas, and the rest of the United States (which are shown in Figures 3 and 4).

Table 2: Continued
(b) Selected Variables for Wage Regressions in Mexico Border Cities

Variable Name	Variable Definition	Mean	Std.Error
Cd. Juarez Wage-Primary	Age-adjusted mean wage for males in Cd. Juarez with primary (0-6 years) education.	1.467	0.103
Cd. Juarez Wage-Secondary	Age-adjusted mean wage for males in Cd. Juarez with secondary (7-11 years) education.	1.641	0.099
Tijuana Wage-Primary	Age-adjusted mean wage for males in Tijuana with primary (0-6 years) education.	1.776	0.132
Tijuana Wage-Secondary	Age-adjusted mean wage for males in Tijuana with secondary (7-11 years) education.	1.927	0.112
Mexico Wage-Primary	Age-adjusted mean wage for males in Mexico interior cities with primary (0-6 years) education.	1.278	0.088
Mexico Wage-Secondary	Age-adjusted mean wage for males in Mexico interior cities with secondary (7-11 years) education.	1.467	0.075
Border Enforcement-Tijuana	Enforcement hours by U.S. Border Patrol in San Diego sector.	12.065	0.272
Border Enforcement-Cd. Juarez	Enforcement hours by U.S. Border Patrol in El Paso sector.	11.580	0.297

All figures are in logs at a quarterly frequency for the first quarter, 1987 through the fourth quarter, 1997.

Table 3: Wage Regressions for Immigrant-Intensive Industries in California

Industry	Food Prod.	Textiles	Apparel	Lumber	Furniture
OLS Regressions					
Long term effect of enforcement	0.002	0.070	-0.033	0.024	-0.041
(standard deviation)	(0.038)	(0.065)	(0.029)	(0.019)	(0.054)
F-test on enforcement	0.000	1.094	0.350	1.431	0.171
(p-value)	(0.986)	(0.297)	(0.555)	(0.233)	(0.680)
Box-Ljung test	8.773	6.485	10.716	7.494	2.466
(p-value)	(0.187)	(0.371)	(0.098)	(0.278)	(0.872)
IV Regressions					
Long term effect of enforcement	-0.047	0.017	-0.016	0.088	-0.112
(standard deviation)	(0.065)	(0.085)	(0.053)	(0.027)	(0.096)
F-test on enforcement	0.440	0.039	0.081	8.800	2.678
(p-value)	(0.508)	(0.843)	(0.777)	(0.003)	(0.104)
F-test on instruments (first-stage regression)	2.399	2.050	1.996	1.952	2.972
(p-value)	(0.004)	(0.023)	(0.019)	(0.032)	(0.000)
Chi squared-test on over-identifying restrictions	13.146	6.281	11.874	3.826	4.544
(p-value)	(0.437)	(0.791)	(0.538)	(0.955)	(0.984)
Box-Ljung test	7.455	8.454	10.959	7.403	16.897
(p-value)	(0.281)	(0.207)	(0.090)	(0.285)	(0.010)

Observations are monthly for March, 1980 to September, 1996, for a total of 199. Complete results are in Appendix Tables A1 and A2. The industry wage (the dependent variable) is log real average hourly wages for production workers in California. Border enforcement is log officer hours by the U.S. Border Patrol in sectors along the California-Mexico border. The exogenous regressors are log real U.S. industry wages, log real wages for production workers in Mexican manufacturing, the state unemployment rate, a time trend, and monthly dummy variables. All specifications include as regressors two lags on the dependent and independent variables. The top panel reports OLS results and the bottom panel reports IV results, both with Huber-White standard errors. The long-run effect is the estimated long-run elasticity of state wages with respect to border enforcement (sum of coefficients on enforcement/(1-sum of coefficient coefficients on lagged wages)). The standard deviation of the long-term effect is calculated using the delta method. See the text for the list of instruments. The F-test on the instruments is for the null hypothesis that the instruments are jointly zero in the first-stage regression. The F-test statistic on long-term effect is for the null that the sum of coefficients on border enforcement is zero. The F-test for over-identifying restrictions is for the null that the error term from an IV regression is uncorrelated with the instruments (Newey 1985). The Box-Ljung statistic is for a chi-squared test with the null that the residuals are not serially correlated up to six lags (Ljung and Box 1978).

