Immigration and Wage Dynamics: Evidence from the Mexican Peso Crisis

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Abstract

How does the US labor market absorb low-skilled immigration? I address this question using the 1995 Mexican Peso Crisis, an exogenous push factor that raised Mexican migration to the US. In the short run, high-immigration states see their low-skilled labor force increase and native low-skilled wages decrease, with an implied inverse local labor demand elasticity of at least -.7. Internal relocation dissipates this shock spatially. In the long run, the only lasting consequences are for low-skilled natives who entered the labor force in high-immigration years. A simple quantitative many-region model allows me to obtain the counterfactual local wage evolution absent the immigration shock.

Key Words: International and internal migration, local shocks, local labor demand elasticity.

JEL Classification: F22, J20, J30

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1 Introduction

Despite large inflows of immigrants into many OECD countries in the last 20 or 30 years, there is no consensus on the causal impact of immigration on labor market outcomes. Two reasons stand out. First, immigrants decide both where and when to migrate given the economic conditions in the source and host countries. Second, natives may respond by exiting the locations receiving these immigrants or reducing inflows to them. The combination of these two endogenous decisions makes it hard to estimate the causal effect of immigration on native labor market outcomes.

Various strategies have been employed to understand the consequences of immigration on labor markets. Altonji and Card (1991) and Card (2001) compare labor market outcomes or changes in labor market outcomes in response to local immigrant inflows across locations. To account for the endogenous sorting of migrants across locations, they use what has become known as the immigration networks instrument – past stocks of immigrants in particular locations are good predictors of future flows. They find that immigration has only limited effects on labor market outcomes in the cross-section or in ten-year first differences: a 1 percent higher share of immigrants is associated with a 0.1-0.2 percent wage decline.[1] Also doing an across-location comparison, Card (1990) reports that the large inflow of Cubans to Miami in 1980 (during the Mariel Boatlift) had a very limited effect on the Miami labor market when compared to four other unaffected metropolitan areas.[2]

In contrast to Altonji and Card (1991) and Card (2001), Borjas et al. (1997) argue that local labor markets are sufficiently well connected in the US that estimates of the effect of immigration on wages using spatial variation are likely to be downward-biased because workers relocate across space. Instead, Borjas (2003) suggests comparing labor market outcomes across education and experience groups, abstracting from geographic considerations. Using this methodology with US decennial Census data between 1960 and 1990, he reports significantly larger effects of immigration on wages. A 1 percent immigration-induced increase in the labor supply in an education-experience cell is associated with a 0.3-0.4 percent decrease in wages on average, and as much as 0.9 for the very least-skilled workers. This has been the main controversy in the immigration debate: whether we should look at local labor markets or should instead focus on the national market.

This paper builds on the previous literature to better understand the effects of immigrants on labor market outcomes, by using the exogenous push factor of the Mexican Peso Crisis of 1995 in conjunction with the migration networks instrument as my identification strategy. I show that the effect of immigration is large on impact for competing native workers – defined by skill and location groups – and that it quickly dissipates across space. My findings emphasize that in order to evaluate the labor market impacts of immigration, it is crucial to think about time horizons and the dynamics of adjustment. These results help to reconcile previous findings in the literature.

In December 1994, the government, led by Ernesto Zedillo, allowed greater flexibility of the peso vis à vis the dollar. This resulted in an attack on the peso that caused Mexico to abandon the peg. It was followed by an unanticipated economic crisis known as "the Peso Crisis" or the "Mexican Tequila Crisis" (Calvo and

[1] Altonji and Card (1991) estimates using first differences between 1970 and 1980 and instruments result in a significantly higher effect. The same exercise, using other decades, delivers lower estimates. See Table 7 in this paper, which uses differences between 1990 and 2000 and the same instrument Altonji and Card (1991) used.

[2] I discuss in detail the similarities and differences between this paper with Card (1990) in Section 3.2 and I provide a longer discussion in Appendix A.4. In a recent paper, Borjas (2015) has challenged the results in Card (1990). Borjas' findings are very much in line with the findings reported in this paper. Relative to Borjas (2015) I document the full path of adjustment to the unexpected inflow of Mexican workers, by documenting internal migration responses and by providing evidence on the longer-run effects.

Mendoza, 1996). Mexican GDP growth fell 11 percentage points, from a positive 6 percent in 1994 to a negative 5 percent in 1995. This occurred while US GDP maintained a fairly constant growth rate of around 5 percent.

This deep recession prompted many Mexicans to emigrate to the US. Precise estimates on net Mexican immigration are hard to obtain (see Passel (2005), Passel et al. (2012) or Hanson (2006)). Many Mexicans enter the US illegally, potentially escaping the count of US statistical agencies. However, as I show in detail in Section 2, all sources agree that 1995 was a high-immigration year.[3] As a result of the Mexican crisis, migration flows to the US were qt least 40 percent higher, with 200,000 to 300,000 more Mexicans immigrating in 1995 than in a typical year of the 1990s. I can thus use geographic, skill and time variation to see if workers more closely competing with these net Mexican inflows suffered more from the shock.[4]

The results are striking. I show that a 1 percent immigration-induced labor supply shock reduces low-skilled wages by at least .7 percent on impact. Soon after, wages return to their pre-shock trends. This is due to significant worker relocation across states. While in the first year the immigration shock increases the share of low-skilled workers almost one to one in high-immigration states, in around two years it goes back to trend.[5] This helps to understand why, while the effect on wages is large on impact, it quickly dissipates across states. By 1999, the fifth year after the shock, the wages of low-skilled workers in high-immigration states were only slightly lower than they were before the shock, relative to low-immigration states. Thus the US labor market for low-skilled workers adjusts to unexpected supply shocks quite rapidly.

Given that there are spillovers across states, I cannot use the natural experiment to investigate the longer-run effects of immigration on labor market outcomes. I take two avenues to try to shed some light on these longer-run effects. First, I show that, when abstracting from locations, the wage increase between 1990 and 2000 for workers who entered the low-skilled labor market in particularly high-immigration years during the 1990s is smaller than for those who entered in lower immigration years. This is in line with what Oreopoulos et al. (Forthcoming) document for college graduates who enter the labor market in bad economic years. This is in the spirit of Borjas (2003) regressions but using the Peso Crisis as a factor generating exogenous variation in immigration inflows. Second, I introduce a dynamic spatial equilibrium model and calibrate it to US data to simulate the evolution of wages at the local level had the Peso Crisis not occurred. The model also allows me to interpret my reduced form estimates as structural parameters. Its two key parameters are the local labor demand elasticity and the sensitivity of internal migration to local conditions. These, in turn, determine how much labor supply shocks are felt in wages and how fast these local shocks spread to the rest of the economy. In short, it helps to determine how long the long run is.

This paper contributes to two important literatures. First, it contributes to the understanding of the effects of low-skilled immigration in the US. Following the pioneering work by Card (1990) and Altonji and Card (1991), I use variation across local labor markets to estimate the effect of immigration. I extend their work by combining Card's immigration networks instrument with the Mexican Peso Crisis as a novel exogenous push factor that brought more Mexicans than expected to many – not just one as in Card (1990)

[3]Using data from the 2000 US Census, from the US Department of Homeland Security (documented immigrants), estimates of undocumented immigrants from the Immigration and Naturalization Service (INS) as reported in Hanson (2006), estimates from Passel et al. (2012) and apprehensions data from the INS, we see an unusual spike in the inflow of immigrants in 1995. I will discuss the numbers of immigration arrivals later in this paper.

[4]A similar instrumental strategy based on push factors and previous settlement patterns is used in Boustan (2010) study of the Black Migration. Also Foged and Peri (2013) use a similar strategy using negative political events in source countries.

[5]Over the 1990s the share of low-skilled workers in high-immigration states increased with immigration (Card et al., 2008). The relocation documented in this paper explains how unexpected labor supply shocks are absorbed into the national economy. Changes in the factor mix, absent unexpectedly large immigration-induced shocks, can be explained through technology adoption in Lewis (2012).

or Borjas (2015) – US local labor markets. This unexpectedly large inflow allows me to understand the timing and sequence of events in response to an immigration shock. When more immigrants enter specific local labor markets, wages decrease more than is suggested in either Card (2001) or Borjas (2003). This prompts net interstate labor relocation that leads the shock to dissipate across space. This explains why in the longer-run, as I document, the effect of immigration on wages is small across local labor markets but larger across age cohorts (Borjas, 2003). This paper adds to Borjas (2003) longer-run results an instrumental variable strategy based on the age distribution of the unexpected inflow of Mexican workers that resulted from the Mexican Peso Crisis.

Second, it contributes to the literature of spatial economics. A number of recent papers, using various strategies, have looked at the effects of negative shocks on local labor demand (see Autor et al. (2013a), Autor et al. (2013c), Autor et al. (2013b), Beaudry et al. (2010), Hornbeck (2012), Hornbeck and Naidu (2012), Notowidigdo (2013), Diamond (2013)). In line with most spatial models (see Blanchard and Katz (1992) and Glaeser (2008)), they report how affected locations lose population after a shock. The relocation of labor leads to a labor supply shock in locations that were not directly affected. Thus, knowing how local labor markets respond to labor *supply* shocks helps in understanding how local labor *demand* shocks spread to the larger national labor market, an important and sometimes neglected aspect in these studies.

2 Historical background and data

2.1 Mexican Inflows in the 1990s

As reported in Borjas and Katz (2007), in 1990 the great majority of Mexicans were in California (57.5 percent). During the decade of the 1990s, the largest increases in the share of Mexicans in a state's labor force were in Arizona, Colorado, California, New Mexico, and Texas. Within the 1990s, however, there was important variation in the number of Mexicans entering each year. There are a number of alternatives with which to try to obtain estimates on yearly flows between Mexico and the US. A first set of alternatives is to use various data sources to obtain a direct estimate of the Mexican (net) inflows. A second set of alternatives is to look at indirect data, like apprehensions at the US-Mexican border. I present the direct measures on what follows and the indirect ones in the following subsection.

The first natural source is the March Current Population Survey (CPS) from Ruggles et al. (2008). The CPS only started to report birthplaces in 1994. Before 1994, however, the CPS data reports whether the person is of Mexican origin. These two variables allow to track the stock of Mexican workers in the US quite well.[6] Figure 1 clearly shows that a significant number of Mexicans entered the US labor force in 1995. Using either the "Mexican origin" variable or the "birth place" definition, Figure 1 shows that in 1994 Mexicans represented around 5 percent of the low-skilled labor force. By 1996 this increased to over 6 percent. Given that there are almost 80 million low-skilled workers in the united states, this implies that around 500,000 thousand low-skilled Mexicans entered the US in 1995 and in 1996, up from around 200,000 or 300,000 a year before 1995.[7] It is also worth emphasizing that, as I show explicitly in appendix B, the observable

[6] These two variables identify more or less the same number of Mexicans. This can be seen in the top graph of Figure 1 which shows the share of Mexicans using the birth place and the Mexican origin information. In Table C1 in the Appendix B I show that around 90 percent of the workers that are born in Mexico are identified by the variable "hispan". It is also the case that almost 90 percent of the workers who have value 108 in the "hispan" variable are born in Mexico.

[7] In the CPS data there is a significant change in the weights of Mexcians relative to non-Mexicans between 1995 and 1996. In fact, using the supplement weights, the increase in Mexican low skilled labor force only occurs in 1995. Using the supplement weights for 1996 results in a drop in the share of Mexican workers. This is entirely driven by the change in weights between 1995 and 1996 and unlikely to be the case in reality. Note that this only affects the comparisons between periods before 1995

characteristics of the Mexicans in the US do not change significantly before and after 1995.

[Figure 1 should be here]

In sum, as the bottom graph of Figure 1 clearly shows, relative to the trend in Mexican arrivals, there is a clear increase in 1995 and 1996. In the top left graph of Figure 2 I show the CPS estimate of these inflows. In Table 1 I show that these numbers are consistent with the numbers in US Census data. I use Census data to compute stocks of Mexican workers in the US in 1990 and 2000. For 1995 I combine information on the US Census and the Mexican Census of 2000, since they both contain locational information five years prior to the survey. Using these information I can then compute average inflows of Mexicans every 5 years. These averages are in line with the yearly inflows obtained from the CPS.

[Table 1 should be here]

There are a number of ways to obtain alternative yearly estimates other than by exclusively using the CPS. They all coincide to a large extent in the magnitude of the increased Mexican inflows, particularly for 1995, but they diverge somewhat in later years. Many of this alternative estimates rely on the question in the Census 2000: "When did this person come to live in the United States?" (Ruggles et al., 2008). This yields an estimate of the number of Mexicans still residing in the US in 2000 who arrived in each year of the 1990s. This is shown in the top right graph of Figure 2.

[Figure 2 should be here]

Passel et al. (2012) use this information to build their estimates, shown in the bottom left graph of Figure 2. They first compute aggregate net inflows over the 1990s by comparing stocks of Mexicans in 1990 and 2000 using US Census data. The net inflow over the 1990s is estimated at about 4-5 million and this needs to be matched by any estimates of yearly inflows.[8] To obtain the yearly inflows, they use the US census question on year of arrival. Passel et al. (2012) adjust these estimates for undercount using information from the CPS and further inflate by 0.5 percent for each year before 2000 to account for mortality and emigration between arrival and 2000. Finally they match decade net inflows estimated using the 1990 and 2000 Censuses by further inflating the annual inflows by almost 9 percent. A summary of these numbers and of the Mexican counts of the US Censuses of 1990 and 2000 is provided in Table 1. Again, the numbers mostly coincide with those coming from the CPS: the largest inflow of Mexicans is 570,000 in 1995.

and after 1996. When I show graphs that contain pre- and post 1995 data I use as weights the average weight of Mexicans and non-Mexicans for all the sample period. When I run regressions using data from before and after 1995 I do not use the supplement weights. Using the supplement weights does not change any result, as can be see in the working paper version of this paper Monras (2015b), but it significantly increases the noise in the results. I document in detail this change in the weights in Appendix B.

[8] In the 2000 US Census, more Mexicans said that they arrived in the US in 1990 than the actual estimate in the 1990 US census. This suggests that undercount is an important issue or at least was in 1990. Hanson (2006) discusses the literature on counting undocumented migrants. There is some open debate on the size of undercount in 1990, but there is a wider consensus that the undercount was minimal in the 2000 US Census. Depending on the sources, this implies a range of possible estimates of Mexican net inflows over the 1990s of between 4 and 5 million.

2.2 Indirect measures of Mexican inflows

As mentioned before, we can also look at more indirect measures of Mexican inflows. A first such measure is the marked increase in "coyote" prices starting in 1995 – the price of the smuggler who facilitates migration across the Mexican-US border, see Hanson (2006). This may be in part due to increased border enforcement, but it also probably reflects an increased willingness to emigrate from Mexico. In fact, the US border enforcement launched two operations in the early 1990s to try to curb the number of immigrants entering the US. Operation Hold the Line and Operation Gatekeeper – launched in El Paso, TX and San Diego, CA respectively – had different degrees of success (Martin, 1995). Operation Hold the Line managed to curb Mexican immigrants, while Operation Gatekeeper was less successful. To some extent, however, these operations redirected the routes Mexicans took to get to the US. There is some evidence suggesting that some of the Mexicans who would have otherwise entered through El Paso, TX did so through Nogales, AZ. In any case, the "coyote" prices only started to increase in 1995 and not when these operations were launched, suggesting that more people wanted to enter the US in 1995, right when the Peso Crisis hit Mexico, and that the increased "coyote" prices were not just a result of the increased border enforcement of the early 1990s.

Another piece of evidence suggesting higher inflows in 1995 is the evolution of the number of apprehensions over the 1990s (data from Gordon Hanson's website, see Hanson (2006) or Hanson and Spilimbergo (1999)). The bottom-right graph of Figure 2 shows the (log) monthly adjusted apprehensions.[9] The spike in September 1993 coincides with the launching of Operation Hold the Line in El Paso, TX. At the beginning of 1995 there is a clear increase in the number of apprehensions that lasts at least until late 1996. This seems to coincide with the evolution of US low-skilled workers' wages, as I will discuss in detail in what follows. It also coincides with the estimates from the CPS that I use for my estimation.

Finally, it is also reassuring that other data sources, like the number of legal Mexican migrants recorded by the Department of Homeland Security or the number of undocumented migrants computed using Immigration Naturalization Service data (Hanson, 2006) also see a spike right after the Peso Crisis.

