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Low Skilled Local Labor Demand Shocks and Labor Market Outcomes: Evidence from the Mexican Tequila Crisis

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Low Skilled Local Labor Demand Shocks and Labor Market Outcomes: Evidence from the Mexican Tequila Crisis

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Abstract

How does immigration affect natives local wages? A vast literature considers this, much of it focused on Mexican immigration to the United States. Prior work emphasizes the importance of instrumenting for immigrant destinations, the key role of experience-skill cells, and the potential for spillovers to national markets. I build on these, using the Mexican 'Tequila Crisis' of the mid-1990s as an exogenous shock to immigration. Instrumentation thus includes both a time dimension for the shock period, plus a destination dimension as in prior work. The 1.5% immigration shock of the Tequila Crisis lowered the wages of young low skilled US natives by 1 to 1.5 percent. It also prompted interstate labor reallocation. The share of low skilled workers is estimated to decrease by 2 percentage points as a result of the shock. This explains why within five years, national markets adjust, leaving no evidence of differential spatial impact.

JEL Classification: F22, J20, J30

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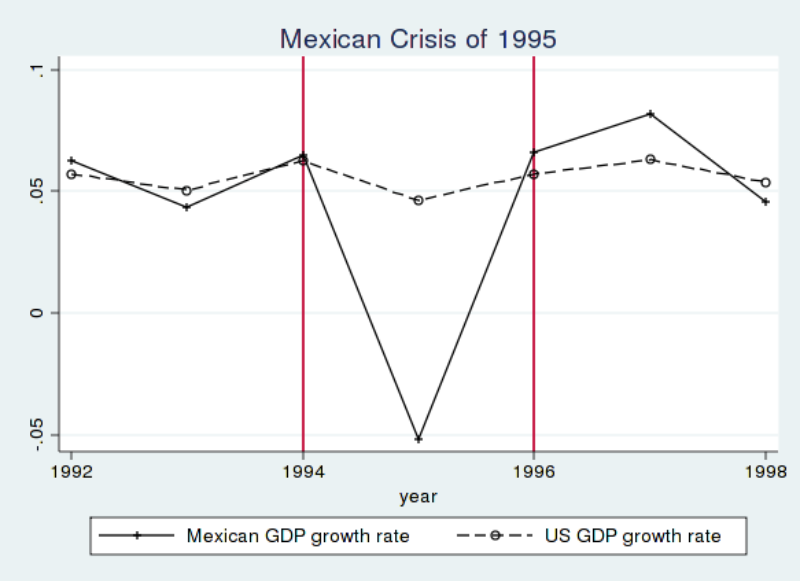
1 Introduction

Despite the large inflows of immigrants into many OECD countries since the late 1970s, there is no consensus on the causal impact of immigration on labor market outcomes. The reason for the lack of consensus is twofold. First, immigrants decide both where and when to migrate given the economic conditions in the source and host countries. Second, natives decide to move to a different location or change industries or occupations if immigrants compete with them in their jobs. The combination of these two endogenous decisions makes it hard for the researcher to estimate the causal effect of immigration on native labor market outcomes.

In this paper, I use the 'Mexican Tequila crisis' as an exogenous push factor to address these concerns. In December 1994, the government led by Ernesto Zedillo unexpectedly 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 that led to an economic crisis in Mexico. Figure 1 shows the US and Mexican GDP growth rates between 1992-1998. Mexican GDP growth fell 11 percentage points, from a positive 6% in 1994 to a negative 5% in 1995. This occurred while US GDP maintained a fairly constant growth rate of around 5%:

Figure 1: Mexican and US GDP growth rates 1991-1999



Notes: This figure shows Mexican and US total GDP growth rates by year. Vertical lines indicate the period 1994-1996.

This deep recession prompted many Mexicans to emigrate. Precise estimates on how many Mexicans actually emigrated are hard to obtain (see (Passel, 2005), (Passel et al., 2012) or (Hanson, 2006)). Many Mexicans go to the US illegally, sometimes escaping the count of US statistical agencies. However, most sources point to the fact that 1995 was a high immigration year[1]. As a result of the Mexican crisis migration flows to the US were likely 50% higher in 1995 than in a typical year of the 1990s[2]. A related piece of evidence is the marked increase in 'coyote' prices starting in 1995[3] -the price of the smuggler that facilitates migration across the Mexican-US border.

[1]Using data from the 2000 US Census, from the US Department of Homeland Security (documented immigrants) or estimates of undocumented immigrants from the Immigration and Naturalization Service as reported in (Hanson, 2006) or estimates from (Passel et al., 2012) we see an unusual spike in the inflow of immigrants in 1995. I will discuss the numbers on immigration arrivals later in this paper. Several things are worth taking into account at this point. The Immigration Act of 1990 increased the number of immigrants allowed into the US, probably encouraging more people to immigrate or ask for admission (despite being in the US for some time) in 1991. This is why I report my numbers starting in 1992, centred in 1995 -the year of the shock-.

[2]This is around 160,000 more Mexicans than in a normal year. See the data description section for more details.

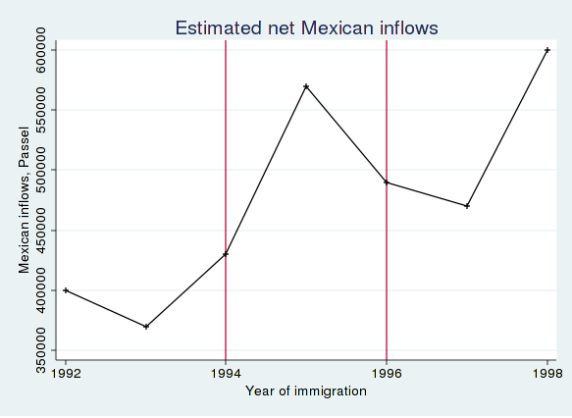
[3]See (Hanson, 2006). Unfortunately his data do not expand to the end of the 1990s.

This may be in part due to increased border enforcement, but it also probably reflects the increased willingness to emigrate from Mexico. Figure 2 shows the best existing estimates of Mexican yearly inflows by (Passel et al., 2012)[4]. The lower panel of Figure 2 shows that real low skilled wages, with a lag, appear to move inversely to the inflows of the corresponding workers from Mexico[5]. On its face, Mexican inflows appear to depress US low skilled wages.

[4]In the empirical section I complement these with my own estimates on net flows based on US and Mexican Censuses.

[5]CPI base year for real wages is 1999. The sensitivity of migration flows to home country economic conditions is well known, see (Hanson and Spilimbergo, 1999) or (Hanson and Grogger, 2011). In the rest of the paper I use the weekly wage in stead of the hourly wage. In this graph I use the hourly wage to show that we have a similar picture to the one we obtain with the weekly wage. See more details below.

Figure 2: Mexican emigration to the US by year of arrival and US low skilled wage



Note: The top panel shows estimates on population ((Passel et al., 2012)) and worker average net flows (computed from from the US and Mexican Census known stocks of potential Mexican workers in the US in 1990, 1995 and 2000) from Mexico to the US by year of arrival. The bottom panel shows the average low skilled hourly wage by year. See more details in Section 4.1.

The direct impact of the Mexican Tequila crisis on the aggregate US economy was probably rather small. The Mexican crisis could have affected the US through trade in two different ways. Demand in Mexico for US products could have dropped, worsening the economic conditions of US states exporting to Mexico. In fact, we do observe that US exports to Mexico decreased in 1995 from around .7% to .6% of US GDP. Nonetheless, to make sure that I am not confounding the effects of Mexican immigration and of exports to Mexico I will consider it closely in the empirical exercises[6].

[6]In fact, US states trading with Mexico and states receiving immigrants from Mexico are not the same.

A second possibility is that Mexico increased its exports to the US increasing competition in US states producing goods also produced in Mexico. Aggregate trade statistics show that this is not the case in the period of interest.

The Mexican Crisis of 1995 offers an opportunity to estimate the effect of an unexpected immigration inflow on US labor market outcomes. In particular, I rely heavily on three aspects of Mexican immigration in the 1990s:

1. Mexican immigrants tend to settle in particular enclaves (Card, 2001).
2. Mexican immigrants are predominantly low skilled (Borjas and Katz, 2007).
3. Mexican immigrants tend to be young upon arrival, see also (Smith, 2012).

Using this unexpected flow of young low skilled Mexican immigrants into particular US states I study how the US labor market reacts. I first document how during the years after the shock, 1995-1997, the wages of young native low skilled workers decreased relative to older low skilled workers, the wage of low skilled workers in high immigration states decreased more than in low immigration states and the wages of young low skilled workers in high immigration states are the most affected of all.

I use this suggestive evidence to build my identification strategy for estimating the causal effect of immigration on wages. In particular, I use the period of the shock interacted with the geographic distribution of Mexicans in 1980 as an instrument for the actual inflow of Mexicans to the US. In other words, my identification comes from within state comparisons, in years with/without immigration shock, of the wage of young low skilled workers given the fact that some states received a larger relative shock than others. Using this strategy I show that a 1% immigration induced labor supply shock, reduces (young) low skilled wages by around .5-1% on impact, i.e. the first and second years after the shock. This instrumental strategy is closely related to the (Boustan, 2010) study of the Black Migration.

Finally I find that Mexican immigration encourages significant across-state reallocation. A 1% labor supply shock reduces the share of low skilled workers by .2 percentage points. In-migration rates are particularly responsive. Fewer native low skilled workers migrate to high immigration states after the shock. This helps to explain why, while the effect on wages is large on impact, it quickly disappears. By 1999, the fifth year after the shock, wages of low skilled workers in high

immigration states are not significantly lower than they were before the shock, relative to low immigration states. This suggests that the US labor market for young low skilled workers adjusts to unexpected supply shocks quite rapidly.

Several papers estimated the impact of immigration on wages. Closely related to this paper is the unexpected arrival of Cubans to Miami during the 1980 Mariel Boatlift (Card, 1990). Surprisingly, even if the influx represented a supply shock of around 7%, (Card, 1990) reports virtually no impact on labor market outcomes. He suggests instead that the fact that Miami had received many immigration waves before helped its labor market to absorb unexpected immigration inflows like the one in 1980. He also points to the fact that some natives who would have relocated to Miami might have not done so as a result of the Mariel Boatlift[7]. Also, while he tries to see if labor market outcomes of particular racial groups deteriorated as a result of the immigrant inflow, he does not use the fact that the Mariel immigrants were probably low skilled and thus competing with low skilled workers (independently of their race) and complementing high skilled workers[8]. Moreover, the Mariel Boatlift natural experiment occurs in only one local labor market so omitted variables might have affected Miami during the same period that mitigated the effect of immigration (see also (Angrist and Krueger, 1999) and (Donald and Lang, 2007))[9].