Table 4: Wage Regressions for Immigrant-Intensive Industries in Texas

Industry	Food Prod.	Textiles	Apparel	Lumber	Furniture
OLS Regressions					
Long term effect of enforcement	0.044	-0.054	0.072	0.080	0.068
(standard deviation)	(0.051)	(0.066)	(0.151)	(0.038)	(0.061)
F-test on enforcement	0.783	0.008	0.130	0.084	1.055
(p-value)	(0.377)	(0.930)	(0.718)	(0.773)	(0.306)
Box-Ljung test	6.421	6.432	10.423	1.740	3.949
(p-value)	(0.378)	(0.377)	(0.108)	(0.942)	(0.684)
IV Regressions					
Long term effect of enforcement	-0.007	0.001	0.198	0.131	0.075
(standard deviation)	(0.058)	(0.135)	(0.394)	(0.061)	(0.116)
F-test on enforcement	0.014	0.000	0.352	2.786	0.394
(p-value)	(0.908)	(0.995)	(0.554)	(0.097)	(0.531)
F-test on instruments (first-stage regression)	1.950	3.799	4.660	3.415	3.101
(p-value)	(0.032)	(0.000)	(0.000)	(0.000)	(0.000)
Chi squared-test on over-identifying restrictions	4.298	7.855	10.755	12.972	15.991
(p-value)	(0.933)	(0.853)	(0.631)	(0.450)	(0.250)
Box-Ljung test	7.919	9.560	9.188	3.202	5.965
(p-value)	(0.244)	(0.144)	(0.163)	(0.783)	(0.427)

Observations are monthly for March, 1980 to September, 1996, for a total of 199. The industry wage, which is the dependent variable, is the log real average hourly wage for production workers in Texas. Border enforcement is log officer hours by the U.S. Border Patrol in sectors along the Texas-Mexico border. See notes to Table 3 for further details on the regressors and the estimation method.

Table 5a: Wage Regressions for Low-Education Workers in California and Texas (Border Areas)

Border Area	California	California	Texas	Texas
OLS Regressions	HS Dropouts	HS Graduates	HS Dropouts	HS Grad.
Long term effect of enforcement	-0.042	0.000	0.031	0.071
(standard deviation)	(0.174)	(0.056)	(0.104)	(0.061)
F-test on enforcement	1.135	2.778	0.045	0.506
(p-value)	(0.290)	(0.099)	(0.833)	(0.479)
Box-Ljung test	3.812	4.626	2.856	2.690
(p-value)	(0.702)	(0.593)	(0.827)	(0.847)
IV Regressions				
Long term effect of enforcement	-0.043	-0.039	0.132	0.130
(standard deviation)	(0.262)	(0.085)	(0.124)	(0.090)
F-test on enforcement	0.027	0.219	1.065	1.985
(p-value)	(0.869)	(0.641)	(0.305)	(0.163)
F-test on instruments (first regression)	1.825	2.028	2.903	2.437
(p-value)	(0.048)	(0.025)	(0.001)	(0.010)
Chi squared-test on over-identifying restrictions	14.740	7.746	12.298	7.684
(p-value)	(0.324)	(0.860)	(0.503)	(0.660)
Box-Ljung test	3.093	5.576	6.982	3.241
(p-value)	(0.797)	(0.472)	(0.322)	(0.778)

Observations are monthly for March, 1986 to May, 1995, for a total of 111. The state wage is the age-adjusted mean wage for males in a given education group in the border region of a given state (see text for details on the construction of age-adjusted mean wages). Border enforcement is log officer hours by the U.S. Border Patrol in sectors along the California-Mexico or Texas-Mexico border. The exogenous regressors are the log real wage for the given education group in the United States as a whole, the log real wage for production workers in manufacturing industries in Mexico, the state unemployment rate, a time trend, and monthly dummy variables. All specifications include as regressors two lags on the dependent and independent variables. See notes to Table 3 for further details on the estimation method, the instruments used in IV regressions, and the reported test statistics.

Table 5b: Wage Regressions for Low-Education Workers in California and Texas (Entire State)

State	California	California	Texas	Texas
OLS Regressions	HS Dropouts	HS Graduates	HS Dropouts	HS Grad.
Long term effect of enforcement	-0.041	-0.097	-0.035	0.069
(standard deviation)	(0.048)	(0.039)	(0.077)	(0.039)
F-test on enforcement	0.003	3.586	0.733	5.577
(p-value)	(0.956)	(0.060)	(0.393)	(0.019)
Box-Ljung test	9.976	23.436	5.308	11.325
(p-value)	(0.126)	(0.001)	(0.505)	(0.079)
IV Regressions				
Long term effect of enforcement	-0.246	-0.161	-0.056	0.025
(standard deviation)	(0.095)	(0.071)	(0.112)	(0.097)
F-test on enforcement	8.043	4.292	0.244	0.065
(p-value)	(0.005)	(0.040)	(0.622)	(0.799)
F-test on instruments (first regression)	1.934	1.905	3.662	5.262
(p-value)	(0.024)	(0.048)	(0.000)	(0.000)
Chi squared-test on over-identifying restrictions	2.018	7.583	24.936	6.589
(p-value)	(1.000)	(0.475)	(0.024)	(0.582)
Box-Ljung test	4.048	10.944	6.389	13.179
(p-value)	(0.670)	(0.090)	(0.381)	(0.040)

Observations are monthly for March, 1980 to June, 1996, for a total of 196. The state wage is the age-adjusted mean wage for males in a given education group in a given state (see text for details on the construction of age-adjusted mean wages). Border enforcement is log officer hours by the U.S. Border Patrol in sectors along the California-Mexico or Texas-Mexico border. The regressors are the log real wage for the given education group in the United States as a whole, the log real wage for production workers in manufacturing industries in Mexico, the state unemployment rate, a time trend, and monthly dummy variables. All specifications include as regressors two lags on the dependent and independent variables. See notes to Table 3 for further details on the estimation method, the instruments used in IV regressions, and the reported test statistics.