2.3 Labor Market Outcome Variables

I use standard CPS data to compute weekly wages at the individual level. I compute them by dividing the yearly wage income (form the previous year) by the number of weeks worked.[10] I only use wage data of full time workers, determined by the weeks worked and usual hours worked in the previous year. From individual-level information on wages, I can easily construct aggregate measures of wages. I use both men and women to compute average wages.[11] I also use the CPS data to compute other labor market outcome variables. I use CPS data to count full time employment levels and relocation. For employment levels, I simply compute the number of individuals who are in full time employment. For relocation, I compute the share of low-skilled individuals. I define high-skilled workers as workers having more than a high school diploma, while I define low-skilled workers as having a high school diploma or less.

I consider all Mexicans in the CPS as workers, since some may be illegal and may be working more than is reported in the CPS. This makes the estimates I provide below conservative estimates. I define natives as

[9] To build this figure I first regress the number of apprehensions on month dummies and I report the residuals.

[10] The CPS also provides the real hourly wage. This is the reported hourly wage the week previous to the week of the interview, in March of every year. I do not report results using this variable in the paper, but all the results are unchanged when using this real hourly wage instead of the real weekly wage. An alternative to the March CPS data is the CPS Merged Outgoing Rotation Group files. I obtain similar estimates when using this alternative data set.

[11] Results are stronger when I only use males. I prefer to be conservative. This is in line with the fact that Mexican migrants tend to be disproportionately males.

all those who are non-Mexicans or non-Hispanics, and use the two interchangeably in the paper. I provide evidence considering only US-born as natives in Appendix A.

In Appendix B.1 I discuss why I decide to use states as the unit of geography for this analysis. The main reason is to avoid losing valuable observations of the workforce not residing in cities.

2.4 Summary Statistics

Table 2 shows the main variables used for the estimation. They are divided into two blocks. The first block describes average labor market outcomes in 1994 and 1995. Average wages of low-skilled workers at the state level are significantly lower than those of high-skilled workers. There is some dispersion across states, as one would expect given the various shocks that hit the economy and given the potentially different amenity levels in each state. This second block uses exclusively CPS data (except for the share of Mexican workers in 1980 that relies on US Census data).

[Table 2 should be here]

The second block provides some descriptive statistics on GDP and trade. Those are used as controls in the short-run regressions. It shows that trade usually makes up a very small fraction of state GDP. In the case of California, the state receiving the largest amount of immigrants, the ratio of US exports to Mexico relative to state GDP was below .7 percent throughout the decade. Other states, like Texas, Michigan, Arizona, Alabama, Louisiana, South Carolina, and Delaware, have higher or very similar ratios of exports to Mexico to GDP. In other words, Mexican immigration is substantially more important for California than exports to Mexico.

Table 3 shows the distribution of Mexicans by skill in the US and in California – the highest Mexican immigration state. It is evident from this table that Mexican immigrants compete mostly in the low-skilled market. On average, over the 90s, Mexican workers represent around 6 percent of the low skilled labor force in the US, while they represent only 1 percent of the high-skilled. In California, Mexicans represent as much as 30 percent of the low-skilled labor force, while only a 7 percent of the high-skilled. This suggests that an unexpected increase in the number of Mexicans workers is likely to affect low-skilled workers, and can be considered almost negligible to the high-skilled. This is important. It provides an extra source of variation. As argued in Dustmann et al. (2013) it is sometimes difficult to allocate immigrants to the labor market they work in, given that education may be an imperfect measure when there is skill downgrading. In this case, a large fraction of Mexican workers are low-skilled and likely to compete with the low-skilled natives.

[Table 3 should be here]

3 Short-run effects of immigration

3.1 Identification strategy

In this section I investigate the short-run effects of immigration on labor market outcomes. To do so, I compare the changes in labor market outcomes across states, given the change in the share of Mexican immigrants among low-skilled workers:

$$\Delta Y_s = \alpha + \beta * \Delta \frac{\mathrm{Mex}_s}{\mathrm{N}_s} + \Delta X_s * \gamma + \varepsilon_s \quad (1)$$

where Y_s is our labor market outcome of interest, s are states, $\frac{\mathrm{Mex}_s}{\mathrm{N}_s}$ is the share of Mexicans among the labor market of interest, X_s are time-varying state controls, and ε_s is the error term.

I follow Bertrand et al. (2004) in first differencing the data and in abstracting from yearly variation. This is the recommended strategy when there is potential serial correlation and when clustering is problematic because of the different size of the clusters (MacKinnon and Webb, 2013) or an insufficient number of clusters (Angrist and Pischke, 2009). In the baseline specification, I simply compare 1994 and 1995. I also use different sets of years as the pre-shock period and group them as one period, while in the baseline regressions I always consider 1995 as the post-shock period.[12] This allows me to estimate the effect of the immigration before the spillovers between regions due to labor relocation contaminate my strategy. In my preferred specification, I control for possibly different linear trends across states and individual characteristics by netting them out before aggregating the individual observations to the post and pre-periods.

I run this regression in a year when Mexican migrants moved to the US for arguably exogenous reasons. This does not necessarily mean that they did not choose what states to enter given the local economic conditions. To address this endogenous location choice I rely on the immigration networks instrument. I use the share of Mexicans in the labor force in each state in 1980 to predict where Mexican immigrant inflows are likely to be more important. This is the case if past stocks of immigrants determine where future inflows are moving to. The first stage regressions are reported in Table 4. They show the results of estimating the following equation:

$$\Delta \frac{\mathrm{Mex}_s}{\mathrm{N}_s} = \alpha + \beta * \frac{\mathrm{Mex}_s^{1980}}{\mathrm{N}_s^{1980}} + \Delta X_s * \gamma + \epsilon_s \quad (2)$$

where the variables are defined as before, and where the subscript 1980 refers to this year. The share of 1980 refers to the entire population, but nothing changes if I use the share of Mexicans in 1980 among low-skilled workers exclusively. I chose the former because immigration networks can be formed between individuals of different skills.

The first column on Table 4 shows that states that had a higher share of Mexicans in 1980 have a six times larger share of Mexicans in 1995. This is a natural consequence of the massive Mexican inflows over the 80s and early 90s and the concentration of these flows into particular states. The second column shows that the flows of Mexican workers between 1994 and 1995 also concentrated in these originally high-immigration states. This is the basis of the instrument.

[Table 4 should be here]

The last two columns of Table 4 report the same regressions but for high-skilled workers. Column 4 shows that it is also true that the share of Mexicans among the high-skilled is higher in the states that originally attracted more Mexicans. It is not true, however, that the change of high-skilled Mexicans between 1994 and 1995 is also well predicted by the importance of Mexicans in the state labor force in 1980.

The main threat to my identification strategy is that the devaluation of the Peso might have changed the trading relations between US and Mexico. This can have effects on the labor market, as Autor et al.

[12] Again, when using pre-1994 data, I define Mexicans using the Hispanic variable in the CPS. See Appendix B for more details.

(2013a) show with import competition from China. In this case, however, US imports from Mexico did not increase, relative to the trend, as shown in Figure 3. This figure also shows that exports from the US to Mexico in fact saw a significant decrease. If states exporting to Mexico are the same states where Mexican immigrants enter, then I might be confounding the effect of trade and immigration. Fortunately, even if there is some overlap, immigrants do not systematically enter states that export heavily to Mexico. The unconditional correlation between the relative immigration flows and the share of exports to Mexico (relative to state GDP) is below .5. Similarly, in an OLS regression with state and time fixed effects the covariance between these two variables is indistinguishable from 0.

[Figure 3 should be here]

Furthermore, even if exports to Mexico and immigration from Mexico occur in the same states, it is harder to explain through trade why the negative effect is mainly concentrated on workers with similar characteristics to the Mexican inflows. I document the largest labor market impacts on low-skilled workers in high-immigration states and no effects on high-skilled workers, which matches the nature of the immigration shock.

To avoid the possible contamination of my estimates from the direct effect of trade on wages I include in some of my regressions (log) US states' exports to Mexico and (log) state GDP. This should control for the possible direct effect of trade on the US labor market[13].

3.2 Short-run effects of immigration on wages

In this section I estimate the causal effect of immigration on US local wages. I use the following equation for estimation:[14]

$$\Delta \ln w_s = \alpha + \beta * \Delta \frac{\text{Mex}_s}{\text{N}_s} + \Delta X_s * \gamma + \varepsilon_s \tag{3}$$

where $\ln w_s$ are the average (log) wages of native low-skilled workers in state s, $\frac{\text{Mex}_s}{\text{N}_s}$ is the share of Mexicans among the low-skilled workers, X_s are time-varying state controls, and ε_s is the error term. As I show later in the section 4.2, in this specification β is the inverse of the local labor demand elasticity in low-skilled labor market.

A simple graphical representation shows the estimates I later report. Figure 4 shows the evolution of the average low and high-skilled wages in California and the evolution of low-skilled wages in a lower Mexican immigration state like New York.[15] Wages are normalized to 1 in 1994 to make the comparisons simpler.

[13]Data for state exports to Mexico is provided by WISERTrade (www.wisertrade.org), based on the US Census Bureau. Exports are computed using "state of origin". "state of origin" is not defined as the state of manufacture, but rather as the state where the product began its journey to the port of export. It can also be the state of consolidation of shipments. Though imperfect, this is the best data available, to my knowledge, on international exports from US states.

[14]Given that the population does not change very much in the short-run horizons using $\frac{\Delta \text{Mex}_s}{\text{N}_{s,1994}}$ (the change in Mexicans divided by the number of workers in 1994) instead of $\Delta \frac{\text{Mex}_s}{\text{N}_s}$ does not matter very much for the estimates of β. This matters more for the estimates of the longer-run local labor demand elasticity shown in Table 7. Note also, that this specification is obtained directly from a local CES production function that combines high- and low-skilled workers. This is, starting from the demand curve for low skilled workers we obtain: $\ln(\text{wage low skilled}) = \alpha - \frac{1}{\sigma}\ln(\text{low-skilled}) + \frac{1}{\sigma}\ln(\text{gdp}) = \alpha - \frac{1}{\sigma}\ln(\text{Mexicans+non-Mexican low-skilled}) + \frac{1}{\sigma}\ln(\text{gdp}) = \alpha - \frac{1}{\sigma}\ln(1 + (\text{Mexicans/Non-Mexican low-skilled})) + \frac{1}{\sigma}\ln(\text{Non-Mexican low-skilled}) + \frac{1}{\sigma}\ln(\text{gdp}) \approx \alpha - \frac{1}{\sigma}(\frac{\text{Mexicans}}{\text{Non-Mexican low-skilled}}) + \frac{1}{\sigma}\ln(\text{Non-Mexican low-skilled}) + \frac{1}{\sigma}\ln(\text{gdp})$.

[15]New York and California are comparable in terms of overall immigrant population, but Mexicans are a lot more prevalent in California than in New York.

A few things are worth noting from Figure 4. First, low-skilled wages decreased in 1993. In some states, unlike California, high-skilled wages also decreased in that year. This is probably a result of the economic downturn in 1992. Second, when comparing low and high-skilled wages in California we see that low-skilled wages clearly decreased in 1995 and 1996 and then recovered their pre-shock trend, while, if anything, high-skilled wages increased slightly in 1995. By the end of the decade high-skilled wages increased in California, probably showing the beginning of the dot com bubble. When instead we compare low-skilled wages in California and New York, we observe that the decrease in California is more pronounced than that of New York, where Mexican immigration was a lot less important.

[Figure 4 should be here]

The estimation exercise identifies β by comparing the sharp decrease in low-skilled wages in high-immigration states like California relative to lower-immigration states like New York in 1995. For the identification strategy, it is crucial to have both an exogenous push factor and to deal with the endogenous choice of where Mexicans decide to migrate to within the US.

[Table 5 should be here]

Table 5 reports the results of estimating equation 4. In the first two columns, I report the results of the regression of native low-skilled average wages on the share of low-skilled Mexican workers among the low-skilled labor force in 1995. We observe in column 1 that there is no correlation in the cross-section between wages and immigration. In column 2, I instrument the share of low-skilled Mexicans by the share of Mexicans in the labor force in 1980. The IV result in the cross-section is very similar. It points to the fact that in the cross-section there is no systematic relationship between higher stocks of immigrants and lower wages. Many things can explain this result. A simple explanation – although not the only one – is that the US labor market may have systematic ways of equilibrating the labor market returns across regions. This is in line with previous literature, and cannot be interpreted as evidence that immigration has no effect on wages.

In column 3, I make an important first step towards identifying the effects of Mexican immigration on US low-skilled workers. When first-differencing the data, we observe that between 1994 and 1995 – when for exogenous reasons the inflow of Mexicans was larger – native wages decreased more in states where the share of Mexicans increased more. This is already an important thing to note and has been absent in previous immigration studies.

Column 3, however, does not take into account four important threats to identification. The first one is addressed in column 4. There may be variables related to the overall economic performance of the different states, or related to the trading relations of these different states with Mexico, that could be correlated with immigration and would explain the negative correlation reported in column 3. To deal with this concern, I add the change in (log) GDP, the change in (log) exports to Mexico and changes in (log) employment levels by skill group. The coefficient in column 4 is similar to that of column 3.

A second threat to identification is that Mexican migrants endogenously decided where to migrate within the US in 1995 based on the labor market conditions at destination. To address this concern, I use the share of Mexicans in the labor force in 1980 to know where the Mexican immigration shock is more likely to be more important. Column 5 shows that this is important. It increases the size of the negative coefficient by sixty percent, suggesting that either Mexican workers do indeed decide based on local labor market conditions or that there is some classical measurement error in how the share of Mexican workers is computed in the CPS which attenuates the OLS estimates.

A third concern is addressed in column 6. It could be that the trend of low-skilled workers is different between states. To address this, I first regress wages on state-specific linear trends and I use the residuals to compute the change in wages between 1994 and 1995. This reduces the size of the negative estimate, but by little. More important is the fourth concern. Since the CPS is a repeated cross-section, it can be that the workers in different years systematically differ, creating differences in wages that are unrelated to the effect of Mexicans, but rather due to the data. Column 7 shows that when controlling for individual characteristics in a first stage Mincerian regression, and allowing for state-specific linear trends, we obtain an estimate of around -.7. In this column, the pre-shock period is 1992 to 1994. This is also another reason why the estimated coefficient is slightly smaller, since in 1993, wages in California – the highest Mexican immigration state – were slightly lower, as discussed previously. This is my preferred estimate.[16] This estimate, however, is a conservative estimate. There are two reasons for this. First, I consider all Mexican as potential workers, and measure the shock relative to the full time non-Mexican labor force. If I were to consider the shock as the Mexicans who are working in 1995, the Mexican immigration shock would be smaller, and thus the estimated inverse local labor demand elasticity larger. Second, among the many estimates of the size of the shock I discussed earlier, I use the largest one. This is the natural one since it is obtained from the CPS data. Using the other estimates of the yearly inflows of Mexicans would result, again, in a larger inverse local labor demand elasticity.[17]

Table 6 repeats the exact same regressions of Table 5 but using the high-skilled workers' wages instead. The results show that low-skilled Mexican immigration did not affect the wages of high-skilled native workers. In the cross-section, as shown in columns 1 and 2, high-skilled wages in high-immigration states are slightly higher. When first differencing, independently of the specification used in Table 5, we observe that the unexpectedly large inflow of Mexican workers in 1995 did not decrease the wages of native high-skilled workers in high-immigration states. This can be thought as a third difference in difference estimate or as a placebo test.

[Table 6 should be here]

The combination of Tables 5 and 6 is to estimate the equation:

$$\Delta \ln \frac{h_s}{w_s} = \alpha + \beta * \Delta \frac{\text{Mex}_s}{\text{N}_s} + \Delta X_s * \gamma + \varepsilon_s \tag{4}$$

where h_s indicates the average wage of high-skilled workers, so that $\frac{h_s}{w_s}$ represents the wage gap between high- and low-skilled workers. This specification directly identifies the inverse of the elasticity of substitution in a model of perfect competition and two factors of production (high- and low-skilled workers). I present such a model in section 4.2. This is also the inverse of the relative local labor demand curve.

[16]Throughout, the R squares of these regression are a bit low. This is due to the large variance in small low-immigration states.

[17]As mentioned before, I use "birth place" information in these regressions since I do not use data prior to 1994. In the regression where I consider the 1992-1994 as the pre-shock period, this refers only to the wage data.

Table 7, shows that the inverse of the elasticity of substitution between high- and low-skilled workers is around .9.[18] Table 7 follows a similar structure to Table 5. In all cases, the wage gap is computed by allowing different linear state-skill specific trends as in my preferred estimates of Table 5. As before, the OLS regressions are likely to provide downward biased estimates of this structural parameter, either because the share of Mexicans is measured with error, or because Mexicans endogenously decide where to locate themselves within the US. The IV deals with these two concerns, and provides my preferred estimate. I use this estimate when I calibrate the model to the data.