Whether we should focus on local labor markets or the national labor market has been a focal point of discussion when evaluating the impact of immigration in the US. On the one hand, (Altonji

[7]Other papers using spatial variation to determine the impact of immigration on the host country using a natural experiment include (Hunt, 1992). She studies the repatriation of French nationals from Algeria in 1962 when Algeria became independent. She finds that unemployment rates increased by at most .3% and wages fell by at most 1.3% as a result of the 1.6% supply shock induced by the repatriates. Several aspects distinguish her paper from this one. In the first place, she does not have annual data, only data for 1962 and 1968, so she cannot see what is the potential effect of repatriates on labor market outcomes between 1963 and 1968. Native and immigrant reallocation responses to locations in France receiving large numbers of repatriates might mitigate possible negative effects of immigrants on labor market outcomes, something that could reconcile my estimated larger effects on impact. Second, most repatriates were high skilled workers, potentially affecting labor market outcomes very differently than inflows of low skilled workers. Finally, she relies on climate and cultural similarity for location choices within France, something that might not entirely be orthogonal to local economic conditions. See (Friedberg and Hunt, 1995) for an early literature review for papers using natural experiments.

[8]CPS data at the beginning of the 80s in a small labor market like Miami is probably too sparse to do it. He does distinguish by race.

[9]It is probably the case that while almost all Mexicans that migrated to the US in the 1990s were ready to enter the US labor market, a smaller share in the Mariel Boatlift were ready to do so. It is well known that Cuban authorities used the Mariel Boatlift to send prisoners and mentality disordered individuals to the US.

and Card, 1991) pioneered the spatial correlations approach. This approach compares the labor market outcomes in different cities or states within the US. A simple regression is, however, hard to interpret. Immigrants and natives endogenously decide when and where to move within the US, so estimates from a simple OLS regression are likely to be biased, as emphasized in (Borjas et al., 1996). (Card, 2001) develops an instrumental variable strategy to try to address these concerns. Immigrants tend to settle where former immigrants settled so that the stock of immigrants in an enclave is a good predictor of the flow of immigrants to that enclave. Using this instrument (Card, 2001) shows that immigrant inflows had small impacts on both wages and native outflows[10]. However, economic conditions can be quite persistent across regions for reasons unrelated to immigration and this may have attracted both early and current immigrants. Another concern with the spatial correlations approach is that amenities or productivity might be different across regions, even for specific skill groups, resulting in across state differences in the wage level. It may well be the case that workers are indifferent between locations even if wages are different. To the extent that wages are higher because they compensate for worse living conditions, these wage differences across locations will persist. Under free mobility of the population, immigration will not affect the equilibrium wages across locations, unless immigrants also affect the amenities or productivity in the locations to which they migrate[11].

On the other hand, (Borjas, 2003) argues that the US is better thought of an integrated national labor market, since the population is quite mobile across locations. To estimate the effect of immigration on natives' wages he relies on the fact that different skill groups at different experience levels received different immigration inflows over the previous 20 or 30 years. Using this approach he finds radically different results than the spatial correlations literature. He reports that a 10% supply shock reduces wages by around 3-4%. He does not take into account, however, the endogenous decisions of immigrants. Immigrants of a certain skill probably decide to move to the US if the relative supply of workers of their experience level is particularly low. Failing to account for this may underestimate the true impact of immigration. Borjas' estimates could also be biased in the other direction. If first waves of immigrants were relatively more skilled and less numerous we would observe that experience cells with more recent immigrants have lower wages, and this would not

[10] See also (Card and DiNardo, 2000) and (Cortes, 2008). (Card, 2001) reports that a 10% increase in the labor supply due to immigration is likely to decrease wages by around 1%.

[11] (Davis and Dingel, 2012) build a model where who lives in your city affects your own productivity through the exchange of ideas.

reflect the impact of immigration, but rather the changing composition of immigration and perhaps the widening of the US income distribution due to skill biased technological change[12].

Similar to (Card, 2001) and (Card, 2009), (Ottaviano and Peri, 2010) argue that the impact of immigration on wages is small but for a different reason: imperfect substitutability between natives and immigrants. They build on (Borjas, 2003) structural part of the paper by incorporating an extra nest in the production function and estimate the elasticity of substitution between natives and immigrants[13]. As in (Borjas, 2003), however, the identification strategy in (Ottaviano and Peri, 2010) only relies on time series variation. Unlike (Borjas, 2003) they also estimate the elasticity of substitution between immigrants and natives within education/experience cells. Since this elasticity is finite, most of the negative effect of new immigrants on wages is on former immigrants and not on natives. Their estimates of this crucial elasticity, however, have been criticized, see for example (Borjas et al., 2008), (Borjas et al., Forthcoming) or (Dustmann and Preston, 2012). Using the 1995 Mexican crisis I can partially reassess this controversial imperfect substitutability between natives and immigrants. Unfortunately, birthplace is not reported in CPS data before 1994. Using instead Hispanic origin, I show that the shock impacted both non-Hispanic and Hispanic wages similarly. In other words, I obtain estimates that suggest that immigrants and natives are essentially perfect substitutes, at least when considering young low skilled workers.

2 Theory

In this section I introduce a model that guides the empirical part. It builds on (Blanchard and Katz, 1992) but it microfounds all the decisions involved. There are S regions representing US states[14]. It has 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 have to pay a fixed

[12] A similar argument is used in (Borjas, 1995) to criticize (Chiswick, 1978) finding that immigrants tend to experience larger wage growths using a cross section from the 1970 Census. Numerous papers document the widening of the US income distribution. A nice review is provided in (Acemoglu and Autor, 2011)

[13] (Peri and Sparber, 2009) provide some micro evidence explaining why immigrants and natives might be imperfect substitutes as they specialize in different types of tasks. (Cortes, 2008), using (Card, 2001) instrument, also reports higher impacts of immigrants on former immigrant wages than on natives.

[14] More generally one can interpret these as local economies.

cost of moving.[15]. They live for two periods. They born in a particular location s and only work and consume when old. Individual workers are uncertain about their future utility 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)).

Under suitable assumptions on the distribution of the idiosyncratic valuation of locations by individuals we can obtain closed form solutions relating internal migration flows, wages and exogenous Mexican inflows. In the empirical part, thus, I can estimate two key structural parameters of the model: the local labor demand elasticity and the sensitivity of internal migration to local labor market economic conditions. These two parameters are crucial to see how local labor shocks are absorbed into a larger economy.

The long run equilibrium coincides with the equilibrium in standard spatial equilibrium models, where indirect utility is equalized across space. In contrast to more standard spatial equilibrium models in the short run wages might be different than in the long run equilibrium. The model is similar to the ones developed in the internal migration literature (see (Moretti, 2011), (Molloy et al., 2011), (Wozniak, 2010) or (Diamond, 2013)) and the international migration literature (see (Hanson and Grogger, 2011) and (Bertoli and Fernandez-Huertas, 2012)).

2.1 Utility Function

Workers derive utility from final good consumption, the amenities in a given location and the idiosyncratic valuation of the location:

$$E(U^i_{s'}) = A_{s'} c^i_{s'} exp(\epsilon^i_{s'})/F^{\mathbf{1}_{s' \neq s}} \tag{1}$$

Where $A_{s'}$ denotes amenities, $c^i_{s'}$ denotes consumption of individual i that is born in s at time t and moves to region s' to work at time $t+1$. I do not include a time discount factor because workers only value consumption when old. $\mathbf{1}_{s' \neq s}$ is an indicator function taking value 1 if $s = s'$.$\epsilon^i_{s'}$ is a random variable that represents the uncertainty that people face when knowing how much utility they will be in each particular location. To save notation I do not explicitly label variables by t. Instead I indicate past variables with a -1 sub index.

[15]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.

Workers earn the market wage of the location they reside in. Since there is only one good, they spend all their wage in 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 in location s', given that they were born in s:

$$lnV(\omega_{s'}, A_{s'}) = lnA_{s'} + ln\omega_{s'} - \mathbf{1}_{s' \neq s} lnF + \epsilon^i_{s'} \tag{2}$$

In equilibrium, workers will be indifferent between locations, that is $V(\omega_s, A_s) = V(\omega_k, A_k)$ $\forall s, k \in S$. Again, $A_{s'}$ indicates the amenities in the different locations. The fact that amenities depend on s' implies that wages need not be the same across locations, nor should it be the case that wages where immigrants arrive are necessarily lower in equilibrium. This is a well known result in the spatial equilibrium economic literature (see (Glaeser, 2008)), but one that is worth emphasizing in the context of immigration.

2.2 Location Choice

Workers decide where they want to reside given the indirect utility they expect to get in each place. Workers are assumed to be born in a specific location s, from the previous generation. The natural population growth rate in each location is n_s. If they want to move to a new location they need to pay a fixed cost of lnF. This is, workers maximize:

$$max_{s' \in S}\{lnV_{s'} + \epsilon^i_{s'}\} \tag{3}$$

In general this maximization problem does not have closed form solutions. Important exceptions are when ϵ^i_s follows a uniform distribution or a generalized value distribution. See (Moretti, 2011) for the former and (Wozniak, 2010) for the latter. In this paper I am explicit about the distribution of ϵ^i_s:

Assumption 1. *ϵ^i_s are iid and follow a Gumbel(μ, λ) distribution.*

μ is the location parameter. It is not very important in this context because it only affects the mean of the utility, which does not matter for the choice made by the workers.

λ is important. It influences the variance of ϵ^i_s. In particular the variance of λ will be $\frac{\pi^2}{6}\lambda^2$, see (Anderson et al., 1992). High λ will be associated with high variance and this implies that economic

variables are relatively less important for the location decision. Low λ reduces the variance and, thus, increases the importance of the economic variables in the individual decision.

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

$$p^i_{s,s'} = \frac{exp(lnV_{s'}/\lambda)}{\sum_{k\in S} exp(lnV_k/\lambda)} \tag{4}$$

It is particularly convenient to think about the probability to stay in state s:

$$\ln(p_{s,s}) = \frac{1}{\lambda} lnV_s - \Phi \tag{5}$$

where $\Phi = ln(\sum_{k\in S} exp(lnV_k/\lambda)$ does not depend on s, but rather on the wages in every region.