Table 6: Wage Regressions for Low-Education Workers in Mexican Border Cities

City	Tijuana	Tijuana	Ciudad Juarez	Ciudad Juarez
OLS Regressions	0-6 Years	7-11 years	0-6 Years	7-11 years
Long term effect of enforcement	-0.347	-0.228	-0.455	-0.023
(standard deviation)	(0.129)	(0.125)	(0.538)	(0.116)
F-test on enforcement	4.984	2.741	2.454	0.044
(p-value)	(0.033)	(0.108)	(0.128)	(0.835)
Box-Ljung test	0.831	3.244	3.522	3.968
(p-value)	(0.991)	(0.778)	(0.741)	(0.681)
IV Regressions				
Long term effect of enforcement	-0.307	-0.152	-0.051	-0.084
(standard deviation)	(0.157)	(0.131)	(0.223)	(0.204)
F-test on enforcement	3.270	1.181	0.058	0.225
(p-value)	(0.081)	(0.286)	(0.811)	(0.638)
F-test on instruments (first regression)	7.414	4.895	2.718	2.301
(p-value)	(0.000)	(0.001)	(0.023)	(0.050)
Chi squared-test on over-identifying restrictions	2.732	0.968	4.439	5.967
(p-value)	(0.842)	(0.987)	(0.925)	(0.651)
Box-Ljung test	3.039	10.813	11.452	4.260
(p-value)	(0.804)	(0.094)	(0.075)	(0.642)

Observations are quarterly from 1987:1 to 1997:4, for a total of 43. The wage is the age-adjusted mean wage for males in a given education group in a given city. Border enforcement is log officer hours by the U.S. Border Patrol in sectors along the U.S.-Mexico border that correspond to each Mexican border city. The exogenous regressors are log real industry wages in interior Mexican cities, log real wages for U.S. workers in the corresponding education group, a time trend, and quarterly dummy variables. All specifications include as regressors one lag on the dependent and independent variables. The top panel reports OLS results and the bottom panel reports IV results, both with Huber-White standard errors. The long-run effect is the estimated long-run elasticity of state wages with respect to border enforcement. See the text for the list of instruments. See notes to Table 3 for additional details on the estimation method and the reported test statistics.

Table A1: OLS Wage Regressions for High-Immigrant Industries in California

Industry	Food Prod.	Textiles	Apparel	Lumber	Furniture
Industry wage (t-1)	0.707	0.707	0.704	0.905	0.691
	(0.079)	(0.078)	(0.088)	(0.069)	(0.068)
Industry wage (t-2)	0.178	0.170	0.114	-0.123	0.209
	(0.088)	(0.076)	(0.084)	(0.064)	(0.076)
Mexican Wage (t)	0.006	0.017	-0.025	0.020	0.045
	(0.015)	(0.037)	(0.019)	(0.020)	(0.026)
Mexican Wage (t-1)	-0.007	0.015	0.018	-0.034	-0.021
	(0.019)	(0.043)	(0.024)	(0.027)	(0.026)
Mexican Wage (t-2)	-0.010	-0.037	0.016	0.029	-0.016
	(0.019)	(0.036)	(0.021)	(0.017)	(0.020)
U.S. Wage (t)	0.791	0.108	0.399	0.678	0.986
	(0.154)	(0.250)	(0.138)	(0.106)	(0.167)
U.S. Wage (t-1)	-0.465	-0.379	-0.235	-0.489	-0.387
	(0.185)	(0.412)	(0.203)	(0.173)	(0.238)
U.S. Wage (t-2)	-0.248	0.280	0.016	0.009	-0.472
	(0.161)	(0.293)	(0.143)	(0.128)	(0.174)
Enforcement (t)	0.000	-0.011	-0.014	-0.006	0.001
	(0.008)	(0.019)	(0.014)	(0.009)	(0.014)
Enforcement (t-1)	0.011	0.048	-0.012	0.004	0.010
	(0.013)	(0.024)	(0.016)	(0.013)	(0.017)
Enforcement (t-2)	-0.011	-0.028	0.020	0.007	-0.015
	(0.009)	(0.020)	(0.012)	(0.011)	(0.014)
State unemployment (t)	0.001	0.009	-0.001	-0.004	-0.002
	(0.004)	(0.007)	(0.005)	(0.003)	(0.005)
State unemployment (t-1)	-0.002	-0.004	-0.003	0.012	0.011
	(0.005)	(0.012)	(0.008)	(0.005)	(0.008)
State unemployment (t-2)	0.002	-0.006	0.003	-0.007	-0.010
	(0.003)	(0.007)	(0.004)	(0.003)	(0.005)
time	-0.001	-0.002	0.000	-0.002	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)
Obs	199	199	199	199	199
Adjusted R-squared	0.98	0.96	0.98	0.99	0.94

See notes to Table 3 for details on the estimation. The regressions also include monthly dummies, a constant, and a time trend. Huber-White standard errors are in parentheses.