[Table 7 should be here]

In Appendix A, I discuss several robustness checks. First, I show that the results presented in this section are robust to excluding California, Texas, or both from the regressions, see Table C2. This is important since in this paper I use an exogenous migration inflow that affects various regions in the United States, something that Card (1990) or Borjas (2015) do not have with the Cuban Mariel Boatlift migrants – these papers essentially rely on five observations (the difference in average wages in 5 cities over two periods). I also show in the Appendix, see Table C3, that I obtain similar results if I consider the high school drop-outs or the high school graduates exclusively as the group of workers competing with the Mexicans. This is in contrast to what Borjas (2015) finds. In Borjas (2015) it is shown that only high school drop-outs are affected by the inflow of Marielitos, while in this paper both high-school drop-outs and high-school graduates seem to be affected by the inflow of Mexicans. Many reasons can explain this divergence. First, Miami can be a especial labor market, a bit different than the average local labor markets in the US, and in that local labor market the difference between high-school drop-outs and graduates may be larger. Second, Cuban migrants might have been a bit special. Many sources claim that an important part of the Marielitos were Cubans released from Cuban prisons, and so perhaps less prepared to enter the labor market. And third, maybe the difference between high-school drop-outs and graduates was more relevant in the early 80s than in the mid 90s.

Finally, I show that the results are very similar if I include or exclude all foreign born people when defining natives – in the previous tables I only exclude Mexicans and define natives as the rest, see Table C4.

3.3 Wage dynamics

At first sight, the estimated local labor demand elasticity may seem large. This is the case, for example, when we compare the estimates presented in this paper with other across-space comparisons.[19] This may be due to the fact that most of the migration literature has not considered exogenous push factors. However, time horizons also matter enormously. To show this, I do two exercises. First, I plot the relative wage of low-skilled workers in high relative to low immigration states – shown in the left part of Figure 7.[20] The

[18]Given the reported standard errors, this estimate does not contradict what Katz and Murphy (1992) found in their seminal contribution.

[19]Llull (2015) is an important exception. He also uses push factors to estimate the wage effects. It is less clear whether in his case, however, he can rightly know whether workers escaping from adverse conditions at origin, like wars, enter the labor market corresponding to their education level or whether the circumstances push them to disproportionately enter the low-skilled labor market irrespective of their education. This is crucial for estimation of the causal effect of migration on wages, and is not a concern in the concrete case of Mexicans immigrants.

[20]I define the high immigration states by the 1848 boundaries of Mexico and the US. See the article discussing this in `http://www.economist.com/news/united-states/21595434-old-mexico-lives` in the Economist. I build the Figure by running

patterns are clear. There seems to be perhaps a small negative trend in the series. The estimate for 1995, however, is significantly lower than what would have been predicted by this small negative trend.[21] Wages in high-immigration states stay lower for around 3 years, before recuperating the pre-shock trend. This suggests that if we expand the post shock period in the empirical specifications discussed in the previous section we will obtain increasingly smaller estimates of the inverse of the local labor demand elasticity for low-skilled workers. This is the second graph of the Figure 7.

[Figure 7 should be here]

More concretely, each year in the right graph of Figure 7 represents different time horizons. For example, when we consider 1995 to be the post-shock period, then the estimated local labor demand elasticity is -.747 as reported in column (7) of Table 5. If I run the exact same specification but I consider 1995 and 1996 as the post period, then I obtain a smaller estimate for this short-run local labor demand elasticity, which is shown in Figure 7 for the year 1996. As can be seen in the Figure, the estimates decrease as I expand the post-shock period. In 1999 I display instead, the longer run local labor demand elasticity estimated in Table 7 and discussed in section 4.1. This explains why the estimates using short-time horizons are large, while for longer-time horizons they decrease very significantly.

There are many things that could generate these dynamics. In the next section I show that a mechanism that helps to generate these dynamics is the pattern of internal migration.

3.4 Relocation of workers

Why do these wage effects dissipate over time? Or in other words, how do these labor market effects spill over between high- and low-immigration states? Does labor relocate across space in response to local shocks? The most important critique of cross-state or cross-city comparisons in the immigration literature is that workers may relocate when hit by negative wage shocks (Borjas et al., 1996). This is what the spatial equilibrium literature would also suggest. The exogenous immigration shock of 1995 is unevenly distributed across US states, offering an opportunity to see how workers relocate from high-immigration states to low-immigration states when hit by an unexpected inflow of low-skilled workers.[22].

Figure 5 shows evidence suggesting that this is the case. It shows two different graphs. They both plot the evolution of the share of native low-skilled population and the overall share of low-skilled population in high- and low-immigration states.[23] First, Figure 5 shows that the share of native low-skilled workers keeps decreasing over the decade both in high- and low-immigration states. This reflects the well-known secular increase in education levels in the entire US which has been documented in the literature on skill-biased technological change, see Katz and Murphy (1992) or Acemoglu and Autor (2011). This is also true for the *overall* share of low-skilled population, even if it decreases less fast in high-immigration states

individual level regressions and interactions of a high immigration state dummy and time dummies. The confidence intervals are constructed using standard errors clustered at the metropolitan level. I also control in these regression for individual characteristics.

[21] Note that I controlled by state specific trends in the previous wage regressions and this takes into account this small negative trend.

[22] Again, see the article discussing this in `http://www.economist.com/news/united-states/21595434-old-mexico-lives` in the Economist. This is how I define high- and low-immigration states.

[23] In this graph, since I use pre-1994 data, I define Mexican workers using the variable Hispanic from the CPS. Also, given the change in the weights between 1995 and 1996 I do not use the supplement weights to compute these shares. See more details in the Section 2 and in Appendix B.

(due to immigration). Effectively, Mexican workers seem to be replacing native low-skilled workers in high-immigration states. This is reinforced by the observation, not directly observable in the graph because I normalize the different shares to one in 1994, that the share of native low-skilled population is *higher* in low-immigration states. This is perhaps not surprising, but it has not been emphasized in other papers. In the top graph, we observe how the overall share of low-skilled workers (dashed line) increases in 1995 in high immigration states. This is entirely driven by Mexican workers. When we exclude them from the computation of low-skilled population, we observe how the share of native low-skilled workers is closer to following its trend. In the bottom graph we see that this does not happen in 1995 in the low-immigration states. Instead, in 1995 the share of low-skilled workers keeps decreasing in the low immigration states. This trend, however, changes in 1996 and 1997. This is the effect of internal relocation after the immigration shock affects the relative wage between high- and low immigration states.

In what follows, I simply quantify the relocation responses shown in Figure 5, following the recommended approach established in the literature, see Peri and Sparber (2011) for a discussion. More specifically, I follow Card (2005) and run the following regression:

$$\Delta \text{Share of low-skilled}_s = \alpha + \beta * \Delta \text{Share Mexicans}_s + \Delta X_s + \varepsilon_s \tag{5}$$

where the share of low-skilled is the share (among the entire population) of low-skilled individuals and is computed using both natives and immigrants. In this case, the inflow of low-skilled workers should increase one to one the overall share of low-skilled workers in the first year (if there is no immediate relocation) and then decrease in the subsequent year or years if there is some relocation.

Table 8 shows the results of estimating (5) in 1995 and 1996 – i.e. the year of the shock and the year after. As before, the first two columns show the cross-sectional regressions. They show that states with more Mexican migrants tended to have a slightly lower share of low-skilled workers in 1995.

In columns (3) to (5) I investigate what happens in 1995. An estimated coefficient equal to 1 would mean that there is no sign of immediate relocation. This is, in 1995, the share of low-skilled workers increases one to one with the Mexican inflows. In the first column I show exactly this result, like in the rest of the literature. I obtain these results both OLS and the same IV strategy that I used before.[24]

[Table 8 should be here]

Columns 6 to 8 investigate what happened in 1996, one year after the unexpectedly large inflow of Mexicans that increased the share of low-skilled workers in the high-immigration states. We immediately see that with the OLS estimates we already obtain an estimate significantly smaller than one. The IV estimate, suggests, in fact, that the share of low-skilled workers almost reverts back to where it was before the unexpected inflow of Mexican workers. This is strong evidence that there was some labor relocation taking place the year after the unexpectedly large inflow of Mexican workers of 1995 and is in line with Figure 5. These strong response can generate the wage dynamics previously discussed, something that becomes even more clearly in when I discuss the model in section 4.2.

There are various internal and international migration responses that could explain these internal migration patters. For example, it could be that Mexican workers returned to Mexico in 1996, after one year of the shock. This is unlikely, given the net inflows observed in the aggregate. Alternatively, it could be that the

[24] Note that in this case the denominator is the overall population, which makes the first stage regression change a little bit.

Mexicans first migrated to high immigration states and then further moved within the US. Third, it could be that the non-Mexican workers responded to the shock, either by migrating away from or not migrating into high-immigration states.

To investigate this further I show two pieces of evidence. First, I repeat the exercise done in Table 8 but using as dependent variable the share of low-skilled natives (i.e. non-Mexicans). The results are shown in Table 9.

[Table 9 should be here]

Interestingly, we observe how, unlike with the total share of low-skilled population, the native share of low-skilled population does not increase in 1995. This is the case both when I estimate the regression with OLS and IV. When I repeat the exercise in 1996, we can clearly see how the share of native low-skilled population reacts strongly to the indlow of Mexican workers. This result can be anticipated in Figure 5 by realising that the dashed and black lines in the low-immigration states are quite close to each other in 1996 and only start to separate one from the other progressively between 1996 and 2000. This suggests, that in the first years, the response of the natives may actually be more important than that of the Mexicans. Whether this response is from reduced inflows of native low-skilled workers into high-immigration states or increased outflows cannot be investigated. The CPS data reports this information but not in 1995. However, these finding are consistent with the reduced migration into locations that were hit harder during the Great Recession, as documented in Monras (2015a).

The second piece of evidence is shown in Figure 6. This Figure looks at the distribution of Mexicans and native low-skilled workers across space over two time periods: 1990-1995 and 1995-2000. To describe these evolution in the distribution of people across space I first rank the states from 1 to 51 by the share of Mexicans (over total Mexicans in the US) in 1990. I then plot the (smoothed) change between the different years. I also do this for the distribution of low-skilled natives. The Figure shows some very interesting patterns. As is also documented in Card and Lewis (2007), over the 90s Mexicans started to spread throughout the US. This is visible in 1990-1995 but it accentuates in 1995-2000. However, what this Figure shows is that the distribution of Mexicans effectively moved from the highest Mexican immigration states (California and Texas) to the states where there were some Mexicans but not too many. This accentuates after 1995. Low-skilled natives, seemed to move towards states with the least amount of Mexicans – a pattern that is stronger in 1996, as suggested before.

[Figure 6 should be here]

Taken altogether, these results suggest very strong and at the same time nuanced relocation responses and internal migration patterns.

4 Long-run effects of immigration

The fact that there is some relocation of low-skilled workers away from high-immigration states as a response to a negative shock to wages and wage convergence across space makes it more difficult to evaluate the longer run effects of immigration on labor market outcomes. There are a number of alternatives one can adopt.

Empirically, I first show the wage changes over the decade of the 1990s in the different states and relate them to Mexican immigrant inflows and internal migration. Finally, I abstract from locations and assume, as Borjas (2003) does, that different age cohorts suffered the shock differently. In this case, while both younger and older workers suffered from the immigration shock, we can compare whether workers entering the labor market in higher or lower immigration years have lower wages or not in 2000, relative to similar workers in 1990. This would be consistent with the literature suggesting that entering during a downturn has lasting consequences Oreopoulos et al. (Forthcoming). Moreover, the Mexicans moving to the US tend to be young, which makes it more likely that they compete more directly with younger low-skilled native workers that enter the low-skilled labor market.

A second alternative is to use the reported short-run estimates on the local labor demand elasticity and the sensitivity of internal migration rates to local wages in a model built around these two key parameters. I can then calibrate the model and perform counterfactual exercises. The calibration exercise assumes two possible − though extreme − technological processes that govern the level of wages. The first one assumes fixed technology, while the second one assumes that normal inflows of Mexican workers are absorbed through local technology changes as argued in Lewis (2012). The main difference between these two technological processes concerns the distribution of workers across space after the immigration episodes takes place. I provide evidence on long-run relocation consistent with previous literature and with the story that normal inflows of Mexican workers are absorbed by technology changes, while unexpected inflows are absorbed through short-run wage decreases and internal relocation as documented in the previous section.

4.1 Empirical investigation of the longer run effects on wages

Cross state comparisons

Table 5 identifies the effect of immigration on wages from very short-run comparisons. The identification comes from the drop in wages of the specific group of workers, i.e., low-skilled, who are competing more closely with the Mexican arrivals. Figures 4 and 7 suggest that wages may have recovered in high-immigration states after the shock, at least to some extent, although the trend may be slightly more negative in high- relative to low-immigration states. To investigate this further I use the following regression:

$$\Delta^{00-90} \ln w_s = \alpha + \beta * \frac{\Delta^{00-90}\text{Mex}_s}{\text{N}_{s,90}} + \varepsilon_s \tag{6}$$

where Δ^{00-90} indicates the difference between 1990 and 2000 of the relevant variable. It is important to note that, in this specification, I use the relative inflow of Mexican workers instead of the change in the share because I consider the population at the beginning of the period to be the size of the relevant labor market. Given the population growth over the 90s in the United States, this strategy obtains a smaller estimate (in absolute value) than using the change in the share of Mexican workers. Thus, the results shown in what follows are conservative estimates.[25]

This specification is very similar to the ones used in Card (2001) and especially Altonji and Card (1991). As mentioned before, the presumption that Mexicans may be choosing where to migrate within the US motivated the construction of the networks instrument. To restate the idea of this instrument, it is a valid

[25] In the previous short-run regressions, this distinction does not matter so much because the population growth in a given year is significantly less pronounced than over an entire decade. Note that without population growth, the two specifications are identical.

instrument if new inflows of Mexican workers are strongly influenced by the past stock of Mexicans in the US *and* there are no spillovers between states. I report the results in Table 7, commented below.

Cross age comparisons

An alternative specification for investigating the long-run impact of immigration is used by Borjas (2003). He assumes that there are spillovers between geographic units, and completely forgets about them in his main specifications. Instead, Borjas (2003) uses across-cohort or across-age variation to study the long-run effect of immigration. This is:

$$\Delta^{00-90} \ln w_a = \alpha + \beta * \frac{\Delta^{00-90}\text{Mex}_a}{\text{N}_{a,90}} + \varepsilon_a \tag{7}$$

The assumption in this case is that different age cohorts of potential migrants do not take into account the labor market outcomes of their own group when migrating. This last concern also suggests that we must find a valid instrument for this regression. In this paper I build such an instrument based on the unexpectedly large inflow of Mexicans in 1995 and on the fact that the age distribution of Mexican immigrants was very constant over the entire 1990-2000 decade. Specifically, I construct:

$$\text{Predicted migrants}_a = \sum_{j=1991}^{2000} \text{Share Migrants aged (a-(j-1990)) at t} * \text{Mex}_t \tag{8}$$

This is, I assign the inflow of Mexicans at year t using the age distribution of the entire decade to match the particular age cohort that receives the shock.

Results

Table 10 shows the empirical results of the effect of Mexican migration in the long-run. The bottom part shows the first stage regressions. In column 2, we see, as in previous tables, that past stocks of immigrants are a good predictor of future inflows across states. The coefficient is around 1.4, suggesting that over the entire decade almost 4 times more Mexicans moved to high-immigration states than in 1995.[26] Note that this is in-line with the idea that Mexican workers are less concentrated in space over time as documented in Card and Lewis (2007) and as can be seen when comparing the distributions of Mexicans across states in 1990 and 2000 using US Census data – not shown in this paper. Column 4 of this bottom part of Table 10 shows that the predicted inflow of Mexicans by age cohort is a good predictor of the actual share of Mexicans in each age cohort. A coefficient smaller than one indicates that some Mexicans, presumably those for whom the labor market was worse, returned to Mexico.

[Table 10 should be here]

The upper part of Table 10 shows the cross-state (left part of the Table) and cross-age comparisons (right part) for low-skilled workers. As in previous literature, across-state Mexican inflows and wage changes are slightly negatively correlated, with point estimates that are not statistically different from zero. This is shown in column 1. In column 2, I instrument the OLS regression with the immigration networks instrument.

[26] This is half as large as if Mexicans did not relocate within the US.

The coefficient becomes slightly more negative, suggesting a long-run local labor demand elasticity of -.4. This is the slightly negative trend in high- relative to low-immigration states discussed in Figures 4 and 7 and is similar to previous studies.[27] Note that columns 1 and 2 simply follow the literature initiated by Altonji and Card (1991). Column 3 instead follows Borjas (2003). Like him, I find a negative estimate of around -.4. In column 4, I use the instrument proposed in equation 8. When instrumenting to take into account the possible selected immigration in particular years and selected return migration by Mexicans, I obtain an estimate of around -.74, surprisingly close to the estimate I obtained in the short-run regression shown in Table 5 using a completely different strategy.