By the law of large numbers we can use equation 5 to express:

$$\ln(\frac{M_{s,s}}{N_s}) = \frac{1}{\lambda}(lnA_s + ln\omega_s) - \Phi \tag{6}$$

where $M_{s,s'}$ is the population moving from s to s' and N_s is the native population.

Equation 6 explicitly shows that more people will stay in location s if local conditions are better. In particular, the stay rate directly depends on the local amenities and the local wages.

2.3 Dynamics

In order to use equation 6 for estimation it is convenient to introduce some notation. By definition the number of individuals of a certain skill at time t is the number of individuals that stay in that location (possibly times the natural growth rate n_s) plus those that arrive:

$$N_s = (1 + n_s)M_{s,s} + I_s \tag{7}$$

We can use this equation to express:

$$ln(\frac{M_{s,s}}{N_s}) \approx -n_s - \frac{I_s}{N_s} \tag{8}$$

So, we obtain our equation to estimate $1/\lambda$:

$$\frac{I_s}{N_s} = -\frac{1}{\lambda}(lnA_s + ln\omega_s) - n_s - \Phi \tag{9}$$

In words, we should expect more people to in-migrate to states where wages increase.

2.4 Production Function

The production function in all regions is the same. In particular, I consider that a perfectly competitive representative firm has the following production function:

$$Q_s = B_s[\theta_s H_s^{\rho} + (1-\theta_s)L_s^{\rho}]^{1/\rho} \tag{10}$$

where L_s is low skilled labor and H_s is high skilled labor[16]. 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).[17]

2.5 Labor market

The marginal product of low skilled workers is:

$$w_s = p_s A_s (1-\theta_s) Q_s^{\frac{1}{\sigma}} L_s^{\frac{-1}{\sigma}} \tag{11}$$

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:

$$h_s = p_s A_s \theta_s Q_s^{\frac{1}{\sigma}} H_s^{\frac{-1}{\sigma}} \tag{12}$$

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

2.6 The Mexican immigration shock: from the model to the empirics

I have already derived the key equations of the model: 1) Equation (9) relates migration rates to wages and 2) Equations (11) and (12) relate current labor force levels with wages.

[16] In the empirical part high skilled workers will be workers with some college or more while low skilled workers will be high school graduates and high school dropouts. This is a standard classification of workers into these two skill groups, see for example (Acemoglu and Autor, 2011) or (Card, 2009)

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

In this section I introduce an unexpected increase in labor supply due to the Mexican inflow.

2.6.1 The Mexican immigration shock on low skilled wages

In the empirical section I use 50 states plus the District of Columbia as the S states introduced in the model[18]. In particular, states where the shock is larger will see their wage decrease accordingly. We use equation 11 to obtain[19]:

$$lnw_{st} = \alpha_1 + \beta_1 * ln(1 + \frac{Mex_{st}}{N_{st}}) + \gamma_1 * X_{st} + \varepsilon_{st} \tag{13}$$

Where subscripts s and t denote state and time and where I have used the decomposition $L_{st} = N_{st} + Mex_{st}$. This is, the low skilled workforce is the sum of low skilled natives and Mexican immigrants. X_{st} are controls such as the output level, the native employment level and the technology parameters as can be seen by comparing Equation 11 and Equation 13.

Note that the variation I use for in the empirical exercise is mainly temporal. In other words, I want to use the fact that at a certain point in time there is an expansion in the supply of Mexican workers. This is true for every state in the US, but it is specially important in high immigration states.

If we wanted to give a structural interpretation to the parameter β_1 it would simply be the inverse of the elasticity of substitution between high and low skilled workers.

2.6.2 The Mexican immigration shock on reallocation

By combining equation (13) and (9) and rearranging I obtain the following estimation equation[20]:

$$\text{In-migrant rate}_{st} = \alpha_2 + \beta_2 * ln(1 + \frac{Mex_{st-1}}{N_{st-1}}) + \gamma_2 * X_{st-1} + \eta_{st} \tag{14}$$

where again Mex_{st} are the Mexican inflows, N_{st} are population levels and X_{st} are the controls implied by the model.

[18] I show in this section the equations for low skilled workers only, but similar expressions can be obtained (with reversed signs and different magnitudes for high skilled workers).

[19] (Borjas, 2003) uses a very similar equation. Instead of using the exact equation that I use he prefers approximations to it, using the fact that for small x $\ln(1+x) \approx x$. He also uses as explanatory variable $\frac{Mex_{st}}{Mex_{st}+N_{st}}$ instead of what I use, something that makes the interpretation of β_1 less straight forward.

[20] I use here again the approximation $ln(1+x) \approx x$ for small x.

A similar equation to 14 is used in (Card, 2001), (Card, 2005) and (Cortes, 2008)[21]. In this case, however, the estimation equation comes directly from a model.

3 Empirical results

3.1 Data Description

3.1.1 Mexican Inflow Estimates

One of the greatest challenges to measure the casual effect of immigration on low skilled wages is that it is hard to know with precision how many Mexicans entered each year in every state.

Measures of aggregate inflows by year are available by using the Census 2000 and other sources. (Passel et al., 2012) offers an estimate of the total number of Mexicans arriving to the US during the 90s. To the best of my knowledge this is the best estimate. Using data from the Censuses in the US and Mexico, I can construct an alternative measure of the aggregate number of Mexican workers entering to the US each year. I report results using both measures.

More concretely, I can use the year of arrival of Mexicans to obtain an estimate of the number of Mexicans (older than 18 years old) in the US each year, in particular for 1990 and 1995. I can then combine this with information in the Mexican Census to obtain an estimate of how many Mexicans were in the US in 1995 [22]. For the number of Mexicans in the US in 1990, I can either use the 2000 US Census or 1990 US Census. The Census 1990 is likely to suffer more from undercount, since the number of Mexicans who in 2000 say they were living in the US 10 years before is larger than the number of Mexicans in the 1990 Census.

Thus, combining information from US and Mexican Censuses I can compute the stock of Mexicans in the US in 1990, in 1995 and in 2000. I can then compute the average inflow between 1990 and 2000, between 1990 and 1995 and between 1995 and 2000. During the 90s a bit more than 350,000 Mexicans entered the US on average, so that the stock of working age Mexicans moved from around 4 millions in 1990 to a bit less 8 millions in 2000.

The US Census of 2000 also offers information on the specific year of arrival of Mexicans that were living in the US in 2000 and their age[23]. We can then know how many Mexicans were still in

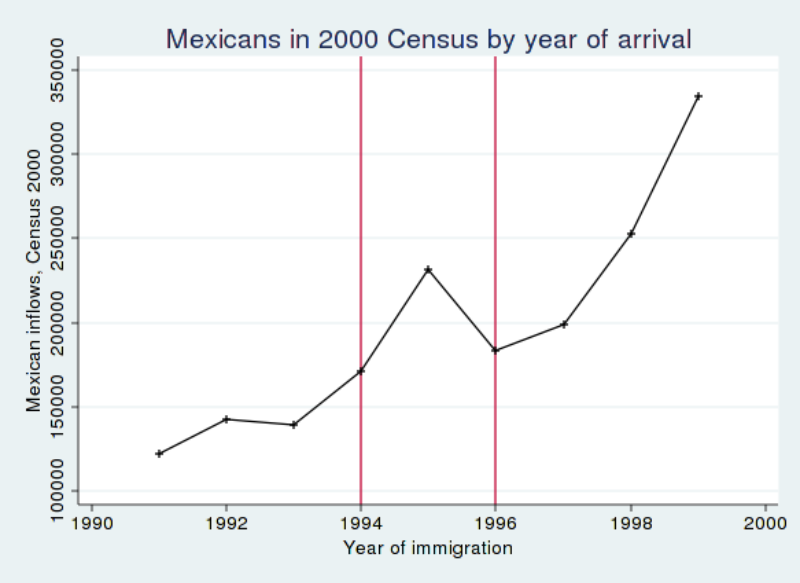
[21] See a discussion of these different specifications in (Peri and Sparber, 2011).

[22] The Mexican Census reports how many Mexicans were in the US in 1995 that were in Mexico in 2000

[23] The 2000 Census is the first that reports the exact year of arrival instead of two, three or five years intervals.

the US in 2000 and could have been working in each year of the 90s. This is an underestimate of the number of Mexicans who actually arrived in each year, since some Mexicans that migrated to the US in the 90s are likely to be back to Mexico by 2000 (see (Thom, 2010) for circular migration). Obviously, the severity of this underestimate is larger the earlier in the decade. With this exercise we obtain Figure 3. Note that the number of Mexicans who reported 1995 as their arrival year is around 50% higher than the ones that reported 1994 or 1996[24]:

Figure 3: Mexicans in 2000, by year of arrival



Notes: This figure plots the number of Mexicans that were in the US in 2000 by their reported year of arrival in the US. Note that the number of Mexicans who reported 1995 as their arrival year is around 50% higher than the ones that reported 1994 or 1996.

[24]For instance if we look at the Mexicans in 2000 that arrived to the US in 1994 or 1996, which are around 160000 and the ones that arrived in 1995, which are around 240000, we have an increase in 1995 of 50% with respect to 1994. I assign this increase in 1995 from the yearly average inflows from 1990 to 1995. Alternatively I could have assigned this increase from the yearly average inflows between 1990 and 2000 or between 1995 and 2000. Given (Passel et al., 2012) numbers, what I do is probably the most reasonable. The results reported in the paper do not change if instead of using what I use, I use these alternatives. Nor do they change significantly if I use (Passel et al., 2012) estimates instead of the inflows matching the stocks implied by the Censuses.

I can therefore use two aggregate measures of Mexican inflows: the implied inflows of Mexican low skilled workers from the Censuses and the estimated inflows of total Mexicans by (Passel et al., 2012). In fact, both measures are quite similar. The biggest divergence between my estimates and (Passel et al., 2012) is in 1998 and 1999. Unlike the estimates based on the known stocks of Mexicans in the US in 1990, 1995 and 2000, (Passel et al., 2012) estimates would over-predict the stock of Mexicans in 2000. This is the main reason why I use both my own estimates and (Passel et al., 2012) estimates in the regression analysis.