Table A2: IV Wage Regressions for High-Immigrant Industries in California

Industry	Food Prod.	Textiles	Apparel	Lumber	Furniture
Industry wage (t-1)	0.703	0.690	0.722	0.875	0.635
	(0.081)	(0.092)	(0.097)	(0.096)	(0.088)
Industry wage (t-2)	0.179	0.188	0.103	-0.140	0.257
	(0.092)	(0.088)	(0.097)	(0.087)	(0.094)
Mexican Wage (t)	0.014	-0.004	-0.022	0.026	0.057
	(0.020)	(0.039)	(0.020)	(0.023)	(0.029)
Mexican Wage (t-1)	-0.015	0.032	0.017	-0.030	-0.034
	(0.026)	(0.053)	(0.025)	(0.030)	(0.029)
Mexican Wage (t-2)	-0.009	-0.039	0.015	0.027	-0.014
	(0.022)	(0.040)	(0.022)	(0.021)	(0.024)
U.S. Wage (t)	0.889	-0.109	0.366	0.648	1.195
	(0.218)	(0.345)	(0.143)	(0.125)	(0.215)
U.S. Wage (t-1)	-0.555	-0.106	-0.206	-0.508	-0.527
	(0.247)	(0.540)	(0.210)	(0.190)	(0.259)
U.S. Wage (t-2)	-0.195	0.204	-0.004	0.051	-0.495
	(0.187)	(0.330)	(0.170)	(0.157)	(0.233)
Enforcement (t)	-0.004	0.038	-0.032	-0.060	-0.082
	(0.039)	(0.067)	(0.038)	(0.042)	(0.047)
Enforcement (t-1)	0.060	-0.078	0.014	0.041	0.160
	(0.083)	(0.107)	(0.071)	(0.061)	(0.074)
Enforcement (t-2)	-0.062	0.042	0.015	0.042	-0.090
	(0.058)	(0.080)	(0.046)	(0.044)	(0.045)
Local unemployment (t)	0.000	0.009	-0.001	-0.003	-0.002
	(0.004)	(0.008)	(0.005)	(0.004)	(0.006)
Local unemployment (t-1)	-0.002	-0.005	-0.002	0.014	0.014
	(0.006)	(0.012)	(0.008)	(0.006)	(0.009)
Local unemployment (t-2)	0.002	-0.005	0.002	-0.009	-0.011
	(0.004)	(0.008)	(0.005)	(0.004)	(0.005)
time	0.000	-0.002	-0.001	-0.003	0.000
	(0.002)	(0.001)	(0.001)	(0.002)	(0.000)
Obs	199	199	199	199	199
Adjusted R-squared	0.98	0.95	0.98	0.99	0.91

See notes to Table 3 and A1 for details on the estimation.

Table A3: Wage Regressions for High-Education Workers in California and Texas

Border Areas	California	California	Texas	Texas
OLS Regressions	Some College	College Grads	Some College	College Grads
Long term effect of enforcement	0.146	0.031	-0.070	0.072
(standard deviation)	(0.057)	(0.052)	(0.084)	(0.058)
F-test on enforcement	1.078	0.624	0.779	0.014
(p-value)	(0.302)	(0.432)	(0.380)	(0.907)
IV Regressions				
Long term effect of enforcement	0.161	-0.024	0.029	0.118
(standard deviation)	(0.071)	(0.065)	(0.117)	(0.080)
F-test on enforcement	0.027	0.219	0.060	2.022
(p-value)	(0.869)	(0.641)	(0.807)	(0.159)
Entire State	California	California	Texas	Texas
OLS Regressions	Some College	College Grads	Some College	College Grads
Long term effect of enforcement	-0.014	-0.008	-0.064	0.055
(standard deviation)	(0.035)	(0.021)	(0.047)	(0.031)
F-test on enforcement	0.000	0.297	0.153	0.237
(p-value)	(1.000)	(0.586)	(0.696)	(0.627)
IV Regressions				
Long term effect of enforcement	-0.061	0.000	-0.064	-0.031
(standard deviation)	(0.057)	(0.030)	(0.047)	(0.065)
F-test on enforcement	1.137	0.000	0.175	0.224
(p-value)	(0.288)	(0.995)	(0.677)	(0.637)

This table reports wage regressions similar to those in Tables 5a and 5b, except that the dependent variable is now the age-adjusted mean wage for workers with either some college (13-15 years of schooling) or who are college graduates (16 plus years of schooling). See notes to Table 5a for details on the estimation for the Border Areas samples and notes to Table 5b for details on the Entire State samples.