The second panel of Table 10 shows the exact same regressions as in the upper part but using the change of high-skilled wages instead of low-skilled. All the estimates in this part of the table are close to 0. In other words, Mexican immigration seems to have affected only low-skilled workers in the long-run. And among those, the ones that suffered larger shocks when young, seem to have suffered more lasting consequences.

Overall, I take this as evidence that wage effects dissipate to a large extent across space, but that there are particular cohorts of low-skilled workers – those that enter the labor market in high-immigration years – that are affected over longer time horizons.

This across-space and across-age comparison cannot account for general equilibrium effects. In the following section I further explore the dynamics of this adjustment using a general equilibrium internal migration model.

4.2 Model

While it is possible to evaluate the short-run effects using a clear natural experiment, spillovers across states due to labor relocation makes it more difficult to evaluate longer run effects using across-space comparisons. Across-age comparisons help to overcome some of the limitations of the spatial reallocation, however, they are not useful to think about the general equilibrium. For this, I introduce in this section a spatial equilibrium model that I calibrate to the data.

In the very short run, each local labor market, in this case states, is closed, so standard models of the aggregate labor market apply (see the canonical model discussed in Acemoglu and Autor (2011) or Katz and Murphy (1992)). In the longer run, internal migration flows link the various local labor markets, spreading local shocks to the rest of the economy. Standard models in the spatial economics literature in the spirit of Rosen (1974) and Roback (1982) are suited to analyzing the long run, once adjustment has taken place (see also Glaeser (2008), Moretti (2011) or Allen and Arkolakis (2013)). Fewer models in this literature are suited to studying the transition dynamics.

Two seminal contributions introduced transition dynamics into a model with many regions: Blanchard and Katz (1992) and Topel (1986). For instance, Blanchard and Katz (1992) report that wages seem to converge spatially after around 8 years, while unemployment rates converge faster. In the estimation of their model, they rely mainly on time series variation, although they also use Bartik (1991) type instruments like subsequent literature (see Diamond (2013) and Notowidigdo (2013)). They do not microfound the migration decisions, something that these more recent papers do using discrete choice theory. Both Diamond (2013) and Notowidigdo (2013) have two skill types and relocation costs, as in Topel (1986), but they model the relocation decision using a discrete choice model. Most spatial equilibrium models are, however, static. The discrete choice location decision determines the distribution of people across space, not where to move in the future.

[27] As shown in Borjas (2003), this coefficient decreases with geographic disaggregation.

The seminal contribution of Kennan and Walker (2011) introduces a dynamic migration model instead. The multiple locations and migration histories that workers can choose makes this problem particularly hard. They simplify in two respects. First, they only take into account a subset of the possible choices of workers. Second, their model is, in nature, partial equilibrium. They do not model the rest of the economy and the interactions between the different states as I do in what follows. In exchange, in the model that I present here I simplify the location decision by limiting the choice set to only the locations available for the subsequent period. I discuss these issues Monras (2014) and Monras (2015a).

The model has S regions representing US states. There is a single final consumption good that is freely traded across regions, at no cost. Workers, who can be high- or low-skilled, are free to move across regions but each period only a fraction of them considers relocating.[28] They live for infinitely many periods. At each point in time they reside in a particular location s and need to decide whether to stay or move somewhere else. Once this decision is made, they work and consume in that location. Workers are small relative to the labor market so they do not take into account the effect they have on the labor market when relocating. Also, they have idiosyncratic tastes for living in each specific location. This is the basis for the location choice that derives optimal location using discrete choice theory (see McFadden (1974) and Anderson et al. (1992)). The long-run equilibrium coincides with the equilibrium in standard spatial equilibrium models, where indirect utility of the marginal mover is equalized across space.

4.2.1 Utility Function

Workers earn the market wage of the location they reside in. Since there is only one good and no savings, they spend all of their wage on this good.

Indirect utility of workers is then given by the local wage for their skill type $\omega_{s'} \in \{w_{s'}, h_{s'}\}$, the amenities and the idiosyncratic draw they get for location s', given that they live in s:

$$\ln V^i_{s,s'} = \ln V_{s,s'} + \epsilon^i_{s'} = \ln A_{s'} + \ln \omega_{s'} + \epsilon^i_{s'} \tag{9}$$

Note that indirect utility has a common component to all workers $\ln V_{s,s'}$ and an idiosyncratic component $\epsilon^i_{s'}$ specific to each worker. The variance of ϵ determines whether the common component or the idiosyncratic component has a higher weight in this decision. $A_{s'}$ denotes amenities in s'.

4.2.2 Location Choice

Workers decide where they want to reside, given the indirect utility they get in each place. That is, workers maximize:

$$max_{s' \in S} \{\ln V_{s,s'} + \epsilon^i_{s'}\} \tag{10}$$

The general solution to this maximization problem gives the probability that an individual i residing in s moves to s':

$$p^i_{s,s'} = p_{s,s'}(A_s, \omega_s, F; s \in S) \tag{11}$$

[28]As written, the model abstracts from fixed factors (e.g., land) that can influence the scale of states in order to focus on incentives in light of disturbances to an initial equilibrium.

Only a fraction η of workers decide on relocation each period.[29] This parameter η is important for the calibration, since the model would otherwise over-predict yearly bilateral mobility in the absence of shocks. By the law of large numbers we can then use equation (11) to obtain the flow of people between s and s':

$$P_{s,s'} = \eta * p^i_{s,s'} * N_s \text{ for } s \neq s' \tag{12}$$

where N_s is the population residing in s. Note that this defines a matrix that represents the flows of people between any two locations in the economy. This matrix depends on the function form of ϵ. Some assumptions on this functional form make this matrix very tractable.

4.2.3 Dynamics

Like most other authors in the literature, I assume that ϵ is extreme value distributed.[30] This has the nice property that the difference in ϵ is also extreme value distributed and that this results in a closed form solution for the probability of an individual moving from s to s'. We can use this to write the bilateral flows as follows:

$$P_{s,s'} = \eta N_s \frac{V_{s,s'}^{1/\lambda}}{\sum_j V_{s,j}^{1/\lambda}} \tag{13}$$

where λ governs the variance of the error term. Lower values of λ, i.e., lower variance of the idiosyncratic error, make people more sensitive to the local economic conditions and thus relocation across local labor markets is faster.

Under these assumptions one can prove (see Monras (2014)) that the derivative of (net) in-migration rates in s with respect to (log) wages in s is approximately $\frac{1}{\lambda}\frac{I_s}{N_s}$, where $\frac{I_s}{N_s}$ is the in-migration rate (around 3 to 3.5 percent in US data). This can be expressed more concisely as follows:

Proposition 1. *If ϵ^i_s are iid and follow a type I Extreme Value distribution with shape parameter λ then, in the environment defined by the model, we have that:*

1. $\partial(\ln N_s)/\partial \ln w_s \approx \frac{1}{\lambda}\frac{I_s}{N_s}$

Proof. See Monras (2014) or Monras (2015a). □

4.2.4 Production Function

The production function in all regions is the same: a perfectly competitive representative firm producing according to:

$$Q_s = B_s[\theta_s H_s^\rho + (1-\theta_s)L_s^\rho]^{1/\rho} \tag{14}$$

where L_s is low-skilled labor and H_s is high-skilled labor. θ_s represents the different weights that the two factors have in the production function, while ρ governs the elasticity of substitution between low- and high-skilled workers. B_s is Total Factor Productivity (TFP) in each state. We could also introduce factor augmenting technologies, as in Acemoglu and Autor (2011).[31]

[29] This fraction η can be endogenized. I do this in Monras (2015a) and show that it is empirically not very relevant. Given that the CPS data is of less quality than the American Community Survey data used in Monras (2015a), I leave the detailed discussion outside the current paper and refer the reader to Monras (2015a).

[30] Moretti (2011) assumes instead a uniform distribution, the other one that admits close form solutions.

[31] None of the results that I will report below change if those technological levels are exogenous to immigration. On the

4.2.5 Labor market

The marginal product of low-skilled workers is:

$$w_s = p_s(1-\theta_s)B_s^{\frac{\sigma-1}{\sigma}}Q_s^{\frac{1}{\sigma}}L_s^{\frac{-1}{\sigma}} \tag{15}$$

where $\sigma = 1/(1-\rho)$ is the elasticity of substitution between high- and low-skilled workers. This defines the labor demand curve.

Similarly, the marginal product of high-skilled workers is:

$$h_s = p_s\theta_s B_s^{\frac{\sigma-1}{\sigma}}Q_s^{\frac{1}{\sigma}}H_s^{\frac{-1}{\sigma}} \tag{16}$$

We can normalize $p_s = 1$. Free trade will guarantee that prices are the same across regions.

4.2.6 Equilibrium

The definition of the equilibrium has two parts. I start by defining the equilibrium in the short run. It satisfies three conditions. First, given the amenity levels and wages in each location, workers maximize their utility and decide where to live. Second, firms take as given the productivity B_s, the productivity of each factor θ_s and factor prices in each location to maximize profits. Finally, labor markets clear in each location. This equates the supply and the demand for labor and determines the wage in every local labor market. More formally:

Definition I. *A short-run equilibrium is defined by the following decisions:*

- *Given* $\{A_s^l, A_s^h, w_s, h_s\}_{s\in S}$*, consumers maximize utility and location choice*
- *Given* $\{\theta_s, B_s, \sigma, w_s, h_s\}_{s\in S}$*, firms maximize profits*
- *Labor markets clear in each* $s \in S$ *so that* $\{w_s, h_s\}$ *are determined*

We can define the long-run equilibrium by adding another condition. In words, I say the economy is in long-run equilibrium when bilateral flows of people of every type are equalized between regions. More specifically,

Definition II. *Given* $\{\theta_s, B_s, \sigma, A_s^l, A_s^h\}_{s\in S}$*, a long-run equilibrium is defined as short-run equilibrium with equalized bilateral flows of population across locations. This is:*

$$P_{s,s'} = P_{s',s}, \forall s, s' \in S$$

for both high- and low-skilled workers.

4.2.7 Properties of the model

Only a share η of workers considers relocating each period. This implies that, depending on the size of the local shock and the sensitivity of workers to local shocks, relocation may take some time to materialize. Thus, we can distinguish between the equilibrium properties of the model and the transitional dynamics.

contrary, if technology responds to immigration shocks, some of the results will change. As is common in the literature, I do not consider other factors of production like capital. As long as other factors enter the production function in a Hicks-neutral way this does not affect relative factor rewards. See also Card and Lewis (2007) and Lewis (2012).

In the long run, in the absence of changes in the location specific variables, the economy converges to a situation in which the marginal worker is indifferent across locations and where factor prices, net of amenities per capita, are equalized across locations.[32] Initial conditions and labor flows determine the size of each location and the relative size of each skill in each location, determining the long-run equilibrium. In this long-run equilibrium there are still positive flows of internal migrants between the different regions. Net flows are, however, zero. In general, the equilibrium need not be unique: starting from different initial conditions, the economy may converge to different long-run equilibria.

When the steady state receives an unexpected shock then the economy changes and reaches a new steady state. The speed of convergence crucially depends on the relative importance that workers give to the idiosyncratic tastes versus the working conditions, governed by the variance of ϵ. If this variance is larger, then idiosyncratic tastes become more important, while if it is zero, only labor market conditions matter and adjustment takes place instantaneously.

The case of interest for the current paper is when there is an unexpected increase in the size of the low-skilled labor force in location s. In this case, the increase in L_s induces an instantaneous increase in the wage gap between high- and low-skilled workers in s. This makes location s attractive to high-skilled workers, while it make it less attractive for low-skilled workers in s. Thus, some high-skilled workers move towards s while some low-skilled workers move away from s.

Proposition 2. *An (unexpected) increase in L_s in s leads to:*

1. *An instantaneous decrease in w_s*
2. *An instantaneous increase in h_s*
3. *A relocation of low-skilled workers away from s*
4. *A relocation of high-skilled workers toward s*
5. *Gradual convergence of indirect utility across regions*

It is possible to write similar propositions for exogenous changes in either the amenity levels or the productivity parameters.

4.2.8 Calibration

The model can be used to explore various counterfactuals. First, I explain what would have happened if there had not been a Peso Crisis in late 1994. In this case Mexican immigration would have probably arrived at the same pace as in other years of the 1990s and wages would have not dropped significantly more in 1995 in California and other high-immigration states.

In the second counterfactual I analyze what would have happened if a state like Arizona had managed to effectively stop its inflow of Mexican immigrants. In this case, the direct effect of Mexican immigration would have disappeared and Arizona would have suffered the consequences of immigration only through the relocation of natives after the shock in other states. Before doing these exercises, however, I describe how I calibrate the model to the data.

There are 3+51*4=207 parameters in the model: $\{\sigma, \lambda, \eta, \theta_s, A_s^h, A_s^l, B_s\}$. σ is the elasticity of substitution between high- and low-skilled workers in the production function. The wage regressions can be used to

[32] We can see this by equalizing bilateral flows, as I show later. I define amenities per capita as $a_s^{1/\lambda} = \frac{A_s^{1/\lambda}}{N_s}$.

estimate this parameter. The estimates suggest that this elasticity is around 1, which I use in my calibration. By doing so, I am choosing the parameter estimated in Table 7. There is an extra benefit in choosing $\sigma = 1$: the CES function collapses to the well known Cobb-Douglas case.

The second parameter is also estimated using the low-skilled population growth rate equations. The estimated coefficient in these regressions is $\frac{1}{\lambda}\frac{I_s}{N_s}$ in the model and around .75 in the data. Given that the in-migration rate is around 3-5 percent, the resulting value of λ is around 1/15.[33] This implies a very strong reaction to local shocks. In the calibration I only let low-skilled workers to relocate. Allowing high-skilled workers to relocate would not change things significantly, since they were hardly affected by the Mexican immigrant inflows. This calibration choice helps to isolate the effect of internal migration of the affected workers.

I calibrate the rest of the parameters to match Census data in 1990. This assumes that the US is in long-run spatial equilibrium. In particular, I use the relative labor demand to calibrate θ_s for each state:

$$ln(h_s/w_s) = \frac{\theta_s}{1-\theta_s} - \frac{1}{\sigma}ln(H_s/L_s) \tag{17}$$

when $\sigma = 1$, i.e. when the production function is Cobb-Douglas, then, $\theta_s = 1/(1 + (w_s L_s/h_s H_s))$. In an aggregate economy this would also coincide with the share of high-skilled workers. While this need not be true at the state level, Figure C.2 in the Appendix shows that there is also a tight relation between the share of high-skilled workers and the weight of high-skilled workers in the local production function.

The next set of parameters that I calibrate are the state-specific productivity levels. To find those I use the fact that, in perfect competition, the total wage bill should be equal to total production. Since total production is the productivity times the Cobb-Douglas production function, I can obtain productivities simply by dividing the total wage bill by the Cobb-Douglas production function given the θ_s and the worker levels in every state. Productivity levels align well with wage levels, as shown in Figure C.3, in the Appendix.

The final set of parameters that I calibrate are the amenity levels. To calibrate these I assume that the US is in spatial long-run equilibrium in 1990:

$$P_{s,s'} = P_{s',s}, \forall s, s' \in S \tag{18}$$

These equations allows me to obtain A_s, $\forall s$. For that we can use the definition of amenities per capita $a_s^{1/\lambda} = \frac{A_s^{1/\lambda}}{N_s}$ and simplify the algebra to obtain:

$$a_{s'}\omega_{s'} = a_s\omega_s \tag{19}$$

This equation allows me to obtain amenities, fixing a base location (in my case California). To obtain a value for η I match the internal in-migration rate in California (3 percent). A value of $\eta = .88$ accomplishes that.

4.2.9 Migration in the absence of the Peso Crisis

While right after an immigration shock wage differences across space might be informative about the causal effect of immigration on wages, the shock then spreads to the rest of the economy leaving little spatial differences. The model introduced can help us think about what the longer-run effects of immigration might be in a (spatial) general equilibrium framework.

[33] I obtain this number by dividing the internal migration rate of 5 percent by the response of internal migration to an increase in wages. This response is around .75 for the natives.

I present the results under two extreme scenarios. On the one hand I show what happens according to the model if nothing else other than relocation accommodates Mexican immigration. As emphasized in Card and Lewis (2007), technology could have adapted to absorb changes in factor endowments, something ruled out here by keeping θ_s constant. In the model, this implies that positive Mexican inflows during the 1990s directly translate into decreases in the wages of low-skilled workers in every state during this decade. An alternative assumption is that only unexpectedly large immigrant inflows matter. This is like assuming that "normal" Mexican inflows are absorbed through changes in the technology. The reality probably lies between these two extreme scenarios, though probably closer to the second. In fact, if we look at the entire decade, we observe higher increases in the low-skilled labor force in initially high Mexican migration states.[34] This is consistent with labor relocation only when wages decrease, which happens with exogenous increases in the number of low-skilled immigrants.