In any case, the size of the shock, which is the crucial aspect for my identification, is very similar in both cases [25]. To summarize the numbers, in 1995 the inflow increased to between 500,000-570,000 Mexicans up from an average inflow in the other years of around 350,000-400,000 Mexicans for exogenous (to the US) reasons [26]. Table 1 provides a detailed account of all these numbers.

To obtain a measure of the Mexican flows to each state at each point in time I do the following. First, I predict the place of arrival by the immigrant geographic distribution in 1990 [27] and, then, I assign the aggregate inflows accordingly. In particular, using the 1990 US Census data we know what share of Mexicans were living in each state in 1990. Let $\text{Stock\_Mex}_{s,1990}$ be the stock of Mexicans living in state s in 1990 and let Stock_Mex_{1990} be the total stock of Mexicans in the US in 1990. Then $\text{Share\_Mex}_{s,1990} = \frac{\text{Stock\_Mex}_{s,1990}}{\text{Stock\_Mex}_{1990}}$ is the share of Mexicans in state s in 1990. To predict the flow of Mexicans to state s at time t we only need to multiply this share by the aggregate flow of Mexicans (Mex_t) to the US at time t:

$$\widehat{Mex}_{st} = \text{Share\_Mex}_{s,1990} * Mex_t$$

This is the measure that I use for the number of Mexicans arriving to state s at time t, using my two alternative measures of aggregate inflows. It is worth noting that the measure I obtain using the 2000 US Census and the one I obtain from (Passel et al., 2012) are almost identical at the state

[25] These two measures coincide also with the estimated inflows of undocumented Mexicans by the INS combined with the legal inflows from the DHS. The only difference between both is that the INS reports some more inflows in 1996 than (Passel et al., 2012) or the Census suggests.

[26] The spike of immigration to the US in 1999 is not exogenous to the US economy, as the US was moving into the beginning of the dot com bubble, which concentrated to a large extent in California, the largest Mexican immigration state.

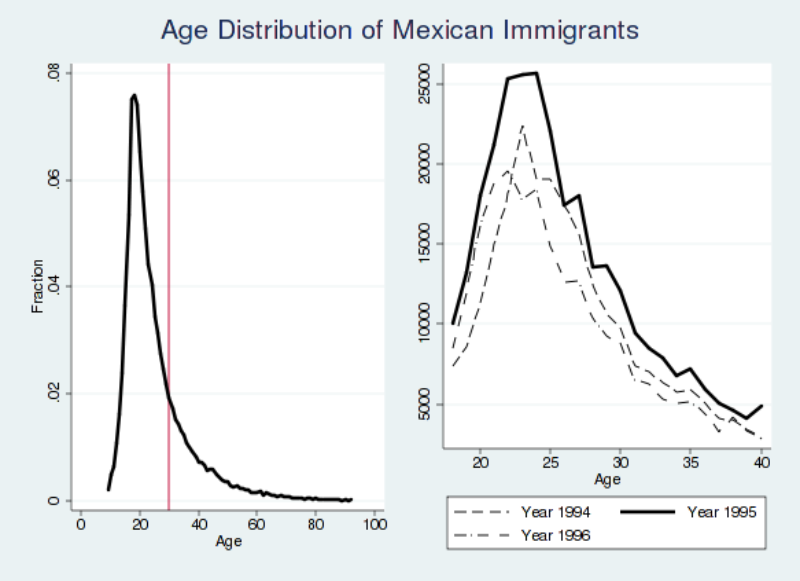
[27] I could also use the distribution in 2000 instead and nothing changes.

level: the correlation between both is then .98.

3.1.2 Immigrant Age Distribution

Mexican immigrants tend to be young and compete with younger workers when they arrive to the US (see also (Smith, 2012)); this has a crucial role in my empirical strategy. The US Census of 2000 allows me to build the age distribution of the immigrants at the time of their arrival (at least of the Mexicans still in the US in 2000). To do so, I use information on the year of arrival and the age in 2000. Figure 4 shows that most Mexican immigrants are indeed quite young when migrating to the US: around 90% of them are between 18 and 30 years old (the red vertical line in Figure 4 indicates 30 years of age). As can be seen in the right panel of Figure 4, this is quite stable across years and it did not change in 1995 or 1996.

Figure 4: Age Distribution of Mexican Immigrants



Notes: The left hand side graph shows the average age of all Mexicans in the US in 2000 in the year of arrival to the US. The right hand side graph shows the age in 2000 of Mexicans in the US in 2000 in three selected years of arrival, 1994-1996. Around 90% of Mexicans are younger than 30 years old when arriving to the US and more Mexicans than usual immigrated to the US in 1995.

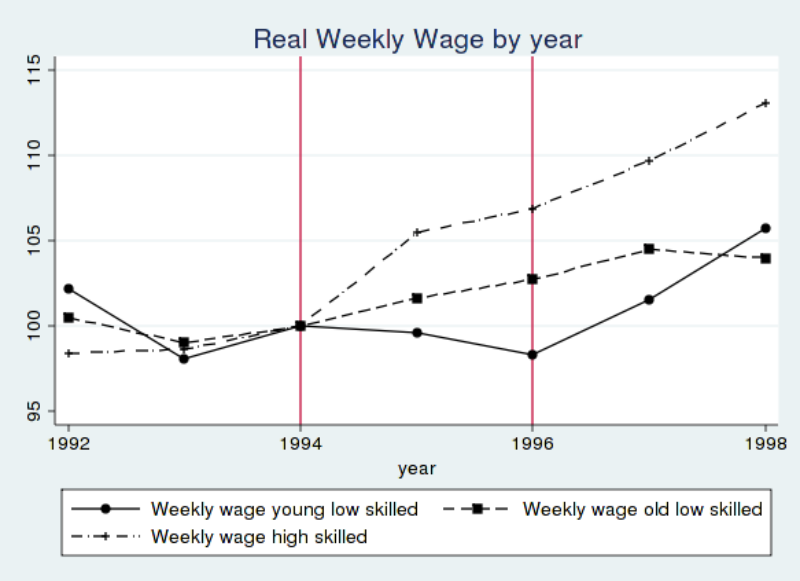
3.1.3 Wages

I use CPS data to compute two measures of wage: the weekly wage, and the composition adjusted weekly wage in a state. The first is at the individual level, while the second one is an aggregate measure at the state level. All wages are in real terms and take 1999 as the base year. The first measure that I use is the weekly wage constructed from the yearly wage and the number of weeks worked in a year[28].

The raw data on the constructed weekly wages for young low skilled, old low skilled and high skilled workers are shown in Figure 5. To help the reader see the changes of wages over the years I have normalized average wages to their 1994 levels.

[28]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. I use the weekly wage because there are more observations available. The wage and the number of weeks worked reported in a given year refer to the previous year. Thus, I will use the answers in 1996 to know the wage in 1995.

Figure 5: Real Weekly Wage by year for Different skill/age groups



Notes: The figure shows the average wage of old and young low skilled workers and the average wage of high skilled workers normalized to 1994 levels for easy comparison. While wages of low skilled workers are quite flat during the 90s or slightly increasing, the average wage of young low skilled workers decreases between 1995 and 1997. This small decrease on the aggregate average wage of young low skilled workers is due to the states receiving immigration. The average wage of high skilled workers increased over the decade. In 1995 this increase was more pronounced.

We can see in the Figure 5 that real wages of low skilled workers are quite stable over the 90s or slightly increasing. However, the average real wage of young low skilled workers is the only one that does not increase precisely right after the immigration shock (at the aggregate level). In contrast, wages of older low skilled workers, and wages of high skilled workers increased during the immigration shock. I show in the regression analysis that this small decrease in young low skilled wages is driven by the wages of young low skilled workers in high immigration states.

From individual level information on wages I construct an aggregate measure of the low skilled wage for each state and each year. I want this to be comparable across years, so I follow the literature by running first stage mincerian regressions to control for compositional effects and I use the state fixed effects as this aggregate measure of wages. In particular I run the following regression[29]:

$$lnwage_i = X_i * \beta_t + \delta_{t,s} + \varepsilon_i, \forall t \in [1992, 1998]$$

Importantly $i \in I_L$ indicates individuals in the set of low skilled workers and $s \in S$ indicates US states. The subscript t indicates that I run each year in a separate regression. Low skilled workers are defined as high school drop outs and high school graduates. X_i are the standard controls (Card, 1999): I include potential experience, experience squared, a dummy for black, a dummy for females, a dummy for rural and a dummy for other races. I also include a dummy for Hispanic origin[30]. $\delta_{t,s}$ is a set of fixed effects capturing the premium in different states. By just using the fixed effects I am considering the wage of workers with no experience evaluated at the omitted dummy variables, i.e. white metropolitan male workers.

Note finally, that I could potentially use CPS data to obtain a measure for the number of Mexicans in each state and point in time. Two things limit this possibility. First, it is unfortunate that before 1994 CPS questions did not include the birth place of the respondents. Thus I cannot use this variable to obtain a measure of Mexicans for some of my sample years. Instead, I can use the variable on hispanic origin. This is actually a good proxy for Mexican origin, especially when

[29] I follow (Acemoglu and Autor, 2011) and I only consider full time full year workers. They are defined as workers who have worked at least 35 hours and 40 weeks a year and report a valid income wage. I further drop self employed workers and workers above and bellow 65 and 18 years old. I also correct for top coding following the literature. Histograms of the raw data are available upon request. In particular histograms of raw weekly wage, experience levels and age. See also (Autor and Katz, 1999) or (Katz and Murphy, 1992).

[30] This variable is the best variable available for the full period to proxy for Mexican born workers.

disregarding the Cuban hispanics and other groups not related to Mexico. The only problem when using this, is the uncertainty about the undercount of undocumented immigrants (see (Hanson, 2006)).

3.1.4 Summary Statistics

Table 2 shows the main variables used in this paper. They are divided in four blocks. The first block describes the wages of young low skilled workers at the state level. This is the wage after controlling for the observable characteristics as described above[31]. Low skilled wages in 1995 and 1996 are somewhat lower than in the remaining of the decade. In the regression analysis I show that this can be explained by the immigration inflows. In other words, I show that the decrease was larger in states where the immigrants entered.