Table A4: Wage Regressions for High-Education Workers in Mexican Border Cities

City	Tijuana	Tijuana	Ciudad Juarez	Ciudad Juarez
OLS Regressions	12-15 years	15+ years	12-15 years	15+ years
Long term effect	-0.174	-0.232	-0.045	-0.162
(standard deviation)	(0.168)	(0.210)	(0.124)	(0.137)
F-test on enforcement	1.330	1.091	0.138	1.557
(p-value)	(0.258)	(0.305)	(0.712)	(0.222)
Box-Ljung test	6.111	6.215	14.873	2.259
(p-value)	(0.411)	(0.400)	(0.021)	(0.894)
IV Regressions				
Long term effect	-0.213	-0.053	-0.167	-0.125
(standard deviation)	(0.182)	(0.281)	(0.174)	(0.200)
F-test on enforcement	2.025	0.036	1.019	0.417
(p-value)	(0.165)	(0.851)	(0.321)	(0.523)
F-test on instruments (first regression)	10.634	2.672	1.387	2.025
(p-value)	(0.000)	(0.030)	(0.250)	(0.081)
Chi squared-test on over-identifying restrictions	7.597	0.477	4.367	14.975
(p-value)	(0.269)	(0.998)	(0.823)	(0.060)
Box-Ljung test	5.977	7.303	8.514	2.622
(p-value)	(0.426)	(0.294)	(0.203)	(0.855)

This table reports wage regressions similar to those in Table 6, except that the dependent variable is now the age-adjusted mean wage for workers with either 12-15 years of schooling or 15 plus years of schooling in a given city. Other details of the estimation are identical to that described in the notes to Table 6.