In this quantitative exercise, I assign the aggregate yearly inflows reported in 1 using the distribution of Mexicans across states in 1990 US Census data, starting from a long-run equilibrium in the model calibrated to 1990.

To show the results, I use the comparison between California – a high- Mexican immigration state – and New York – a lower- Mexican immigration state – to provide intuition, something I also did with the raw data shown in Figure 4. Figure 8 shows the wage evolutions with and without the shock provoked by the Peso crisis in late 1994 under the assumption that all inflows matter.

[Figure 8 should be here]

Figure 8 shows how the wages of low-skilled workers decrease over the decade. They especially do so in high-immigration states like California, but internal migration ensures that wage decreases spill over to other states. In the long run, immigration affects all locations equally. Wage decreases of low-skilled workers vary from 10 percent in California to 5 percent in New York or even slightly lower in other states. This depends on the initial share of low-skill workers in the production function.

Figure 9 shows the case when only unexpected large inflows matter.[35] It shows that the unexpected large inflow of Mexican workers starting in 1995 decreased wages by at least 3 percent in California and that wages started to recover in 1997. The drop is slightly smaller than in the observed data due to the fact that I calibrated the model to a slightly higher elasticity of substitution, but it captures very tightly the wage dynamics.

[Figure 9 should be here]

4.2.10 Migration with a restrictive policy in Arizona

In 2010, Arizona tried to adopt a law, the most controversial aspect of which was to allow officials to ask for residence permits if they had some suspicion that particular individuals were not legal residents. Given

[34] See section A.5 in the Appendix.

[35] This is the case when normal inflows of workers are absorbed though changes in the technology – the θ_s in my model – or changes in the use of capital that substitutes low-skilled labor – not modelled in my paper, but discussed extensively in Lewis (2012).

that a large fraction of Mexican immigrants in the US are undocumented, to some extent this is a policy that greatly reduces the incentives of Mexicans to move to Arizona.

Motivated by this policy, in this section I try to answer what would have happened in Arizona if Arizona had had a policy that had effectively stopped Mexican immigration in the 1990s. The link between the different states through internal migration suggests that in the long run a single state can do little to avoid being affected by immigration. In this section, I investigate what would be the short-run gains of such controversial policies. I suggest in what follows that these policies are likely to do very little.

As in the previous counterfactuals, I consider two alternative scenarios. In the first case I assume that overall inflows matter, while in the second case only inflows above average. I study the Mexican inflows of the 1990s, and then I assume that they stop in 2000 to see the long-run consequences. Figure 10 shows these different wage dynamics. The exercises show that in the short run, in the worst years, Arizona's low-skilled wage was maybe 2 percent lower than what it would have been with a more restrictive immigration law. Wages were back to equilibrium soon after 2000. This suggests limited benefits from a unilateral law in one particular state to limit the amount of immigrants in that state.[36]

[Figure 10 should be here]

5 Conclusion

Existing literature on the causal effect of immigration on native wages seems to find contradictory evidence. On the one hand, evidence presented in various papers by Card and some other authors would suggest that immigration has a small effect on native wages. In the particular case of low-skilled US workers, this would be a consequence of two important facts. First, if high school drop-outs and high school graduates are close substitutes in the production function then the pool of low-skilled workers absorbing low-skilled immigration into the US would be large, and thus aggregate wage effects small. Second, as first discussed in Ottaviano and Peri (2012), if low-skilled natives and immigrants are imperfect substitutes then former immigrants, not natives, absorb the labor supply shocks induced by newer immigrants.

On the other hand, Borjas (2003) and some earlier papers question the evidence coming from comparisons of local labor markets because they argue that the US labor market is well integrated. When abstracting from geographic considerations, Borjas (2003) concludes that the effect of immigration on native workers is significantly larger than what we would conclude from Card (2009) or Ottaviano and Peri (2012).

In this paper, I use the Mexican crisis of 1995 as a novel push factor that brought more Mexicans than expected to historically high-immigration states to document the causal effect of immigration on native wages. Using this natural experiment I show that a 1 percent immigration-induced supply shock decreases wages by at least 0.7 percent on impact. This is substantially higher than was reported either by Card (2009) or by Borjas (2003). It is important to keep in mind that this is a short-run effect.

Labor relocation as a response to unexpected wage decreases ensures that immigration shocks spread across US regions. When the relative inflow of Mexicans increases by 1 percentage point, the share of low-skilled workers increases almost by 1 percent in the first year and then returns to its trend. This dissipates the shock across space, helping to explain why low-skilled wage growth between 1990 and 2000 was only

[36] A recent paper (Watson, 2013) analyses how immigrants respond to these type of policies by relocating within the US.

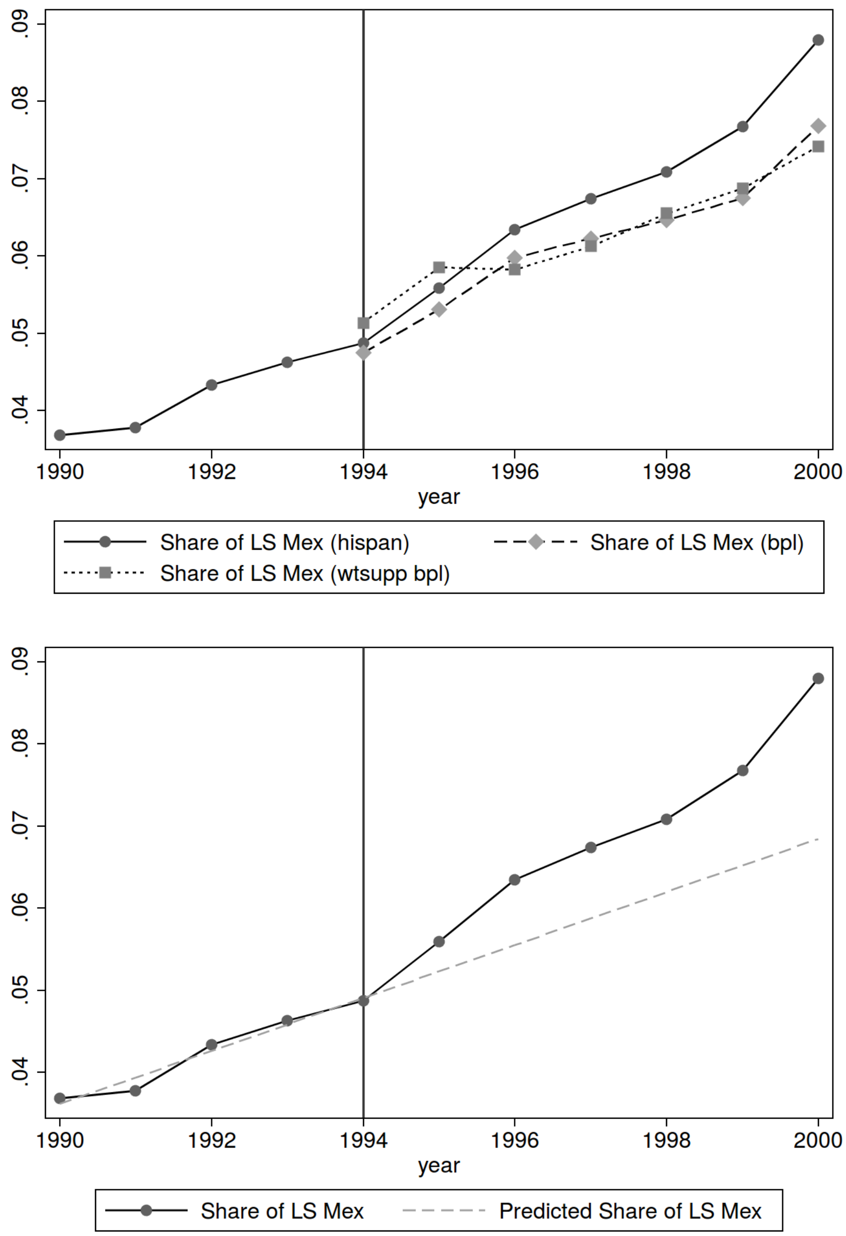
slightly lower in initially high-immigration states. At the same time, I have shown evidence that, when abstracting from geographic considerations like in Borjas (2003), age cohorts entering the labor markets in high-immigration years had significantly lower wage growth in the decade of the 1990s, which is in line with Oreopoulos et al. (Forthcoming). In other words, this paper documents how local shocks become national, an important step absent in Borjas (2003), and documents the causal effect of immigration in the short and long run.

Taken together, this evidence is consistent with the model presented in the last part of this paper, where I calibrated the model to US data and showed how it can be used to answer policy-relevant counterfactuals. The first counterfactual analyzed in this paper is a study of the wage evolution that would have occurred without the immigration shock. This allows me to evaluate over longer-time horizons the effect of immigration on low-skilled wages in every local labor market, taking into account the (spatial) general equilibrium effects.

The second policy-relevant experiment studied in the paper tried to work out how effective a policy stopping Mexican migration into a particular state would be. The main insight from this exercise is to show how rapid internal relocation spreads immigration shocks and, thus, how the effects of such policies are likely to be limited. This highlights, again, the importance of taking into account the general equilibrium effects.

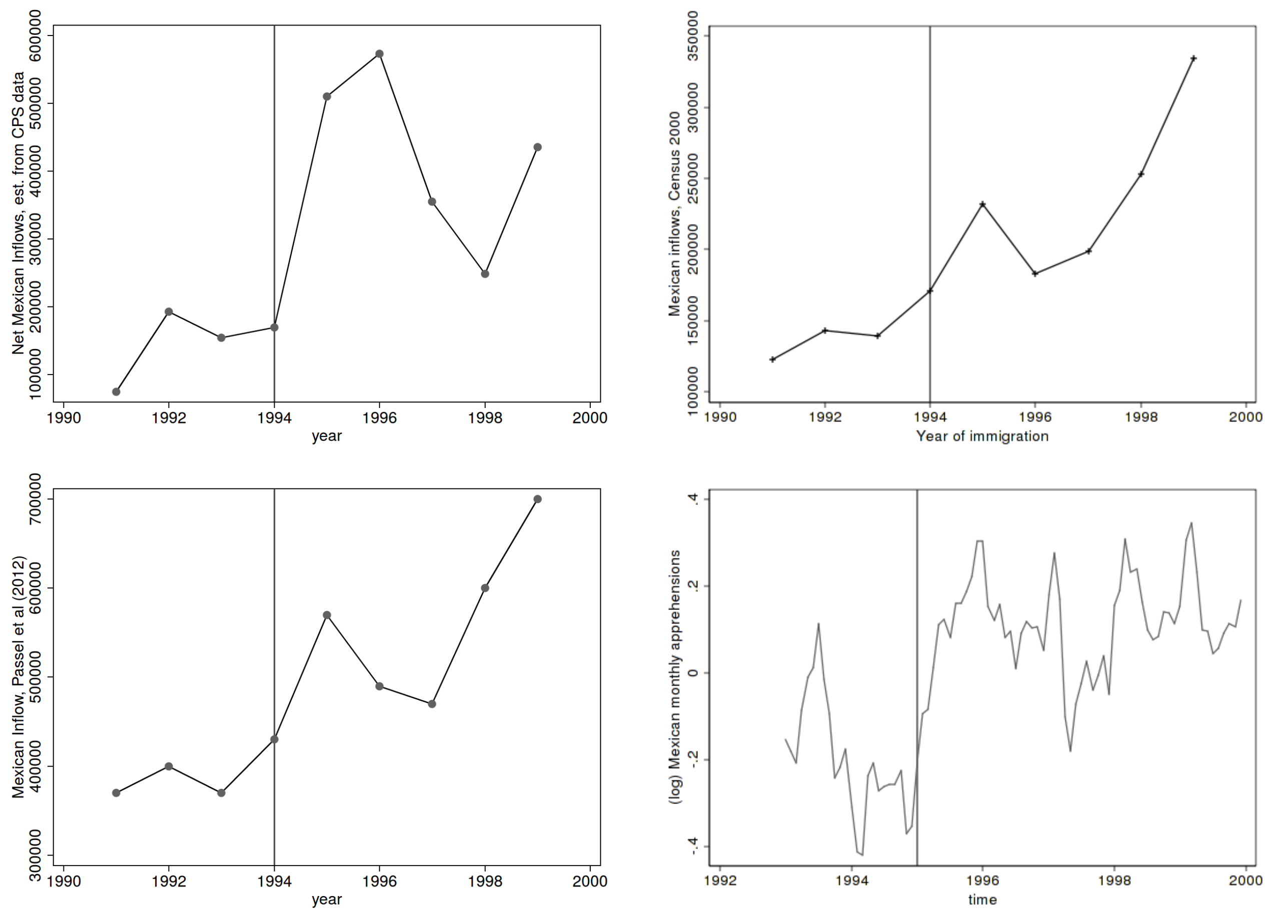
6 Figures and Tables

Figure 1: Share of Mexicans in the US low-skilled labor force, CPS data



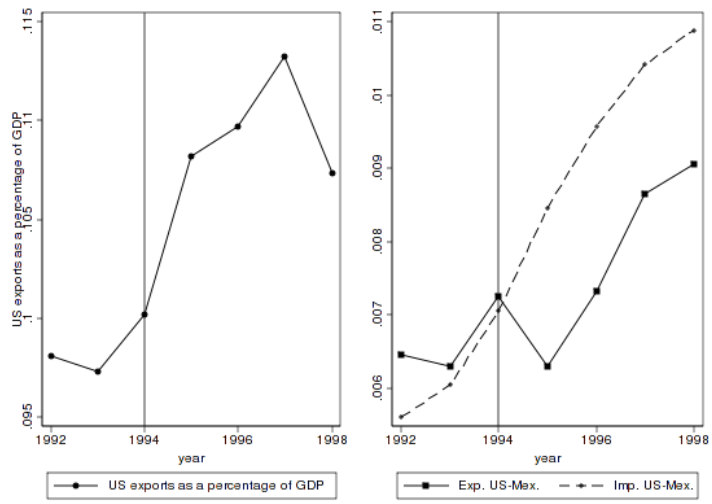
Notes: This figure plots the share of Mexicans among low-skilled workers in each year of the 1990s where CPS data is available. I use two different variables, the "birth place" and the "Mexican origin" to identify Mexicans. The figure reports the share of Mexicans. More details can be found in the text and in Appendix B.

Figure 2: Mexicans inflows



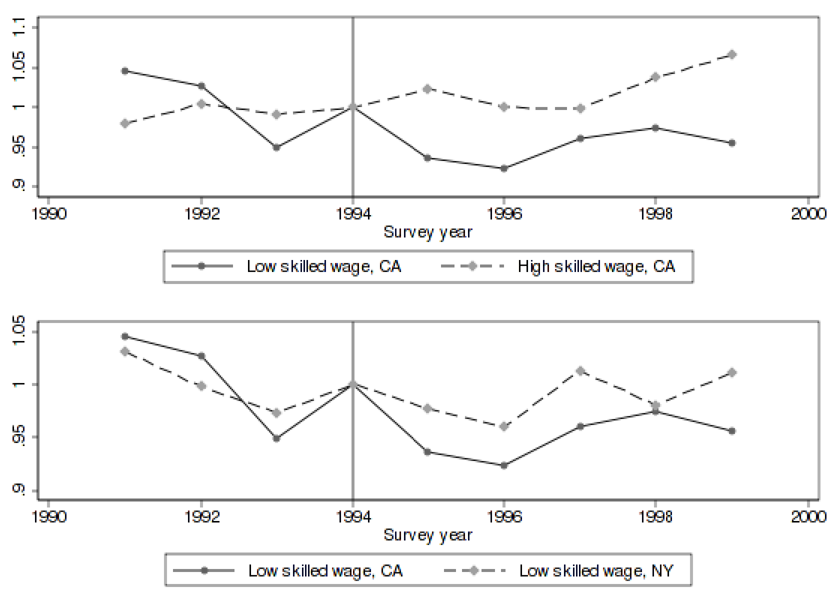
Notes: This figure plots direct and indirect measures of yearly inflows of Mexicans into the US. Details about these four graphs can be found in the main text.