The second block provides some summary statistics on Mexican flows. On average, Mexican flows represented a 1.5% of the young low skilled labor force. In 1995 Mexican inflows increased by around 50%. There is huge variation however on the geographic distribution of Mexicans across states. California is the state that receives more Mexican immigrants. Both in 1990 and 1980 around 57% of all low skilled Mexicans in the US were living in California. This is around 20-30% of California's low skilled labor force throughout the 90s. The implied inflow to California during the 90s is around 10-15% of the young low skilled working labor force: in any given year of the 90s there were around 1 million full time low skilled native workers in California[32] while the aggregate inflow of Mexicans to the US in the 90s was between 300,000 and 600,000 a year. In 1995, the unexpected increased inflow was around 8% of the young low skilled labor force. This is a sizeable shock to a particular group of workers in a local labor market. We can expect an effect on native wages as well as some labor reallocation away from California.

The third block provides some descriptive statistics on GDP and Trade, while the fourth block offers statistics on the levels of employment. These variables are used as controls in all my regressions.

[31] For some descriptive evidence on wages before running the mincerian regressions, see the following section.

[32] This numbers can be computed from CPS or Census data. According to Census data there were 1,008,213 young low skilled native workers in 1990 and 1,069,384 in 2000. In 1995, according to CPS, there were 1,061,001 young low skilled native workers.

3.2 Descriptive Evidence

Mexican immigrants arriving to the US are both low skilled and young. Thus, we would expect that young low skilled workers are especially affected by an unexpected inflow of Mexican immigrants. A simple way to observe this in the raw data is by running the following regressions:

$$lnwage_{it} = \alpha + \beta_1 * Young_{it} + \beta_2 * Shock_t + \beta_3 * Young_{it} * Shock_t + X_{it} * \beta + \gamma * time + \varepsilon_{it} \quad (15)$$

$$lnwage_{it} = \alpha + \beta_1 * Shock_t + \beta_2 * HIS_{it} + \beta_3 * HIS_{it} * Shock_t + X_{it} * \beta + \gamma * time + \varepsilon_{it} \quad (16)$$

Where $lnwage_{it}$ is the weekly wage of individual i at time t [33]. $Young_{it}$ is a dummy variable indicating whether individual i is young (i.e. less than 12 years of experience or younger than 31 years old) at time t. Similarly, HIS_{it} is a dummy indicating whether individual i lives in a high immigration state or not [34]. $Shock_t$ is a dummy for the time of the shock, i.e. 1995 through 1997. X_{it} is a vector of individual characteristics: race, gender, rural status, state fixed effects, metropolitan area fixed effects or metropolitan-state fixed effects. $time$ is a time trend. The sample of workers used in these regressions is full time full year low skilled workers.

The coefficient of interest is in all cases β_3. We expect $\beta_3 < 0$, so that young low skilled workers experienced a larger drop in their wage during the shock period relative to the control group. Similarly, we expect low skilled workers to suffer a larger drop in wages if they are working in a high immigration state than in a low immigration state. Table 3 reports results from running regressions (15) and (16).

In the first column of Table 3 I report the regression specified in equation 15 using the full sample, i.e. low skilled workers. While the shock did not have a negative effect on wages of all workers, it did decrease young low skilled worker's wage by 2.5%.

Column 2 drops the workers identified as hispanic by the CPS data. One may think that the drop in wages that I am reporting comes from a drop in the wages of former immigrants to the

[33] I obtain the same results irrespective of whether I use the real hourly wage or the weekly wage. The difference between them is that the weekly wage is constructed from the yearly income in the previous year and has more observations, while the hourly wage is the wage in the week when the CPS is conducted. I also obtain the same results irrespective of whether I include state-specific time trends or if I include or exclude the controls.

[34] High immigration states are the following: California, Arizona, New Mexico, Texas, Illinois and Florida

US, something suggested in the research by (Ottaviano and Peri, 2010), (Peri and Sparber, 2009), (Cortes, 2008) or (Card, 2009). Column 2 shows that when only considering non-Hispanic workers we also have that young low skilled worker's wage decreased by a bit more than a 3% during these two years defined as the shock. This result suggests that Mexican immigrant workers and young low skilled native workers are close to perfect substitutes[35].

The third column of Table 3 runs the same regression than column 1 but on high skilled workers only. The wage of young high skilled workers does not decrease during the shock years relative to the wage of old high skilled workers. This shows that the effect is only on young workers is only on low skilled and not on high skilled workers. In column 4 I run the regression presented in equation 16. I run this regression using the sample of low skilled workers [36]. Comparing high and low immigration states yields a result similar to the age comparison. In particular, low skilled workers in high immigration states have 3% lower wage than in low immigration states over these 2 years of the shock.

The last column, re-runs regression 16 but using young low skilled workers only. The sample size decreases substantially, but we can still obtain an estimate that indicates that young low skilled workers in high immigration states had on average a bit less than a 5% lower wage during the 2 years of the shock.

This table, thus, shows that the main effect of the shock on US wages is concentrated on young low skilled workers in high immigration states. In what follows I will use the flows of Mexican workers to each state to obtain a causal estimate of the effect of immigration on wages.

[35]Another exercise that I have done, but that I do not report in the paper in order not to distract the reader from the main results is to compare Hispanic wages to non-Hispanic during the year of the shock, using a difference in difference type specification. The wage on the interaction, Hispanic dummy times Shock, is slightly positive and statistically indistinguishable from 0. This is evidence suggesting that Hispanic and non-Hispanic low skilled workers are not imperfect substitutes. There are a number of reasons that can explain my results, see for example (Aydemir and Borjas, 2011), (Borjas et al., Forthcoming) and (Dustmann and Preston, 2012). Something not discussed in previous literature that could explain my findings is simply that Mexican workers and native workers may be close substitutes only when considering young low skilled workers.

[36]The fact that there are fewer observations in column 4 compared to column 1 is due to the lack of information on the occupation of certain workers. If I do not include the occupation fixed effects in column 4 the results do not change and the sample size coincides with that of column 1.

3.3 The causal effect of immigration on wages

In this section I report the causal effect of immigration on US wages. Following the model I presented in section 2 (see equation (13)), we can use the following equation for estimation:

$$lnwage_{st} = \alpha + \beta * ln(1 + \frac{Mex_{st}}{N_{st}}) + X_{st} * \gamma + \lambda * t + \delta_s + \varepsilon_{st} \tag{17}$$

Where, Mex_{st} is the flow of low skilled Mexican workers in state s at time t, while N_{st} is the population of native young low skilled workers. X_{st} is a vector of controls that includes the total population of low skilled workers in a given state, the output of the state and its exports to Mexico. I also include a state-specific time trend and state fixed effects. The total number of observations is 357: 50+1 states times 7 years [1992-1998]. The wage used is the wage resulting from the mincerian regressions described in the data section.

I could estimate this equation using OLS, but my estimates are likely to be biased. Mexican workers endogenously decide where to move within the US, and US natives arbitrage away differences in wages across locations. The unexpected arrival of more Mexicans than usual as a result of the crisis is the basis for my instrument. I describe the details in what follows.

3.3.1 Instrument

The basic idea to construct the instrument is to use the fact that in 1995 more young low skilled Mexicans than usual immigrated to high immigration states. A simple way to capture this is to instrument the relative inflow of Mexicans by the shock and the interaction of the shock and the share of Mexicans in each state in 1980. Specifically let's define:

$$Z_{1,st} = \begin{cases} 1 & \text{if } t = 1995 \\ 0 & \text{if otherwise} \end{cases}$$

and

$$Z_{2,st} = Z_{1,st} * \frac{Mex_{s1980}}{N_{s1980}}$$

Where $\frac{Mex_{s1980}}{N_{s1980}}$ is simply the share of Mexicans in each state in 1980 relative to the size of the low skilled labor market in 1980. The identification comes from comparing states with themselves

before and after the shock, given that the size of the shock is different in the different states due to the uneven settlement pattern of the early immigrants.

3.3.2 Exclusion Restriction

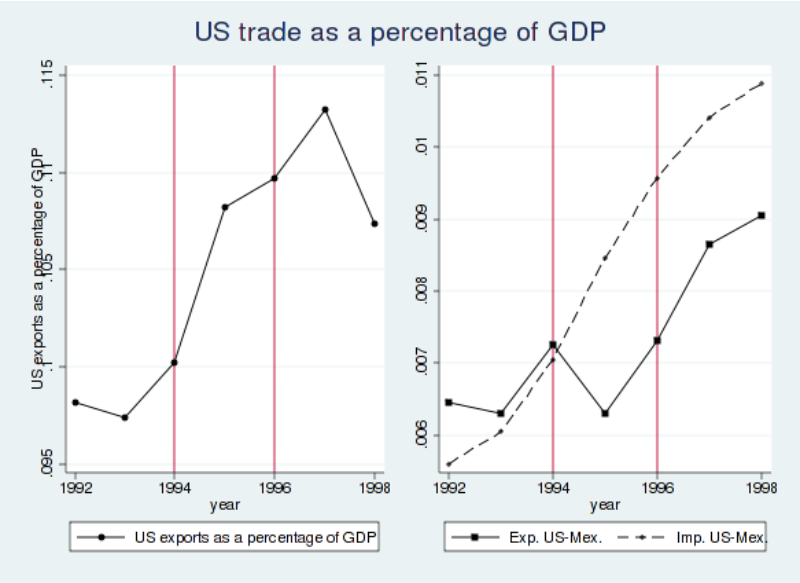
In this case the biggest concern is that the Mexican crisis not only affected immigration, but it also affected US-Mexican trade relations.

It could be the case that the devaluation of the Peso increased exports from Mexico to the US. Figure 6 suggests that this is not the case. It 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 don't 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.

Furthermore, even if exports to Mexico and immigrants from Mexico occur in the same states, trade cannot explain why the negative effect is mainly concentrated on young low skilled workers. Still, to avoid the contamination of my estimates from the direct effect of trade on wages I include in all my regressions the (log) exports and the (log) state GDP. This should control for the possible direct effect of trade on US labor market[37].

[37]Data for state exports to Mexico is provided by WISERTrade (www.wisertrade.org), based on the US Census Bureau. Exports are computed using the '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.

Figure 6: US trade



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)

3.3.3 Short run effects on wages

Table 4 reports the results of estimating equation 17. The first and second column are the first stage regressions. They show that during the shock the supply of Mexican workers increased especially in high immigration states. The second column is a reduced form regression of the instrument on my dependent variable. It shows that young low skilled wages decreased during the time of the shock, but they especially did so depending on the share of Mexicans in each state in 1980.