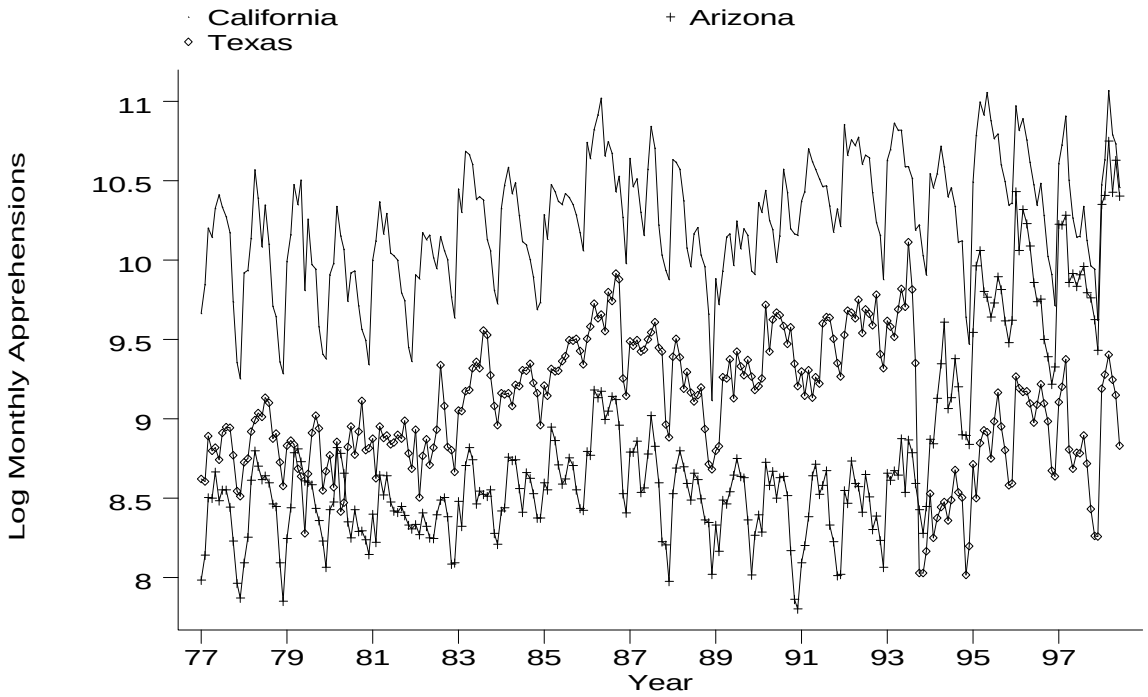

Figure 1: Border Patrol Apprehensions by Region

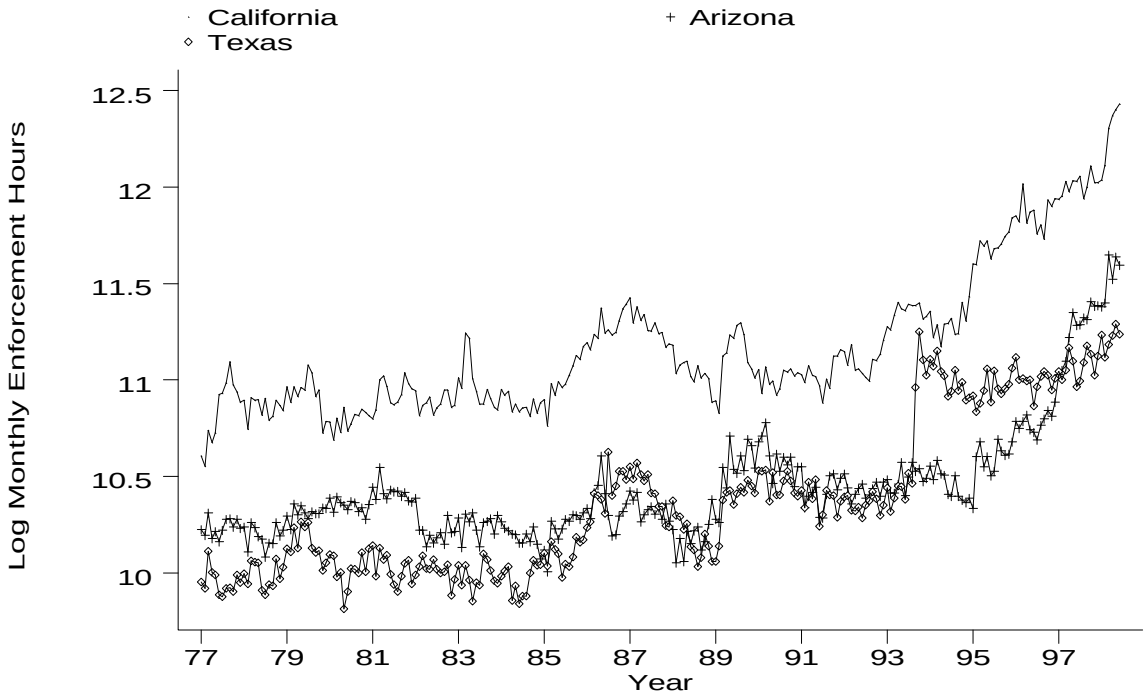

Figure 2: Border Patrol Enforcement by Region

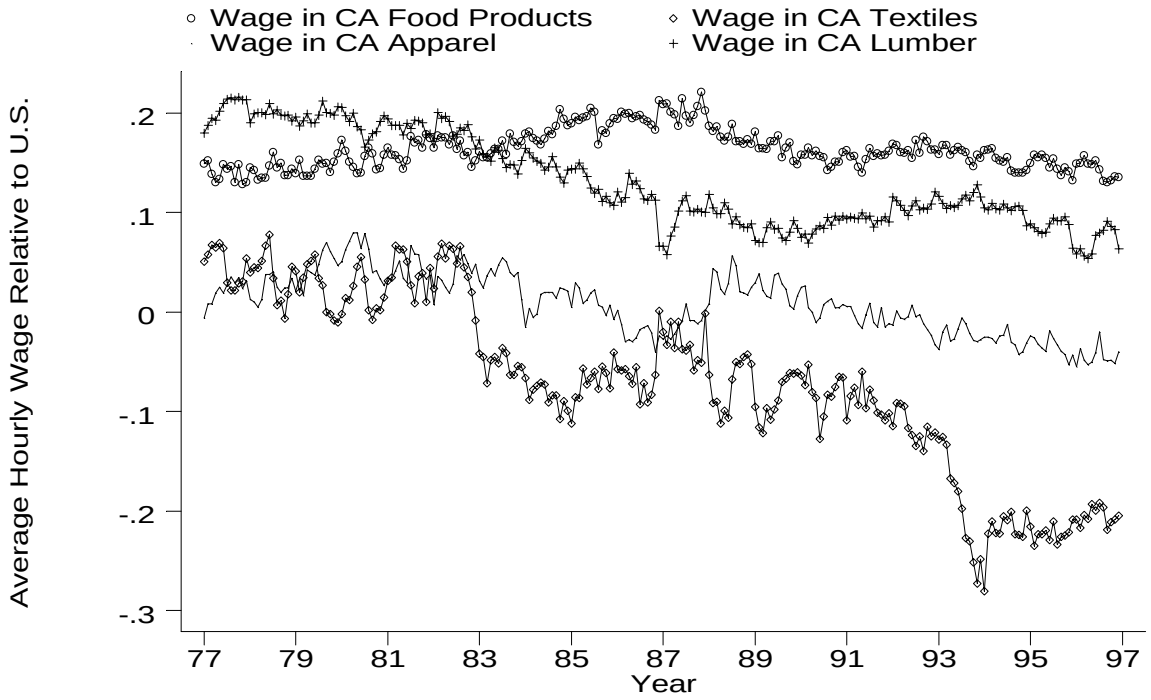