Figure 3: US trade with Mexico



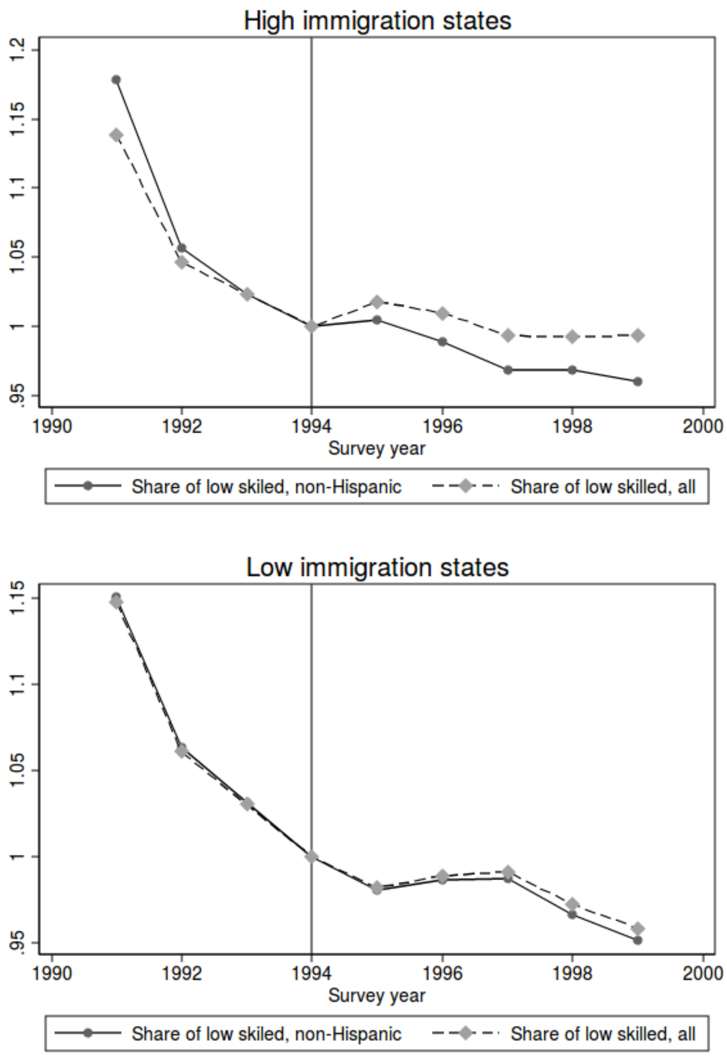
Note: Exports US-Mex are exports from the US to Mexico divided by US GDP. Imports US-Mex are imports to the US from Mexico divided by US GDP. Total US exports are exports from the US to the rest of the world divided by US GDP. Mexican exports to the US did not increase above trend in 1995, while US exports to Mexico decreased in 1995, potentially affecting labor market outcomes. At the same time US exports to the rest of the world were slightly above trend in 1995. Source: Census Bureau (http://www.census.gov/foreign-trade/balance/c2010.html)

Figure 4: Evolution of wages, raw data



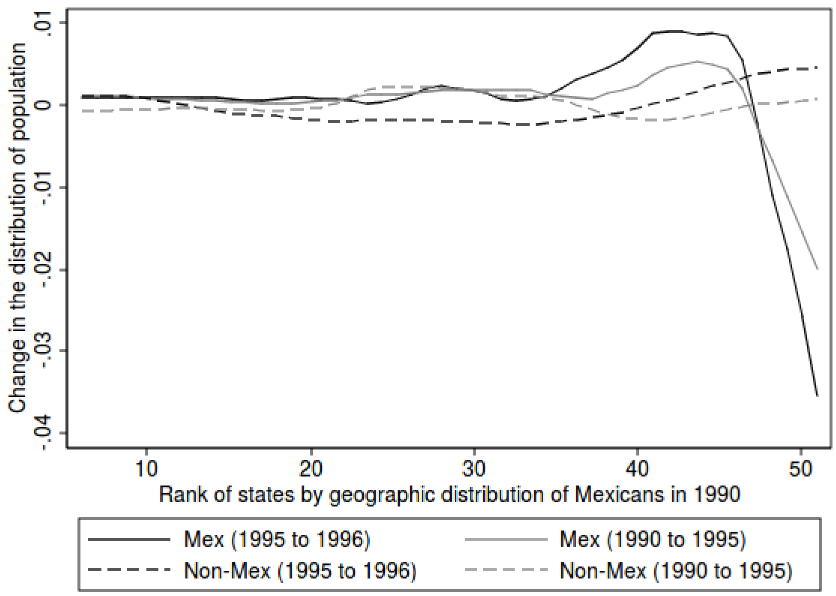
Note: The top graph reports the low- and high-skilled average wage in the high-immigration states, defined by the 1848 Mexican-US border. The bottom graph shows average low-skilled wages in high- and low-immigration states. I exclude Hispanics from the average low-skilled wage computations.

Figure 5: Share of low-skilled population in high- and low-immigration states



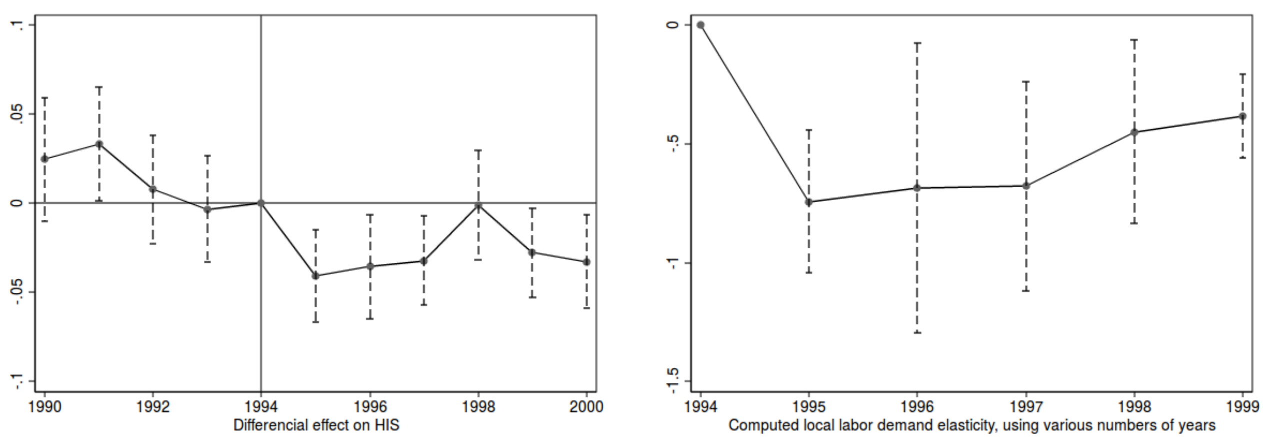
Notes: The two graphs in this Figure show the overall share of low-skilled and the non-Hispanic share of low-skilled population in high- and low-immigration states, defined by the 1848 borders. We observe that in 1995 the share of low-skilled workers increases in high- relative to low-immigration states relative to the share of low-skilled non-Hispanics. With some lag the share of both all and non-Hispanic low-skilled workers increases in low-immigration states. This is evidence, as discussed in the text, on relocation between high- and low-immigration states.

Figure 6: Internal relocation



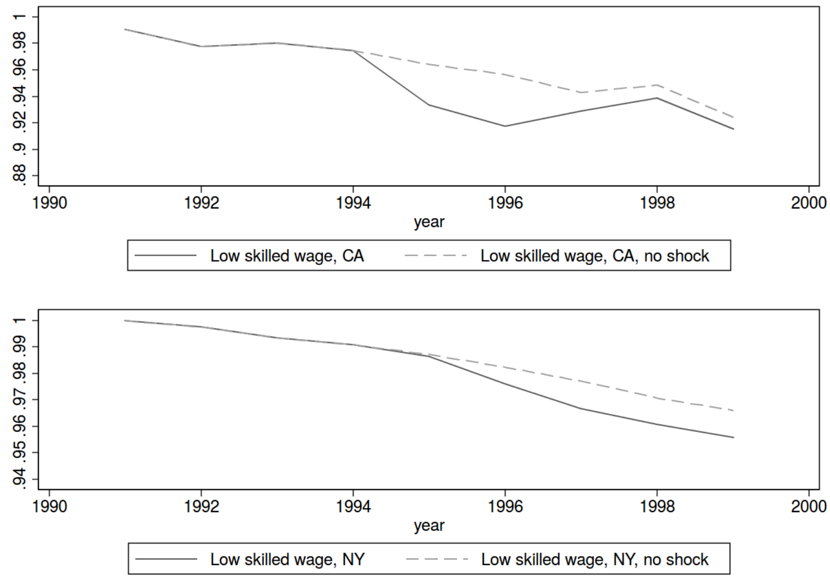
Notes: This graph shows the internal migration patterns over longer time horizons. It ranks states by its initial share of Mexicans (over total Mexican population in the US). It shows how Mexicans spread through the US during the 90s, and particularly in the last 5 years of the 90s. It also shows, how Mexicans moved from the top two Mexican immigration states to the next top 5 - top 10 Mexican immigration states. See more details in the text.

Figure 7: Wage differential by year



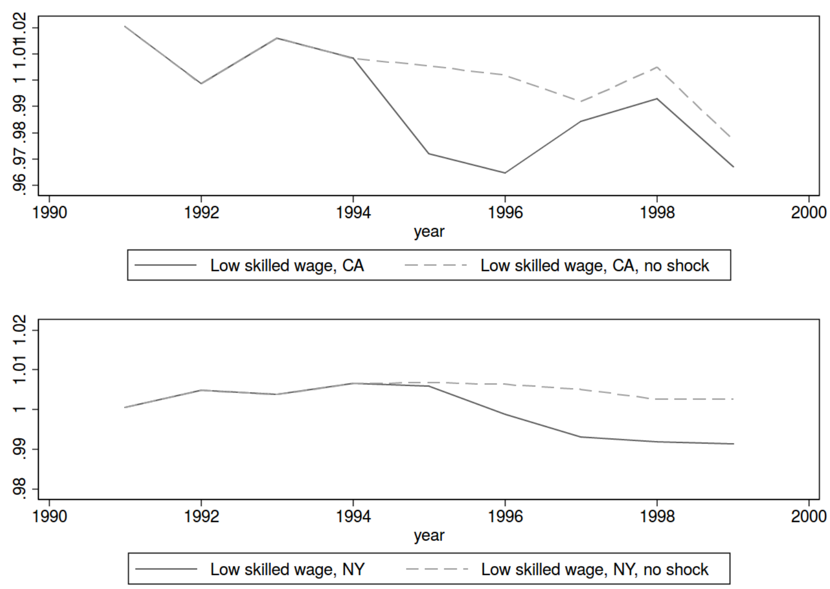
Notes: The graph on the left shows the relative low-skilled wage in all the high-immigration states relative to the low-immigration states. 90 percent confidence intervals constructed using standard errors clustered at the metropolitan area are reported. The graph on the right reports the coefficient and standard error of different measures of the local labor demand elasticity that are constructed using different lengths of the post-period. The estimate in 1995 is the estimate in the column (7) of Table 5. The estimate in 1996, uses 1995 and 1996 as the post-period. The estimate for 1999 is the estimate using Census data, and reported in column (2) - panel A Table 7. This figure shows that when I increase the time horizon the implied local labor demand elasticity is smaller, since internal migration dissipates the shocks.

Figure 8: Counterfactual wage evolution



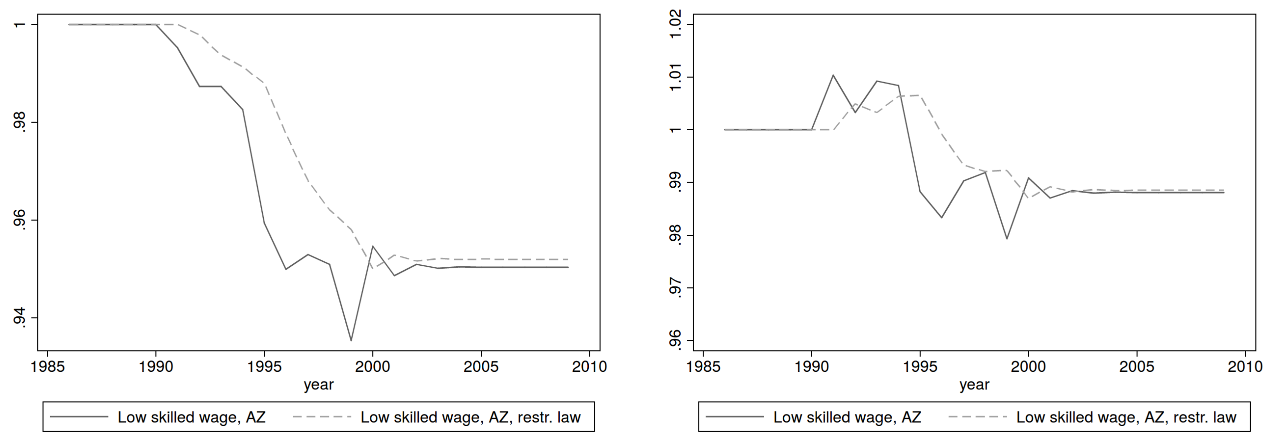
Notes: This figure shows the evolution of wages in the model with actual inflows of Mexicans and under the alternative that the Peso Crisis had not occurred. In this exercise, all inflows matter. This means that the accommodation of Mexican immigrants only occurs through labor relocation across states.

Figure 9: Counterfactual wage evolution



Notes: This figure shows the evolution of wages in the model with actual inflows of Mexicans and under the alternative that the Peso Crisis had not occurred. In this exercise, only inflows above average matter.

Figure 10: Counterfactual wage evolution



Notes: The figure on the left shows the evolution of wages in Arizona with actual inflows of Mexicans and under the alternative that Arizona had not received any Mexicans. In this exercise, all inflows matter. This means that the accommodation of Mexican immigrants only occurs through labor relocation across states. This figure on the right shows the evolution of wages in Arizona with actual inflows of Mexicans and under the alternative that Arizona had not received any Mexicans. In this exercise, only inflows above average matter.

Table 1: Mexican Stocks and Inflows

Variable	**Source**	**Number**	**year**
Mexican Stock	US Cen. 2000	4,274,710	1990
Mexican Stock	US Cen. 1990	3,699,873	1990
Mexican Stock	US Cen. 2000 + Mex. Cen.	6,140,924	1995
		(=5,909,696+231,228)	
Mexican Stock	US Cen. 2000	7,970,009	2000
Average Inflow 1990-2000 (workers)	US Cen. 2000	369,529.9	1990-95
Average Inflow 1990-1995 (workers)	US Cen. 2000 + Mex. Cen.	373,242.8	1990-95
Average Inflow 1995-2000 (workers)	US Cen. 2000 + Mex. Cen.	365,817	1995-00
Mexican Inflow (total)	Passel et al. (2012)	400,000	1992
Mexican Inflow (total)	Passel et al. (2012)	370,000	1993
Mexican Inflow (total)	Passel et al. (2012)	430,000	1994
Mexican Inflow (total)	Passel et al. (2012)	570,000	1995
Mexican Inflow (total)	Passel et al. (2012)	490,000	1996
Mexican Inflow (total)	Passel et al. (2012)	470,000	1997
Mexican Inflow (total)	Passel et al. (2012)	600,000	1998

Notes: This table reports the stocks and inflows of Mexicans in the US in different years. Sources of the estimates are also reported. Data from Censuses comes from Ruggles et al. (2008). Further details are provided in the text.

Table 2: Summary statistics

Variable	Mean	Std. Dev.	N
Labor Market Outcomes			
Average (log weekly) wage, low-skilled non-Mexicans	5.953	0.099	102
Average (log weekly) wage, high-skilled	6.307	0.124	102
Observations low-skilled non-Mexicans	378.52	289.313	102
Observations low-skilled	516.647	425.843	102
Full time employed, low-skilled	756,413.587	779,010.954	102
Full time employed, high-skilled	984,069.74	1,093,654.666	102
Share Mexicans, low-skilled	0.055	0.119	102
Share Mexican in 1980	0.005	0.012	102
GDP and exports			
(ln) US-Mexico exports	18.97	1.798	102
(ln) state GDP	11.336	1.024	102

Notes: These are the main variables used in the analysis of the causal effect of immigration on wages. The averages are unweighted, so do not necessarily coincide with the true US average. This data covers years the 1994-1995, i.e. before and after the shock.

Table 3: Mexican skill levels in 1994

Skill	Share Mex (bpl)	Share Mex (hispan)	Share pop
Entire US			
Low	0.057	0.058	0.521
High	0.013	0.015	0.479
California			
Low	0.315	0.324	0.517
High	0.068	0.076	0.483

Notes: This table shows that a large share of Mexicans are low skilled workers, and account for a large fraction of the Californian low-skilled labor force. It also shows that using as a definition of Mexican workers the hispan variable or the birth place variable in the March CPS does not make a big difference.