The third and fourth columns show cross state comparisons[38]. Column 3 is just an OLS regression of wage on relative inflows. In Column 4 I use the share of Mexican workers in 1980 to instrument the relative inflows of workers in the 90s *without* including state fixed effects. This

[38]The spatial correlations literature has been more sophisticated than that in that it has controlled for city or state wide characteristics by introducing occupations, like in (Card, 2001)

is, I am doing across state comparisons, pooling all years together. I obtain, like in most of the literature, small negative effects on native wages. In my case, when I instrument, I can distinguish the coefficient in the IV regression from 0. However, to the extend that the settlement patterns in the 80s were based on economic conditions and those are correlated over time, this estimate is not the causal effect of immigration on wages. Instead it confounds the causal effect of immigration on wages with the Mexican immigrants and native responses to immigration.

In column 5 I report OLS results including state fixed effects. We already observe that when making within state comparisons I obtain that whenever inflows are larger wages are lower. In column 6 and 7 I further specify the years of the exogenous shock. This is I am comparing the years of the shock with the years that do not experience an exogenous shock. Since the unusual inflow of Mexicans is high in 1995 (both using Census data and Passel's estimates) the shock in this table is only in 1995.

In the last column I report the results excluding California. California is by far the state where most Mexican immigrants enter and it is the state that exports more to Mexico. We might fear that most of my findings are driven by this state. In this last column we see that this seems not to be the case.

All these estimates suggest that a 1% supply shock reduces wages by between .4% and 1% on impact.

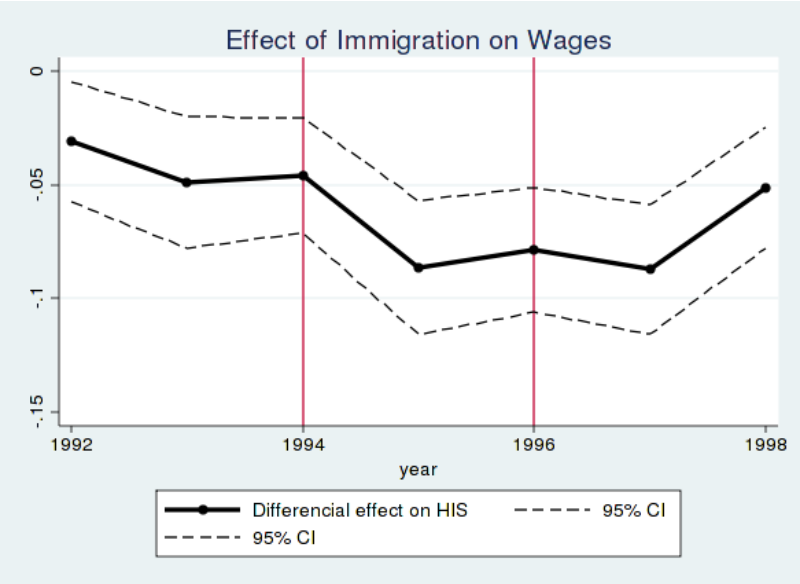
We can use lags to see whether the effects happen only in the first year, or whether the effects are also noticed in following years. Table 5 shows that the effects of immigration are not only in the first year, but also 1 or 2 years after the unexpected large inflow. Both using levels and first differences we obtain a similar result: namely, a 1% supply shock reduces wages by around .4% in the first ear and by a bit more than .5% the following year. The cumulative effect of a 1% supply shock is around 1.5% reduction of wages of workers closely competing with immigrants. In this case I use the lagged instrument for lagged inflows. In Table 6 I replicate Table 5 using (Passel et al., 2012) numbers. Finally, in Table 7, I use individual observations, instead of state level wages. All the results are almost identical. In Table 7 I also show that the results are very similar for whites, females, hispanic and possibly black workers.

To explore how long the unexpected immigration shock lasted I can run the following regression:

$$\ln wage_{ist} = \delta_s + \sum_t \delta_t HIS_s + Controls + \varepsilon_{ist}$$

where HIS_s indicates whether the state is a high immigration state, δ_s are state fixed effects and δ_t are year fixed effects. Figure 7 plots the coefficients of the year fixed effects, which are the differential effect of each year on wages of workers in high immigration states:

Figure 7: Wage differential by year



Notes: This graph reports the coefficient of a regression of (log) weekly wages at the individual level on the interaction between year dummies and an indicator dummy for high immigration state.

The graph shows that in high immigration states, wages of low skilled workers were around 5% lower before 1994. In 1995, they were almost 10% lower and they continued at this level until 1997. In 1998 they return to the original 5%[39]. Outside the graph, wages are slightly lower in 1999 than in 1998 and clearly lower in 2000. The decrease of 2000 is consistent with the spike of immigration in 1999 reported in (Passel et al., 2012), but it is difficult to argue that these Mexican immigrants were leaving Mexico for exogenous (to the US) reasons: US was growing fast in 1999 and 2000, attracting large numbers of workers from around the world.

3.4 Labor reallocation

The most important critique to the cross state or cross city comparisons in the immigration literature is the suggestion that workers might reallocate 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 reallocate from high immigration states (HIS) to low immigration states (LIS), as suggested by the model.

Figure 8 shows suggestive evidence that this is the case. In the dependent axis I have plotted the share of native low skilled workers in HIS versus LIS. Several key points are worth emphasizing from this figure.

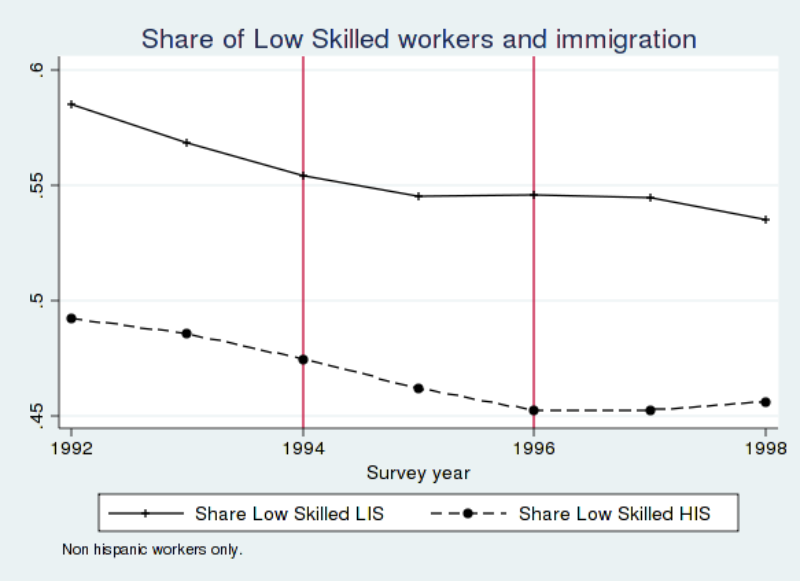
First, the share of native low skilled workers keeps decreasing over the decade. This is the well known increase in education levels in the US. This has been documented in the literature on skilled biased technological change, see (Katz and Murphy, 1992) or (Acemoglu and Autor, 2011).

Second, the share of native low skilled workers is *higher* in low immigration states. This is perhaps not surprising, but it has not been emphasized in other papers. It indicates that when there are immigrant low skilled workers in the economy, natives tend to either migrate to other states or acquire more education.

Third, during the shock or perhaps a bit later, the share of native low skilled workers fell less in low immigration states than in high immigration states, suggesting that either some low skilled natives moved from HIS to LIS or some high skilled natives moved from LIS to HIS. This is the effect of immigration on labor reallocation that I want to capture in my econometric exercise.

[39] See also Table 10.

Figure 8: Share of low skilled workers HIS vs LIS



Notes: This figure shows the share of native low skilled workers in high immigration states and low immigration states. The red vertical lines indicate the time of the immigration shock. We observe that the share of low skilled workers decreases in both high and low immigration states, but that it decreases more after the shock, with some lag, in high immigration states than in low immigration ones.

The problem with Figure 8 is that it does not allow to distinguish between the inflows and the outflows, nor does it distinguish whether high skilled workers are the ones reallocating or whether it is the low skilled ones that move. I investigate this in some detail later on. The first econometric exercise, however, shows that the intuition obtained from Figure 8 is statistically significant and identifiable. More concretely I can estimate the following equation:

$$\text{Share of Low Skilled natives}_{st} = \alpha + \beta * \text{Relative Mexican Inflow}_{st} + Controls_{st} + \varepsilon_{st} \qquad (18)$$

where the share of Low skilled natives at time t and state s is the number of low skilled natives divided by the total amount of natives in the state (i.e. low and high skilled). I exclude Hispanic workers since they may be undercounted in the CPS data and to explicitly check that natives are also reallocating as a response to the shock. The relative Mexican Inflow is the same variable than in the wage equations. It is the the number of Mexicans entering in the economy, divided by the

number of young low skilled workers. The controls follow also the wage regressions and the theory. I include the levels of low skilled and high skilled workers, the (log) GDP of the state, time dummies, and state-specific time trends. In this exercise, it is particularly important to include time trends. From the literature on skilled biased technological change (see Acemoglu and Autor (2011)) we know that the relative supply of low skilled workers has steady declined over the last 30 or 40 years. Moreover, there are good reasons to believe (see (Beaudry et al., 2010) and (Berry and Glaeser, 2005)) that the trends might be different across different states.

Table 8 shows the results of running 18. In the first column we see that in general is true that high immigration states have lower shares of native low skilled workers in the cross-section. To identify the causal effect of immigration on reallocation we need to look within states. In column 2 we see that only including state-specific time trends and state fixed effect, we obtain a much smaller relationship between migration flows and the share of natives that are low skilled in the population. Importantly, we obtain these results with the lagged inflow of Mexicans. This is, if in a given year, like 1995, there is an especial high inflow of low skilled Mexicans, in the following year, the share of low skilled natives is reduced(**?**).

Columns (4)-(6) show different specifications of the instrumented regression. It is remarkable to note that only lagged (one and two periods) effects are identified with the shock in 1995. The results are virtually identical independently of whether I use Census estimates or (Passel et al., 2012) estimates. Quantitatively, they suggest that a percentage point increase in the young low skilled participation of Mexican workers leads to a .18 decrease in the share of native low skilled workers.