Figure 3: Wages in High-Immigrant California Industry

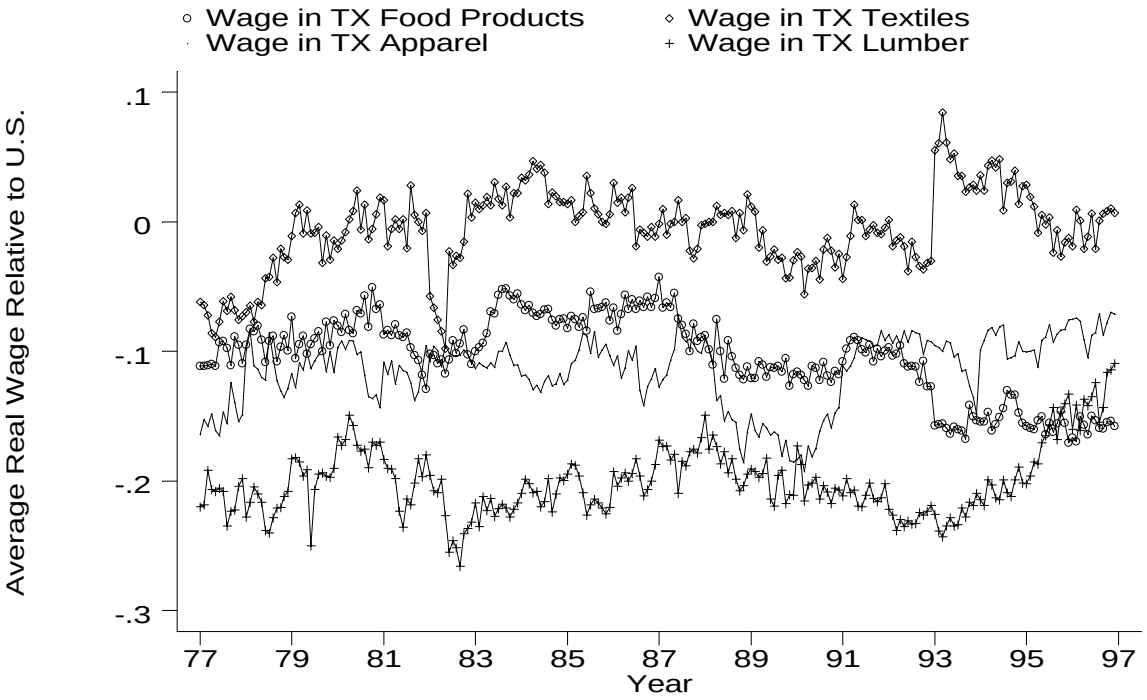

Figure 4: Wages in High-Immigrant Texas Industry

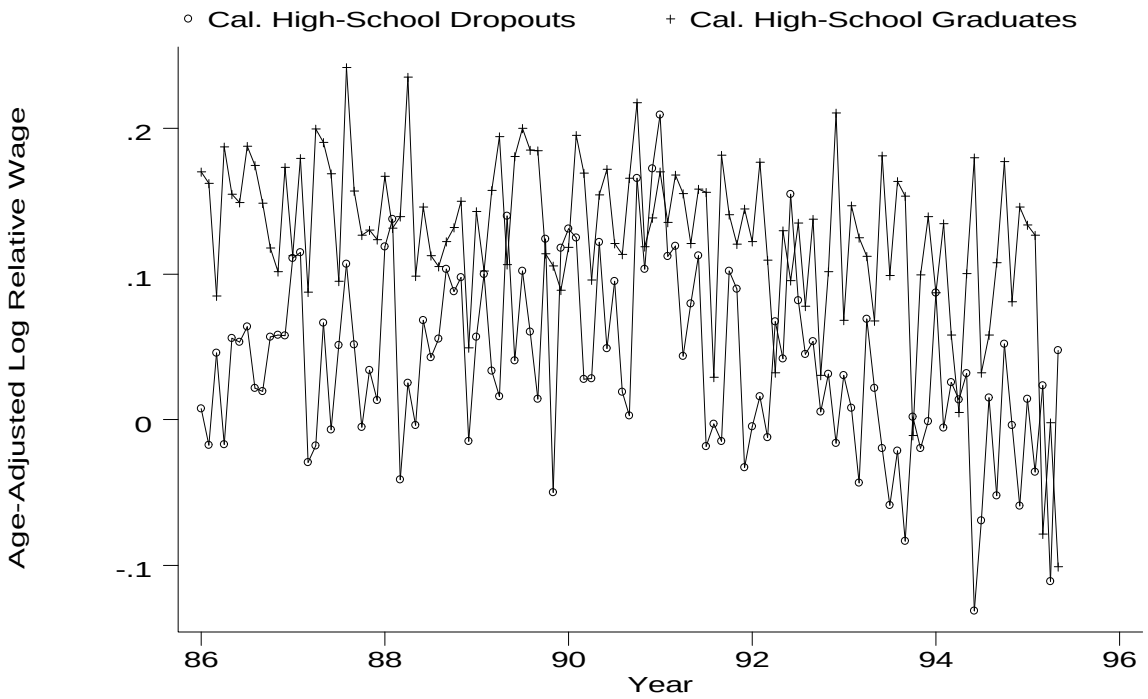