Table 4: First stage regressions for the estimation of the causal effect of Mexican immigration on wages

VARIABLES	(1) Share Mexican LS OLS	(2) Share Mexican LS OLS	(3) Share Mexican HS OLS	(4) Share Mexican HS OLS
Share of Mexicans in 1980, LS	6.005	0.431		
	(0.185)	(0.0882)		
Share of Mexicans in 1980, HS			5.851	0.0651
			(0.244)	(0.283)
Observations	51	51	51	51
R-squared	0.968	0.227	0.928	0.002
First Differenced	no	yes	no	yes

Notes: This table shows the regression of the share of Mexicans in the labor force at the state level in 1995 on the same variable in 1995. It also shows the same regression but first differencing the dependent variable. This table is the first stage regression for the IV in Table 5. Robust standard errors are reported. See more details in the text.

Table 5: Causal effect of immigration on wages, low-skilled workers

VARIABLES	(1) Wage LS non-Mex OLS	(2) Wage LS non-Mex IV	(3) Δ Wage LS non-Mex OLS	(4) Δ Wage LS non-Mex OLS	(5) Δ Wage LS non-Mex IV	(6) Δ Wage LS non-Mex IV	(7) Δ Wage LS Ind. controls IV
Share of Mexicans, LS	-0.0143	-0.0178					
	(0.0552)	(0.0539)					
Δ Share of Mexicans, LS			-0.611	-0.746	-1.467	-1.347	-0.744
			(0.293)	(0.293)	(0.521)	(0.449)	(0.300)
Δ (log) exports to Mexico				0.0106	0.0126	0.00915	0.00806
				(0.0139)	(0.0126)	(0.0131)	(0.00981)
Δ (log) state GDP				0.417	0.685	0.568	0.135
				(0.463)	(0.511)	(0.500)	(0.398)
Δ (log) high skilled labor				-0.131	-0.180	-0.208	-0.0731
				(0.143)	(0.143)	(0.140)	(0.0952)
Δ (log) low skilled labor				-0.00614	0.0365	0.0168	0.0850
				(0.120)	(0.118)	(0.114)	(0.0873)
Observations	51	51	51	51	51	51	51
R-squared	0.001	0.001	0.081	0.121	0.022	0.040	0.069
Wages detrended	no	no	no	no	no	yes	yes
widstat		1058				23.75	23.75

Notes: This table shows the regression of the average low-skilled native wage at the state level on the share of low-skilled Mexicans relative to low-skilled workers in 1995. The first two columns report the regressions in levels, while the next 5 report the first differenced (using 1994 data) regressions. It shows that wages of native low-skilled workers decrease with an immigration induced supply shock at the local level. 'LS' indicates 'Low-skilled'. Column 7, which is my preferred estimate, reports average wages controlling for individual characteristics using Mincerian regressions. It also uses 1992-1994 (instead of only 1994) as the pre-shock wage levels. Robust standard errors are reported. See more details in the text.

Table 6: Causal effect of immigration on wages, high-skilled workers

VARIABLES	(1) Wage HS non-Mex OLS	(2) Wage HS non-Mex IV	(3) Δ Wage HS non-Mex OLS	(4) Δ Wage HS non-Mex OLS	(5) Δ Wage HS non-Mex IV	(6) Δ Wage HS non-Mex IV	(7) Δ Wage HS Ind. controls IV
Share of Mexicans, LS	0.142	0.158					
	(0.0831)	(0.0711)					
Δ Share of Mexicans, LS			-0.364	-0.320	0.172	0.192	0.364
			(0.249)	(0.270)	(0.336)	(0.375)	(0.203)
Δ (log) state GDP				-0.295	-0.479	-0.576	-0.131
				(0.370)	(0.412)	(0.418)	(0.272)
Δ (log) exports to Mexico				0.0107	0.00935	0.00474	0.00553
				(0.0102)	(0.0107)	(0.0105)	(0.00787)
Δ (log) high skilled labor				-0.0649	-0.0316	-0.0149	0.0395
				(0.100)	(0.0873)	(0.0857)	(0.0565)
Δ (log) low skilled labor				-0.0517	-0.0808	-0.0690	-0.0384
				(0.130)	(0.125)	(0.127)	(0.0864)
Observations	51	51	51	51	51	51	51
R-squared	0.048	0.047	0.034	0.059	0.005	0.004	-0.065
Wages detrended	no	no	no	no	no	yes	yes
widstat		1058			23.75	23.75	23.75

Notes: This table shows the regression of the average high-skilled wage at the state level on the share of low-skilled Mexicans (relative to low-skilled workers) in 1995. It is the same table as 5 but using high-skilled wages as the dependent variable. It shows that low-skilled immigration did not affect high-skilled wages. The first two columns report the regressions in levels, while the next 5 report the first differenced (using 1994 data) regressions. 'HS' indicates 'High-skilled'. Robust standard errors are reported. See more details in the text.

Table 7: Wage gap between high- and low-skilled workers

VARIABLES	(1) Wage Gap OLS	(2) Wage Gap IV	(3) Δ Wage Gap OLS	(4) Δ Wage Gap OLS	(5) Δ Wage Gap OLS	(6) Δ Wage Gap IV	(7) Δ Wage Gap IV	(8) Δ Wage Gap IV
Share of Mexicans, LS	0.0476	0.0564						
	(0.0324)	(0.0256)						
Δ Share of Mexicans, LS			0.389	0.447	0.477	0.877	0.874	0.939
			(0.302)	(0.335)	(0.319)	(0.378)	(0.332)	(0.351)
Δ Relative labor supply				0.0422	0.0425		0.0687	0.0698
				(0.0808)	(0.0823)		(0.0759)	(0.0756)
Δ (log) state GDP					-0.166			-0.327
					(0.472)			(0.533)
Δ (log) exports to Mexico					0.000996			-0.000244
					(0.00964)			(0.00932)
Observations	51	51	51	51	51	51	51	51
R-squared	0.023	0.022	0.028	0.035	0.038	.	0.004	0.003
widstat	.	1058	.	.	.	23.83	37.38	27.37

Notes: This table shows the regression of the wage gap between high- and low-skilled workers on the share of Mexicans in the low-skilled labor force between 1994 and 1995. The wage gap is computed as the adjusted average wage of high-skilled workers, divided by the adjusted average wage of low-skilled workers. See more details in the text.

Table 8: The short-run relocation response

VARIABLES	(1) Share LS OLS	(2) Share LS IV	(3) Δ Share LS OLS	(4) Δ Share LS OLS	(5) Δ Share LS IV	(6) Δ Share LS OLS	(7) Δ Share LS OLS	(8) Δ Share LS IV
	1995			1995			1996	
Share of Mexicans (over population)	0.0978	0.0943						
	(0.0999)	(0.0958)						
Δ Share of Mexicans			1.026	1.043	1.140			
			(0.233)	(0.254)	(0.244)			
Δ (log) exports to Mexico				-0.00389	-0.00401			
				(0.00512)	(0.00493)			
Δ (log) state GDP				-0.00459	-0.0141			
				(0.148)	(0.137)			
Lagged Δ share of Mexicans						-0.157	-0.117	-0.817
						(0.400)	(0.425)	(0.381)
LaggedΔ (log) exports to Mexico							-0.00615	-0.00468
							(0.00414)	(0.00414)
Lagged Δ (log) state GDP							-0.0279	0.0798
							(0.160)	(0.172)
Observations	51	51	51	51	51	51	51	51
R-squared	0.012	0.012	0.164	0.171	0.170	0.004	0.022	-0.030
First Differenced	no	no	yes	yes	yes	yes	yes	yes
widstat		3888			26.37			26.37

Notes: This figure shows that in 1995 when the inflow of Mexican workers increased, the share of low-skilled population increases 1 for 1. The year after, this share reverts back to trend. All regressions instrument the change in the share of Mexican by the share of Mexicans by state in 1980. Lagged variables are instrumented by the lagged instrument. Robust standard errors are reported. See more details in the text.

Table 9: The short-run native relocation response

VARIABLES	(1) Share native LS OLS	(2) Share native LS IV	(3) Δ Share native LS OLS	(4) Δ Share native LS OLS	(5) Δ Share native LS IV	(6) Δ Share native LS OLS	(7) Δ Share native LS OLS	(8) Δ Share native LS IV
	1995			1995			1996	
Share of Mexicans (over population)	-0.465	-0.470						
	(0.166)	(0.166)						
Δ Share of Mexicans			0.318	0.287	0.0146			
			(0.320)	(0.349)	(0.516)			
Δ (log) exports to Mexico				-0.000928	-0.000596			
				(0.00410)	(0.00394)			
Δ (log) state GDP				0.0742	0.101			
				(0.151)	(0.150)			
Lagged Δ share of Mexicans						-0.242	-0.150	-0.748
						(0.460)	(0.477)	(0.406)
Lagged Δ (log) exports to Mexico							-0.0102	-0.00949
							(0.00495)	(0.00504)
Lagged Δ (log) state GDP							-0.0983	-0.0375
							(0.167)	(0.179)
Observations	51	51	51	51	51	51	51	51
R-squared	0.175	0.175	0.018	0.023	0.010	0.008	0.055	0.012
First Differenced	no	no	yes	yes	yes	yes	yes	yes
widstat		3888			26.37			25.90

Notes: This figure shows that in 1995 when the inflow of Mexican workers increased, the share of native low-skilled population does not increases 1 for 1. The year after, this share responds to the Mexican shock of 1995. All regressions instrument the change in the share of Mexican by the share of Mexicans by state in 1980. Lagged variables are instrumented by the lagged instrument. Robust standard errors are reported. See more details in the text.

Table 10: Long-run effect of Mexican immigration on low-skilled wages

VARIABLES	(1) OLS	(2) IV	(3) OLS	(4) IV
	Δ (log) Low Skilled Wages, 1990-2000			
Relative Inflow of Mexicans, 1990 - 2000	-0.114	-0.383	-0.396	-0.735
	(0.171)	(0.175)	(0.103)	(0.141)
Observations	51	51	48	48
R-squared	0.031	.	0.180	0.048
Cross-state	yes	yes		
Cross-age			yes	yes
widstat		35.38		43.35
	Δ (log) High Skilled Wages, 1990-2000			
Relative Inflow of Mexicans, 1990 - 2000	0.185	0.0762	0.139	-0.142
	(0.0775)	(0.0807)	(0.161)	(0.212)
Observations	51	51	48	48
R-squared	0.182	0.119	0.012	.
Cross-state	yes	yes		
Cross-age			yes	yes
widstat		35.38		43.35
	First Stage			
	Relative Inflow of Mexicans, 1990 - 2000			
Share of Mexicans among Low Skilled in 1980		1.369		
		(0.230)		
Predicted migrants competing with each cohort				0.473
				(0.0718)
Observations		51		48
R-squared		0.684		0.427

Notes: This table shows the results of regressing the percentage change in native low-skilled weekly wage on the change in labor supply accounted for the Mexicans arriving in the US between 1990 and 2000. The IV for the cross-state comparisons is the immigration networks, while the IV for the cross-age comparisons is the interaction between the age distribution of immigrants and the aggregate yearly inflows in the 1990s. I use 48 age categories and 50+1 states. Robust standard errors are reported. See more details in the text.

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Everything that follows is for online publication only

A Appendix: Empirics

A.1 Geography robustness

An important robustness check is to see whether the short-run results on wages are driven by California or Texas exclusively. I do so by excluding these two states, either separately or simultaneously from the OLS regressions presented in Table 5. I use OLS instead of IV because the first stage is, when excluding California and Texas, not sufficiently strong.

[Table C2 should be here]

Table C2 shows very similar estimates independent of whether I drop California, Texas or both.

A.2 Substitutability between high school drop-outs and graduates

A second important robustness check is to use only high school drop-outs or high school graduates when computing low-skilled wages. Borjas (2003) distinguishes these two groups suggesting that they are imperfect substitutes, while Card (2009) strongly criticizes this assumption.

[Table C3 should be here]

Table C3 shows that the results are very similar between high school drop-outs and high school graduates. This is consistent with Card (2009) argument that these two types of workers are closely competing. The standard errors increase for the smaller group of high school drop-outs, as should be the case.

A.3 Excluding foreign-born from the computation of non-Mexicans wages

A final robustness check that I present is that instead of excluding only Mexicans from the computation of low-skilled wages, I exclude all non-US foreign born. Doing so does not change the results, as can be seen in Table C4

[Table C4 should be here]

A.4 Comparing the evidence from the Mexican Peso crisis and the Mariel Boatlift

I have argued before that my results are consistent with much of the literature. The one study for which this appears not to be true is Card's (1990) landmark study of the Mariel Boatlift. Card (1990) also looked at short-term effects of immigration inflows but, unlike this paper, found essentially no effects. What explains this difference? This section examines it in more detail.

In April 1980, Fidel Castro allowed Cubans willing to emigrate to do so from the port of Mariel. These Cubans – the "Marielitos" – were relatively low-skilled and some of them had allegedly been released from prisons and mental hospitals by Cuban authorities (Card, 1990). As a result, around 125,000 Cubans migrated to the US between late April 1980 and October 1980. Slightly under half of them probably settled in Miami. Card (1990) uses this natural experiment to assess the effect of immigration on the labor market. Using a group of four comparison cities – Tampa, Houston, Atlanta and Los Angeles – Card (1990) reports no effect of Cuban immigrants on any group of the Miami labor force.[37] These findings are contrary to what is reported in this paper.

Two reasons could explain these differences. A first point is simply that although Card's point estimates are near zero, the standard errors are not small enough to rule out effects of the size I document in this paper. In addition, I can show that his estimates are somewhat sensitive to the choice of data set. I am able to replicate Card's findings when using the CPS merged Outgoing Rotation files, but when using the alternative March CPS supplements I find that average wages of low-skilled workers decreased by almost 8 percent while wages of high-skilled workers increased by 4 percent. Both estimates are, however, imprecise. The results using the Mexican shock are not dependent on the data set I use.

Second, and perhaps more importantly, as Card (1990) acknowledges, the nature of the "Marielitos" – who were perhaps not ready to enter the labor market immediately – and the particularities of Miami may, in part, explain why there is no evidence of a negative effect on wages. By contrast, Mexicans moving to the US in 1995 do not appear to be specially selected nor did they migrate to a singular local labor market, and therefore, their effects may be more representative of the effects of low-skilled immigrants in the US.

It is worth emphasizing that the results reported in this paper are very much in-line with the results reported in Borjas (2015).

A.5 Long-run relocation in decennial data

By looking at the patterns of long-run relocation across states we can disentangle the two scenarios used in the calibration of the model is more likely. This also needs to be in line with the qualitative evidence in Figure 5. Finally, it is important to re-examine the long-run evidence using Census data, to align the findings in this paper with those of previous literature. To do so, I use the specification 5 previously shown, but between 1990 and 2000.

[Table C5 should be here]

Table C5 shows the results. The first three columns show that in 1980 Mexicans entered states where the share of low-skilled workers was lower. Over the following two decades, the share of low-skilled workers increased more in initially high-immigration states, as can be seen in columns 2 and 3. Column 4 is yet another way of looking at the first stage regression of the immigration networks instrument used in the immigration literature. We observed that the importance of Mexicans in the low-skilled labor force in 1980 is a good predictor of where the share of Mexicans would increase more during the 90s. This is the instrument used in column 6 and 8. Columns 5 and 6 estimate the relocation equation 5. The OLS and IV estimates of columns 5 and 6 suggest that for every low-skilled Mexican entering a high-immigration state, the state gains 0.8 low-skilled workers. This estimate decreases to .6 when controlling for the 1980 distribution of low-skilled workers in the US. This is consistent with the estimates in Wozniak and Murray (2012). This is also certainly consistent with Figure 5 and with the story that while high-immigration states absorb an important share of low-skilled Mexicans by increasing the use of this factor locally, unexpected shocks can be accommodated through internal migration. Monras (2015a) suggests that this is a consequence of reduced

[37] Card distinguishes by racial groups and quartiles in the wage distribution.

in-migration into shocked locations which explains the fast response, but CPS data is limited to explore this further in this paper.

B Appendix: Data

B.1 Geographic disaggregation

The geographic units that I use in this paper are US states. There is some discussion in the literature as to what the appropriate geographic disaggregation to represent a local labor market is. Card (2009) argues that metropolitan areas probably provide the appropriate level of analysis. When using Census data there are many metropolitan areas with many individual level observations. This is different with CPS data. As an example, there are only 11 metropolitan areas in the March CPS data for 1995 that have more than 500 individual level observations. Another drawback of using metropolitan areas is that we would lose nearly 24,000 individual observations that lack metropolitan area information. This is a lot of information given the sample size in the CPS.