To further on what is driving this reallocation I use one of the questions in the CPS about the state of residence in the previous year. Using this question I can construct the number of people (high or low skilled) that were living outside of state s at $t-1$ that at time t live in s, in other words the inflows to state s at time t. Similarly I can look at all the people that report that at time $t-1$ were living in state s and that no longer live in state s at time t, in other words the outflows from state s at time t. By dividing by the current population (of a given skill level and age bracket) I can construct the migration rates. I can then use these measures to try to establish the effect of Mexican immigration on inflows and outflows rates.

$$\text{Migration rate}_{st} = \alpha + \beta * \text{Relative Mexican Inflow}_{st} + Controls_{st} + \varepsilon_{st} \tag{19}$$

where the migration rates indicate the in-migration rate or the out-migration rate depending on the specification. The migration rates are computed using the young workers only. In fact there is ample evidence that these are the workers that move more frequently. Given that Mexican workers are especially affecting the labor market outcomes of young workers, this is also where we should expect to find the native response[40]. I include as controls the state GDP, the exports from the state to Mexico, as well as state and year fixed effects.

Importantly, the parameter β in this equation can be interpreted using the model. In fact $\beta = \frac{1}{\sigma\lambda}$ so from the estimate of β and the estimate of σ from the wage regressions, we can obtain an estimate of λ.

The results of running these regressions are shown in Table 9. The first part of the Table shows the in-migration rates. From the model we would expect that the in-migration rates decrease when more low skilled migrants enter high immigration states. This is precisely what the regressions show. Again, the first column shows that in the cross section in-migration rates are not related to Mexican immigration. In other words, it is not the case that in-migration rates are higher or lower in high immigration states. When we include state fixed effects and state specific time trends we observe how this changes after the shock. Low skilled workers that would have otherwise moved to high immigration states seem to do less so after high inflows of Mexican workers. This is particularly true in 1996, as can be seen in in the 4th and 5th columns of the Table. In particular a one percentage point increase in the flow of young low skilled workers workers leads to a .2 percentage points decrease in the in-migration rate of native young low skilled workers. Instead, as seen in column (6), it leads to an increase in the in migration rate of native young low skilled workers, though this is partially driven by the increased attractiveness of California in the years leading to the dot com bubble.

Instead, if we concentrate in out migration rates, we see that in the cross section high immigration states have higher out-migration rates. This helps to explain the gap in the share of native low skilled workers discussed in table 8 and in graph 8. Now, the reaction of out-migration rates is less instantaneous than the in-migration rates. It is likely to be true that, in the presence of fixed costs of out-migration, the decision to change destination (towards relatively better local labor markets) is less costly than the decision to move out to the affected labor market.

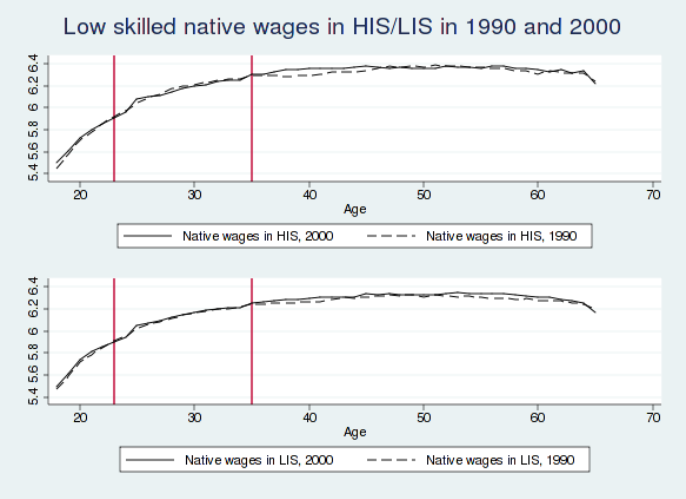
[40]Flows are flows of people irrespective of their working status

3.5 Longer run effects on wages

Tables 4, 5 and 6 identify 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. young low skilled, that are competing more closely with the Mexican arrivals. Tables **??** and **??** show that some reallocation of workers takes places as a response to the immigration shock, that should diffuse the effect on wages in the longer run. This should help to understand why the typical spatial correlations literature finds only limited effects of immigration on wages. In this section I replicate these studies to show that I also get these same results.

Figure 9 shows the average weekly wage of low skilled workers in New York and California in 1990 and 2000 at every age level. It should serve as motivation for the general results. We do not see significant changes in the wage by cohort between 1990 and 2000 across states. This is suggestive evidence that by 2000 young low skilled workers in California did not have lower wages than in less immigration intensive states like New York.

Figure 9: Wages by age in selected states



Notes: This figure shows the wage of native low skilled workers by age for California and New York. The red vertical lines indicate the age 25-35, young workers in 1995.

It is easy to translate the figure into a regression framework:

$$\ln(\text{wage}_{a,s,2000}) - \ln(\text{wage}_{a,s,1990}) = \alpha + \beta * \%\Delta \text{ in Lab. Force by Mex}_{a,s} + \delta_a + \delta_s + \varepsilon_{a,s} \quad (20)$$

where $\%\Delta$ in Lab. Force by $\text{Mex}_{a,s} = \frac{\text{Mexican Inflows in 90s}_{a,s}}{\text{Labor force in 1990}_{a,s}}$

This is a specification very similar to the ones used both in (Card, 2001) and in (Borjas, 2003)[41]. It is a regression of the change of wage of workers aged a in 1990 and workers aged a in 2000. So, I am comparing the wage profiles of different cohorts in two different decades. I regress these wage changes on the increase in the labor force of a particular age a in a state s due to the Mexican immigration in the 1990s. Obviously, Mexicans might be selecting particular states. Also, Mexicans of a particular age might be selecting specific states if the wages for their age group are particularly favorable. I build on previous literature to instrument this regression. In particular, I use the geographic distribution of 1980 to predict where the Mexicans will move to and I use the overall age distribution of the arrived Mexicans to assign the aggregate flows into the different geographic/age cells[42]. More concretely the first stage looks as follows:

$$\%\Delta\text{in Lab. Force by Mex}_{a,s} = \alpha + \beta * \text{Pred. } \%\Delta \text{ in Lab. Force by Mex}_{a,s} + \delta_a + \delta_s + \varepsilon_{a,s}$$

where Pred. $\%\Delta$in Lab. Force by $\text{Mex}_{a,s} = \frac{\text{Mex Inflows in 90s} * \text{Share Mex}_{s,1980} * \text{Share Mex}_{a,2000}}{\text{Labor force in 1990}_{a,s}}$.

The results can be seen in Table 10.The first two columns show that Mexican immigrants in the 90s tended to settle where former Mexicans settled. This is the basis of (Card, 2001) the instrument. Columns three and four show the reduced form regressions, while columns (5)-(8) show the OLS and IV results. They all point to the same conclusion, namely, that over longer horizons the wages of natives competing more strongly with Mexicans decrease only marginally. Over this longer horizon, a 10% immigration induced supply shock reduces wages by at most 1%.

4 Conclusion

This paper uses the Mexican crisis of 1995 to document the causal effect of immigration on US wages. In particular, I use the fact that Mexican migration to the US is low skilled, young and

[41] (Card, 2001) uses occupations instead of age. Like in (Borjas, 2003) I pool together together 5 year cohorts from age 20 to 65.

[42] I restrict the age groups between 25-55 to avoid cells with small numbers of observations.

concentrated in certain states, to show that a 1% immigration induced supply shock decreases wage by a .5-1%.

As a result, natives reallocate across states. When the relative inflow of Mexicans increases by 1 percentage point, the share of low skilled workers decrease by almost .2 percentage points. This is due to a decrease in the in-migration rates. In other words, fewer natives move towards high immigration states when these receive unusually high inflows of Mexican workers. This in turn helps to understand why in 2000 there is no evidence of lower wages of workers in high immigration states that suffered the shock, relative to the workers in low immigration states.

The fact that this paper uses both (Borjas, 2003) and (Card, 2001) type comparisons and obtains the exact same result using either approach, should help to clarify the effect of immigration on labor market outcomes, both on impact and dynamically.

References

Acemoglu, D. and D. Autor, "Skills, Tasks and Technologies: Implications for Employment and Earnings," *Handbook of Labor Economics Volume 4, Orley Ashenfelter and David E. Card (eds.)*, 2011.

Altonji, J. and D. Card, "The Effects of Immigration on the Labor Market Outcomes of Less-Skilled Natives," *in John Abowd and Richard Freeman (eds.), Immigration, Trade, and the Labor Market, University of Chicago Press*, 1991.

Anderson, S., A. De Palma, and J-F. Thisse, "Discrete Choice Theory of Product Differentiation," *MIT Press*, 1992.

Angrist, J. and A. Krueger, "Empirical Strategies in Labor Economics," *Chapter 23 in O. Ashenfelter and D. Card, eds., The Handbook of Labor Economics*, 1999, *Volume 3.*

Autor, D. and L. Katz, "Changes in the Wage Structure and Earnings inequality," *Handbook of Labor Economics*, 1999.

Aydemir, A. and G. Borjas, "Attenuation Bias in Measuring the Wage Impact of Immigration," *Journal of Labor Economics*, 2011.

Beaudry, P., M. Doms, and E. Lewis, "Should the Personal Computer Be Considered a Technological Revolution? Evidence from U.S. Metropolitan Areas," *Journal of Political Economy*, 2010, *118(5)*, 988–1036.

Berry, C. and E. Glaeser, "The divergence of human capital levels across cities," *Papers in Regional Science*, 2005, *84(3)*, 407–444.

Bertoli, S. and J. Fernandez-Huertas, "Multilateral Resistance to Migration," *Journal of Development Economics*, 2012.

Blanchard, O. and L. Katz, "Regional Evolutions," *Brookings Papers on Economic Activity*, 1992, pp. 1–75.

Borjas, G., "The Economic Benefits of Immigration," *Journal of Economic Perspectives*, 1995.

_ , "The Labor Demand Curve is Downward Sloping: Reexamining the Impact of Immigration on the Labor Market," *Quarterly Journal of Economics*, 2003, pp. 1335–1374.

_ **and L. Katz**, "The Evolution of the Mexican Born Workforce in the United States," *Mexican Immigration to the United States, Borjas ed.*, 2007.

_ **, J. Grogger, and G. Hanson**, "Imperfect Substitution between Immigrants and Natives: A Reappraisal," *NBER working paper No 13887*, 2008.

_ **,** _ **, and** _ , "Substitution between Immigrants, Natives and Skill Groups," *Journal of European Economic Association*, Forthcoming.

_ **, R. Freeman, and L. Katz**, "Searching for the Effect of Immigration on the Labor Market," *American Economic Review Papers and Proceedings*, 1996.