Figure 5: Border Region Wage Relative to US Wage

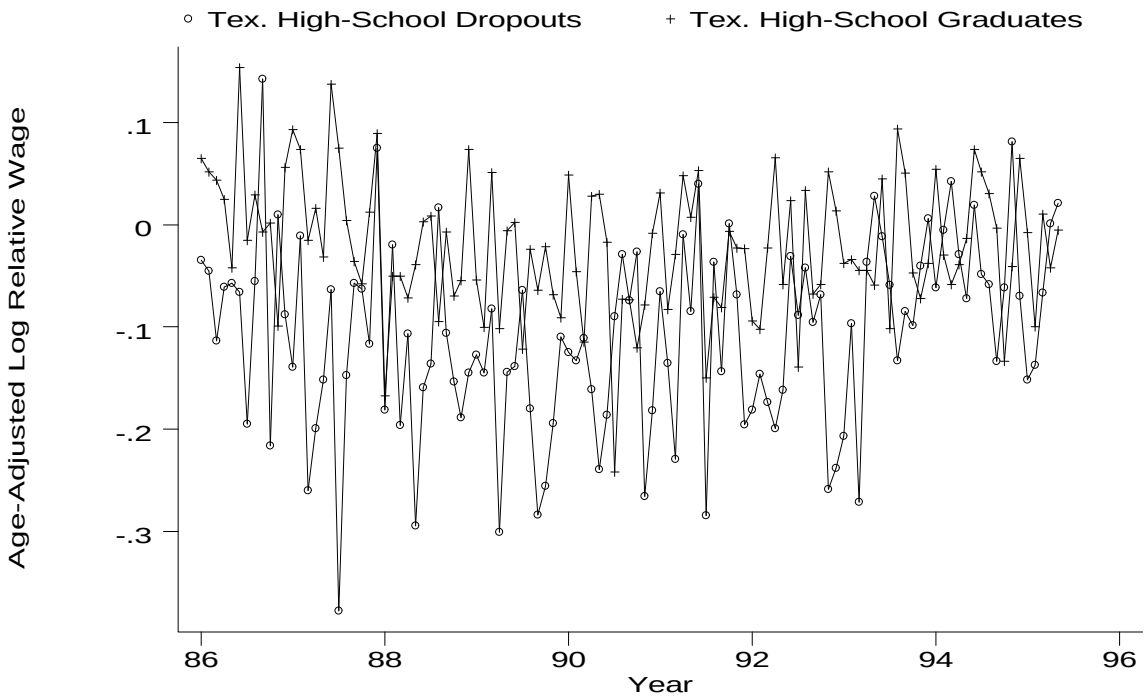

Figure 6: Border Region Wage Relative to US Wage

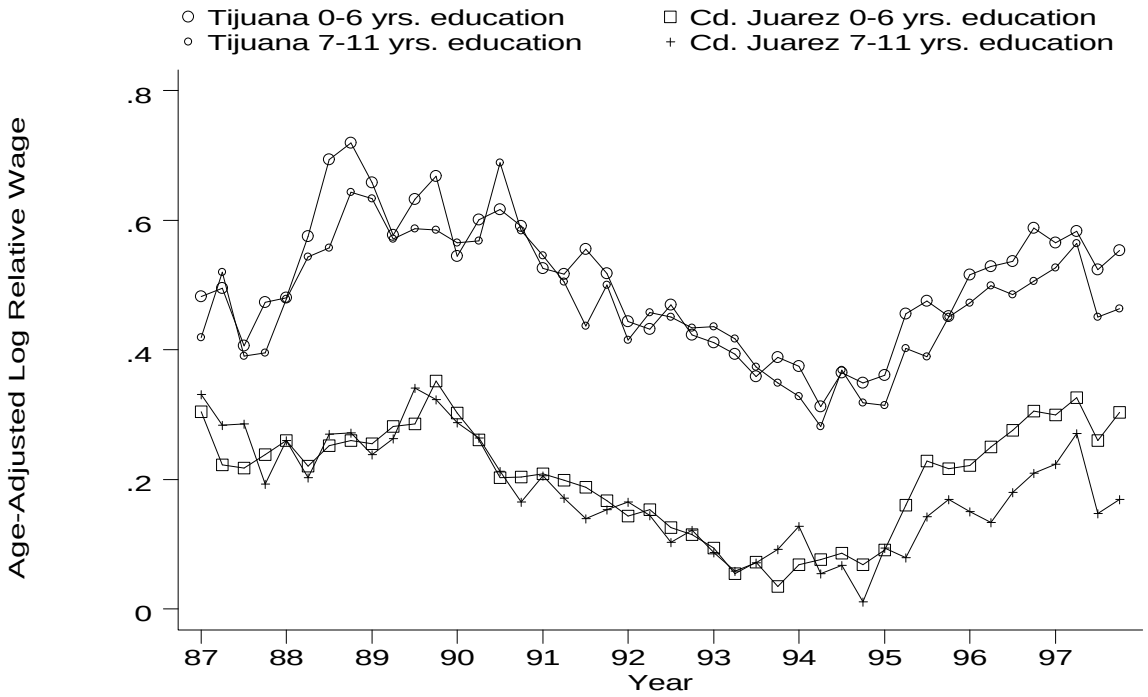

Figure 7: Border Wage Relative to Interior Mexico Wage