This suggests using a partition of the US territory, an observation also made in Autor and Dorn (2009). They use commuting zones (CZ), which are constructed based on commuting patterns from the 1990 US Census based on the work by Tolbert and Sizer (1996). This results in 722 different CZs that cover the entire US. The number of commuting zones, however, is too large for the CPS data. The CPS data has around 150,000 observations per year.[38] This means that if I were to use all the CZs I would only have around 70 observations per CZ on average. Moreover, since I distinguish between high- and low-skilled workers I would end up with geographic units of around 35 observations. Given the variance in wages in the US, this is not a feasible geographic unit. This leaves me with states as natural candidates for a geographic disaggregation, which I use throughout the paper.

B.2 Definition of Mexicans

When using Census data or post-1994 CPS data I define Mexicans by the place of birth. When using CPS data before 1994 I use the variable HISPAN from the CPS. I use the category "Mexican(Mexicano)" – value 108 – when plotting or using data before 1994. When plotting various years, I keep the definition fixed at the pre-1994 definition.

For data after 1994 and US Census data, I use the variable BPLD from the March CPS and Census 1990 and 2000 files, Ruggles et al. (2008).

B.3 Definition of low-skilled

Low-skilled workers are defined as having a high school diploma or less. I use the variable EDUC from the CPS to do so.

B.4 Definition of worker

I use full-time workers to compute wages. This is constructed using the EMPSTAT variable from the CPS. I exclude from the wage computations workers who are self-employed or in group quarters. I correct for top coding following the literature. I limit the analysis to workers aged 18 to 65.

[38] This number includes all individuals irrespective of age. Around 60,000 observations can be used to compute wages.

B.5 Individual characteristics and weights

In some micro-level Mincerian regressions, I include individual characteristics as controls. These include age and age square, race dummies (using directly the CPS variable), marital status, and occupation dummies. I aggregate the occupation OCC1990 variable to 24 larger groups, based on the definition of this variable in Ipums.

In all the wage computations, regressions, and graphs I use the weights coming from the WTSUPP. For the internal relocation results I do not use weights, and instead focus on individual observations. The distribution of weights between natives and immigrants changes dramatically between 1995 and 1996, as can be seen very clearly in Figure C.1. This could contaminate some of the results on relocation, or in general any regression that compares pre and post 1995 data. While the results using the weights are similar to the ones reported in the paper, using WTSUPP results in more imprecise estimates. The only significant difference is that when using WTSUPP, there is a net-outflow of Mexicans in 1996. This is unlikely and entirely driven by the change in the distribution of weights between 1995 and 1996. For the graphs showing the aggregate Mexican stock and Mexican inflow data I use the average weight of all Mexican observations thorught the decade for every year. This gives me a better estimate of the level of these variables. For the differences (which are used in the regressions) this hardly matters.

[Figure C.1 should be here]

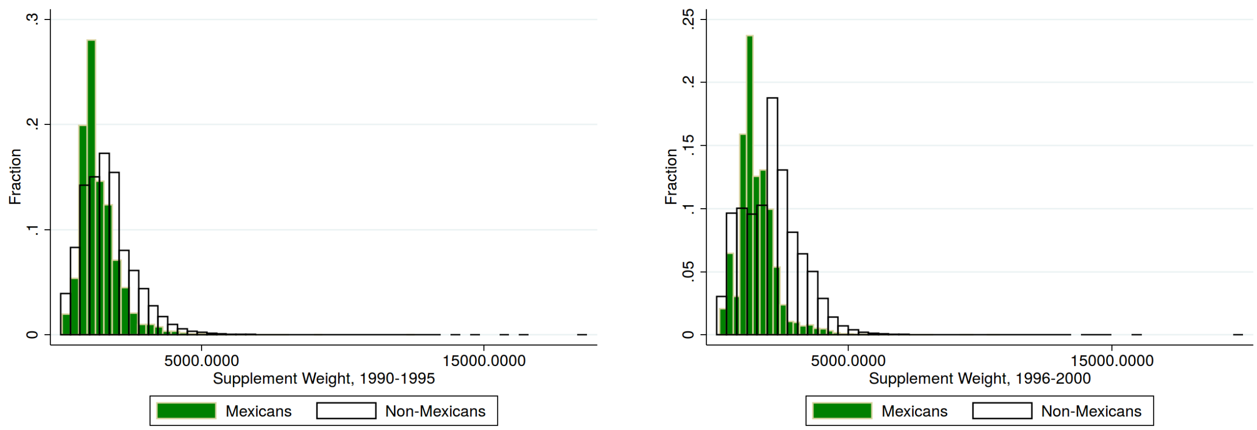
When aggregating to the state level, I use the number of observations used to compute the averages in each cell. I use this in the regressions, using the analytic weights command from stata.

B.6 Aggregation of occupations

I create these categories following the aggregation proposed in Ruggles et al. (2008): Management Occupations, Business Operations Specialists, Financial Specialists, Computer and Mathematical Occupations, Architecture and Engineering Occupations, Life, Physical, and Social Science Occupations, Community and Social Services Occupations, Legal Occupations, Education, Training, and Library Occupations, Arts, Design, Entertainment, Sports, and Media Occupations, Healthcare Practitioners and Technical Occupations, Healthcare Support Occupations, Protective Service Occupations, Food Preparation and Serving Occupations, Building and Grounds Cleaning and Maintenance Occupations, Personal Care and Service Occupations, Sales Occupations, Office and Administrative Support Occupations, Farming, Fishing, and Forestry Occupations, Construction Trades, Extraction Workers, Installation, Maintenance, and Repair Workers, Production Occupations, Transportation and Material Moving Occupations.

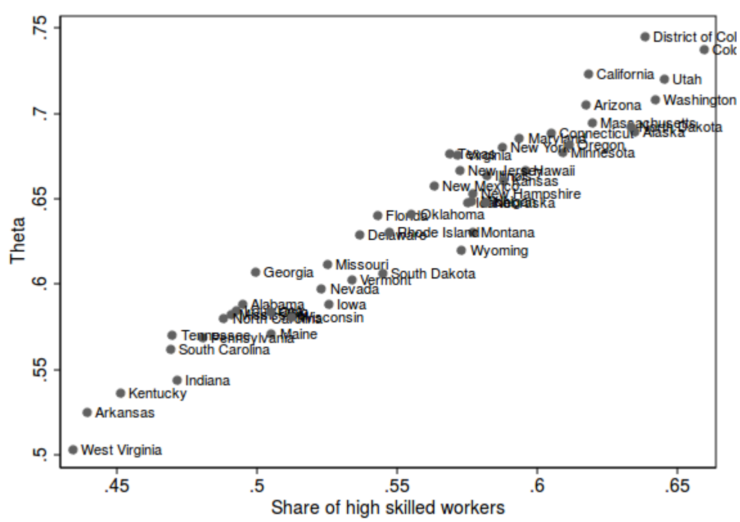
C Appendix: Figures and Tables

Figure C.1: Share of Mexicans in the US low-skilled labor force, CPS data



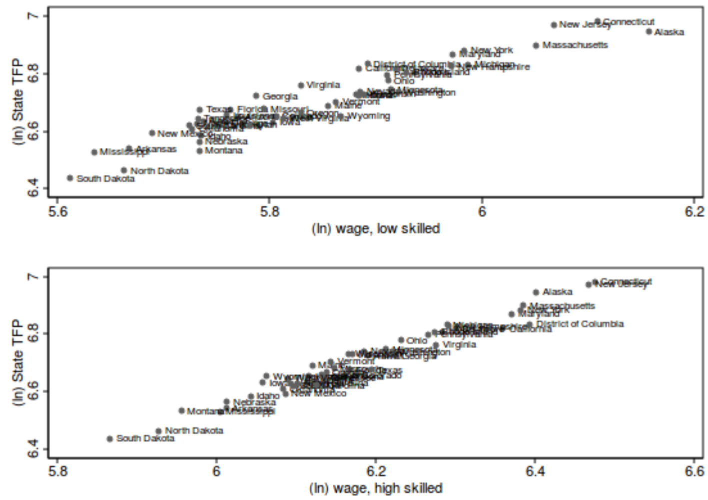
Notes: This Figure shows the distribution of supplement weights before and after 1995, separating Mexican and non-Mexican workers.

Figure C.2: Share of high-skilled workers and production technology



Notes: This figure shows the share of high-skilled workers and the calibrated θ_s in 1990.

Figure C.3: Productivity levels and wages



Notes: This figure shows the productivity levels B_s and high- and low-skilled wages in 1990.

Table C1: Comparison between 1994 and 1995-96 samples

	Mexican born				
Variables	Obs	Mean	Obs	Mean	MeanDiff
	1994		1996 and 1996		
age	6057	34.86	2749	34.64	0.216
male dummy	6057	0.525	2749	0.517	0.00800
white dummy	6057	0.909	2749	0.928	-0.019***
maried dummy	6057	0.654	2749	0.643	0.0100
Employed Full time	6057	0.460	2749	0.452	0.00800
Years of Education	6057	8.264	2749	8.186	0.0780
Salary worker dummy	6057	0.628	2749	0.623	0.00500
Occupation category	3961	18.14	1790	18.09	0.0530
Industry category	4152	5.855	1865	5.896	-0.0410
Mexican dummy (hispan)	6057	0.892	2749	0.874	0.018**
Supplement Weight	6057	1560	2749	1566	-5.856
	Overall Population				
Variables	Obs	Mean	Obs	Mean	MeanDiff
	1994		1996 and 1996		
age	78911	40.38	43407	40.41	-0.0340
male dummy	78911	0.470	43407	0.467	0.00300
white dummy	78911	0.823	43407	0.831	-0.008***
maried dummy	78911	0.579	43407	0.589	-0.010***
Employed Full time	78911	0.489	43407	0.474	0.015***
Years of Education	78911	11.27	43407	11.27	0.00500
Salary worker dummy	78911	0.511	43407	0.497	0.014***
Occupation category	51924	15.24	28525	15.33	-0.090*
Industry category	56038	7.132	30846	7.151	-0.0190
Mexican dummy (hispan)	78911	0.0120	43407	0.00800	0.003***
Supplement Weight	78911	1923	43407	1769	153.586***

Table C2: Causal effect of immigration on wages, geographic robustness check

VARIABLES	(1) Δ Wage LS Ind. controls OLS	(2) Δ Wage LS Ind. controls OLS	(3) Δ Wage LS Ind. controls OLS
Δ Share of Mexicans, LS	-0.427	-0.536	-0.458
	(0.243)	(0.223)	(0.261)
Δ (log) exports to Mexico	0.00848	0.00689	0.00796
	(0.0111)	(0.0111)	(0.0113)
Δ (log) state GDP	0.0290	0.0268	0.0148
	(0.386)	(0.387)	(0.390)
Δ (log) high skilled labor	-0.0462	-0.0553	-0.0458
	(0.0973)	(0.0966)	(0.0970)
Δ (log) low skilled labor	0.0629	0.0663	0.0597
	(0.0939)	(0.0933)	(0.0942)
Observations	50	50	49
R-squared	0.061	0.092	0.065
State excl.	CA	TX	CA, TX

Notes: This table shows the regression of the average low-skilled wage at the state level (controlling for individual level characteristics using Mincerian regressions) on the share of low-skilled Mexicans (relative to low-skilled workers) in 1995 relative to 1992-1994. 'LS' indicates 'Low-skilled', 'UC' indicates that the variable is adjusted for a 10 percent undercount of Mexican workers in 1995. This table shows OLS regressions excluding California and/or Texas. I do not report the IV results because in some cases the first stage is not sufficiently strong. See more details in the text.

Table C3: Causal effect of immigration on wages, high school drop-outs and high school graduates

VARIABLES	(1) Wage HSDO non-Mex OLS	(2) Wage HSG non-Mex OLS	(3) Wage HSDO non-Mex OLS	(4) Wage HSG non-Mex OLS	(5) Wage HSDO non-Mex IV	(6) Wage HSG non-Mex IV	(7) Wage HSDO non-Mex IV	(8) Wage HSG non-Mex IV
Share of Mexicans, LS (FD)	-0.897	-0.739	-0.869	-0.675	-0.245	-1.577	-0.237	-1.320
	(0.865)	(0.277)	(0.882)	(0.239)	(0.820)	(0.369)	(0.785)	(0.295)
(log) state GDP (FD)	0.580	0.452	0.380	0.353	0.309	0.755	0.117	0.586
	(1.696)	(0.399)	(1.705)	(0.402)	(1.612)	(0.505)	(1.617)	(0.463)
(log) exports to Mexico (FD)	-0.0145	0.0187	-0.0100	0.0152	-0.0191	0.0218	-0.0146	0.0176
	(0.0471)	(0.0127)	(0.0489)	(0.0131)	(0.0461)	(0.0114)	(0.0477)	(0.0116)
(log) high skilled labor (FD)	-0.142	-0.141	-0.191	-0.158	-0.0568	-0.217	-0.109	-0.217
	(0.419)	(0.112)	(0.423)	(0.109)	(0.398)	(0.118)	(0.404)	(0.111)
(log) low skilled labor (FD)	-0.0310	0.00846	-0.102	0.00550	-0.0755	0.0553	-0.146	0.0415
	(0.341)	(0.113)	(0.340)	(0.107)	(0.336)	(0.117)	(0.336)	(0.108)
Observations	51	51	51	51	51	51	51	51
R-squared	0.027	0.163	0.029	0.150	0.015	-0.000	0.017	0.045
First Differenced	yes	yes	yes	yes	yes	yes	yes	yes
Instrumented	no	no	no	no	yes	yes	yes	yes
Wages detrended	no	no	yes	yes	no	no	yes	yes
widstat					97.36	30.83	97.36	30.83

Notes: This table shows the regression of the average low-skilled wage at the state level separating high school drop-outs and high school graduates on the share of low-skilled Mexicans (relative to low-skilled workers) in 1995 relative to 1992-1994. See more details in the text.

Table C4: Causal effect of immigration on wages

VARIABLES	(1) Wage LS Ind. controls OLS	(2) Wage LS Ind. controls OLS	(3) Wage LS Non-FB OLS	(4) Wage LS Ind. controls IV	(5) Wage LS Ind. controls IV	(6) Wage LS Non-FB IV
Δ Share of Mexicans, LS	-0.433	-0.506	-0.779	-0.670	-0.744	-1.165
	(0.201)	(0.215)	(0.279)	(0.328)	(0.300)	(0.552)
Δ (log) exports to Mexico		0.00742	0.0164		0.00806	0.0175
		(0.0109)	(0.0163)		(0.00981)	(0.0146)
Δ (log) state GDP		0.0458	0.494		0.135	0.638
		(0.382)	(0.490)		(0.398)	(0.502)
Δ (log) high skilled labor		-0.0570	-0.199		-0.0731	-0.225
		(0.0969)	(0.146)		(0.0952)	(0.144)
Δ (log) low skilled labor		0.0709	-0.00751		0.0850	0.0153
		(0.0930)	(0.124)		(0.0873)	(0.115)
Observations	51	51	51	51	51	51
R-squared	0.062	0.086	0.146	0.044	0.069	0.119
First Differenced	yes	yes	yes	yes	yes	yes
Wages detrended	yes	yes	yes	yes	yes	yes
Controls	no	yes	yes	no	yes	yes

Notes: This table considers different OLS and IV specifications, and shows that excluding all foreign born from the computation of non-Mexican low-skilled wages does not change any of the results presented in the paper. Robust standard errors reported. See more details in the text.

Table C5: The effect of Mexican immigration on the share of low-skilled workers across states in the long run

VARIABLES	(1) Share LS 1980 OLS	(2) Share LS 1990 OLS	(3) Share LS 2000 OLS	(4) Δ Mexicans LS 1990-2000 OLS	(5) Δ Share LS 1990-2000 OLS	(6) Δ Share LS 1990-2000 IV	(7) Δ Share LS 1990-2000 OLS	(8) Δ Share LS 1990-2000 IV
Share of Mexicans in 1980	-1.406			0.914				
	(0.247)			(0.0960)				
Share of Mexicans in 1990		-0.567						
		(0.121)						
Share of Mexicans in 2000			-0.0977					
			(0.104)					
Δ Share Mexican, 1990 - 2000					0.782	0.794	0.632	0.613
					(0.0544)	(0.0513)	(0.0913)	(0.0988)
Share of low skilled, 1980							-0.115	-0.119
							(0.0416)	(0.0423)
Observations	51	51	51	51	51	51	51	51
R-squared	0.335	0.177	0.018	0.822	0.664	0.664	0.716	0.716
widstat						90.49		65.32

Notes: This table shows the effect of Mexican migration in the distribution of skills across states. Mexican migrants moved in the 1980s to states that initially had a low share of low-skilled workers. The imperfect relocation of workers across space increased the share of low-skilled workers in high-immigration states. Robust standard errors are reported. The results reported in this Table are used to disentangle between the possible scenarios discussed in section 4.2.8.