Boustan, L.P., "Was Postwar Suburbanization 'White Flight'? Evidence from the Black Migration.," *Quarterly Journal of Economics*, 2010.

Card, D., "The Impact of the Mariel Boatlift on the Miami Labor Market," *Industrial and Labor Relations Review*, 1990, pp. 245–257.

_ , "The Causal Effect of Education on Earnings," *Handbook of Labor Economics, Volume 3A. Ed Orley Ashenfelter and David Card*, 1999.

_ , "Immigrant Inflows, Native Outflows and the Local Labor Market Impacts of Higher Immigration," *Journal of Labor Economics*, 2001, *19.*

_ , "Is The New Immigration Really So Bad?," *Economic Journal*, 2005, *115*, 300–323.

_ , "Immigration and Inequality," *American Economic Review Papers and Proceedings*, 2009, *99(2)*, 1–21.

_ **and J. DiNardo**, "Do immigrant Inflows lead to Native Outflows," *American Economic Review*, 2000.

Chiswick, B., "The Effect of Americanization on the Earnings of Foreign-born Men," *Journal of Political Economy*, 1978, *86(5)*, 897–921.

Cortes, P., "The Effect of Low-skilled Immigration on U.S. Prices: Evidence from CPI Data," *Journal of Political Economy*, 2008, pp. 381–422.

Davis, D. and J. Dingel, "A Spatial Knowledge Economy," *NBER Working Paper 18188*, 2012.

Diamond, R., "The Determinants and Welfare Implications of US Workers' Diverging Location Choices by Skill: 1980-2000," *mimeo*, 2013.

Donald, S. and K. Lang, "Inference with Difference-In-Differenrence and other panel data," *Review of Economics and Statistics*, 2007, *89(2)*, 221–233.

Dustmann, C. and I. Preston, "Estimating the Effect of Immigration on Wages," *Cream Discussion Paper 21/11*, 2012.

Friedberg, R. and J. Hunt, "The Impact of Immigrants on Host Country Wages, Employment and Growth," *Journal of Economic Perspectives*, 1995, pp. 23–34.

Glaeser, E., "Cities, Agglomeration and Spatial Equilibrium," *Oxford University Press*, 2008.

Hanson, G., "Illegal Migration from Mexico to the United States," *Journal of Economic Literature*, 2006, *44(4)*, 869–924.

_ **and A. Spilimbergo**, "Illegal Migration, Border Enforcement and Relatvie Wages: Evidence from Apprehensions at US-Mexico Border," *American Economic Review*, 1999, *89(5)*, 1337–1357.

_ **and J. Grogger**, "Income Maximization and the Selection and Sorting of International Migrants," *Journal of Development Economics*, 2011, *95(1)*, 42–57.

Hunt, J., "The Impact of the 1962 Repatriates from Algeria on the French Labor Market," *Industrial and Labor Relations Review*, 1992.

Katz, L and K. Murphy, "Changes in Relative Wages, 1963-1987: Supply and Demand Factors," *Quarterly Journal of Economics*, 1992, *107(1)*, 35–78.

McFadden, D., "Conditional Logit Analysis of Qualitative Choice Behavior," *Frontiers in Econometrics, ed. Zarembka*, 1974, pp. 105–142.

Molloy, R., C. Smith, and A. Wozniak, "Internal Migration in the United States," *Journal of Economic Perspectives*, 2011, *25(3)*, 173–196.

Moretti, E., "Local Labor Markets," *Handbook of Labor Economics*, 2011.

Ottaviano, G. and G. Peri, "Rethinking the Effect of Immigration on Wages," *Journal of the European Economic Association*, 2010, *forthcoming.*

Passel, J., "Estimates of the Size and Characteristics of the Undocumented Population," *Pew Hispanic Center Report*, 2005.

_ , D. Cohn, and A. Gonzalez-Barrera, "Net Migration from Mexico Falls to Zero and Perhaps Less," *Pew Hispanic Center Report*, 2012.

Peri, G. and C. Sparber, "Task Specialization, Immigration and Wages," *American Economic Journal: Applied Economics*, 2009, *1(3)*, 135–169.

_ and _ , "Assessing Inherent Model Bias: An Application to Native Displacement in Response to Immigration," *Journal of Urban Economics*, 2011, *69(1)*, 82–91.

Ruggles, S., M. Sobek, T. Alexander, C.A. Fitch, R. Goeken, PK Hall, M. King, and C. Ronnander, "Integrated Public Use Microdata Series: Version 4.0 [Machine-readable database].," *Minneapolis, MN: Minnesota Population Center [producer and distributor]*, 2008.

Smith, Christopher L., "The Impact of Low-Skilled Immigration on the Youth Labor Market," *Journal of Labor Economics*, 2012, *30(1)*, 55–89.

Thom, K., "Repeated Circular Migration: Theory and Evidence from Undocumented Migrants," *mimeo*, 2010.

Wozniak, A., "Are College Graduates More Responsive to Distant Labor Market Opportunities?," *Journal of Human Resources*, 2010, *45(4)*, 944–970.

5 Tables

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
Estimated Inflow in 1995 (workers)	US Cen. 2000 + Mex. Cen.	508,967.45	1995
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. When using not using estimates from (Passel et al., 2012) stocks and inflows are computed for potential workers, i.e. between 18 and 65 years old. Data from Censuses comes from (Ruggles et al., 2008). 'Estimated Inflow in 1995 (workers)' by assigning a 50% larger inflow of Mexicans to the US in 1995 compared to 1991-1994. See further details in the text.

Table 2: Summary statistics

Variable	Mean	Std. Dev.	N
Wages of Low Skilled workers			
Weekly Wage (in logs)	5.687	0.09	357
Weekly Wage (in logs) in 1995 and 1996	5.672	0.091	153
Mexican Migration Flows			
Mexican flow (Census)	7351.13	31736.196	357
Mexican flow (INS+DHS)	7215.339	31555.762	357
Mexican flow (Passel)	9327.731	40375.738	357
Relative Mexican flow (Census)	0.015	0.031	357
Relative Mexican flow (INS+DHS)	0.019	0.039	357
Relative Mexican flow (Passel)	0.015	0.031	357
Relative Mexican flow (Census) in 1995	0.02	0.042	51
Relative Mexican flow (Passel) in 1995	0.022	0.046	51
GDP and exports			
GDP growth rate US	0.056	0.006	357
GDP growth rate Mex	0.045	0.041	357
exports (in millions)	1079.3	3828.7	357
gdp (in millions)	288375.1	349363.9	357
exports to GDP	0.002	0.003	357
Employment Characteristics (in logs)			
Young Low Skilled Full time Employed	11.654	1.091	357
Young Low Skilled Part time Employed	10.793	1.073	357
Young Low Skilled Full time Employed (Non-Hispanic)	11.58	1.054	357
Young Low Skilled Full time Employed (Hispanic)	8.593	1.774	258
Old Low Skilled Full time Employed	12.635	1.072	357
Young Low Skilled Part time Employed	11.43	0.99	357
Young Low Skilled Unemployment Rate	0.226	0.113	357

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 US true average.

Table 3: Low skilled weekly wages by age and state

	Low Skilled Wage		High Skilled		Low Skilled Wage	
	All workers	Only no.Hisp	Wage		All workers	Only Young
shock	0.006	0.011	-0.013	shock	-0.007	-0.017
	0.008	0.008	0.010		0.005	0.011
young	-0.417***	-0.436***	-0.314***	HIS	-0.097***	-0.000
	0.010	0.013	0.009		0.021	0.029
young shock	**-0.025****	**-0.034*****	**0.000**	**HIS shock**	**-0.038****	**-0.047***
	0.010	0.012	0.013		0.015	0.025
Controls	yes	yes	yes	controls	yes	yes
State FE	yes	yes	yes	Occupation FE	yes	yes
r2	0.162	0.169	0.158	r2	0.213	0.273
N	147206	118700	60866	N	136384	28029

Note: 'shock' is a dummy for the year 1995 and 1996. 'young' is a dummy indicating whether individual is between 18 and 30 years old. 'HIS' is a dummy indicating whether individual lives in a high immigration state. 'young shock' and 'HIS shock' is the interaction between the variables 'young¡ and 'shock', and 'HIS' and 'shock', respectively. Weekly wages are constructed by dividing yearly wage by weeks worked for full time full year workers. Robust standard errors clustered at the state level. 3 stars is 1%, 2 stars is 5% and 1 star is 10% significance levels. Low skilled workers are high school drop outs and high school graduates. Hispanic workers are defined by the variable 'hispan' in the CPS. Controls are observable characteristics in CPS data: race, urban status and gender and a time trend. Including or excluding the controls and the fixed effects does not change the results significantly.

Table 4: The causal effect of Mexican immigration on low skilled wages

	First Stage		Main Regressions						
	Rel.Mex.Flow	Low Skilled Wage	Low Skilled Wage						
	OLS	OLS	OLS	IV (Card'01)	OLS	IV	IV	IV	IV (No Cal.)
shock share 1980	1.226***	-0.700**							
	0.163	0.295							
rel mexican flow census			-0.161	-0.176*	-0.615*	-0.636**	-0.373*		-0.985*
			0.153	0.106	0.345	0.284	0.202		0.394
rel mexican flow passel								-0.497*	
								0.284	
State Fixed Effects	yes	yes	no	no	yes	yes	yes	yes	yes
State Specific trend	yes	yes	no	no	yes	yes	yes	yes	yes
Year Fixed Effects	yes	yes	yes	yes	no	no	yes	yes	yes
r2	0.997	1.000	0.207	0.302	0.752	0.752	0.819	0.816	0.824
N	357	357	357	357	357	357	357	357	350

Notes: 'shock' is a dummy for the year 1995 and 1996. 'shock share 1980' is the interaction between the shock variable and the share of Mexicans by state in 1980. 'shock' and 'shock' interacted with a dummy for 1995 are used in the IV specification as instruments for my measure of relative inflow of low skilled Mexicans. Panel regressions at the state level between years 1991-1999. 3 stars is 1%, 2 stars is 5% and 1 star is 10% significance levels. 'rel mexican flow census' is the relative inflow of Mexicans to low skilled young natives using estimates for the inflow from the US Census 2000 (see text for more details). 'rel mexican flow passel' is the relative inflow of Mexicans to low skilled young natives using estimates for the inflow from **?**Passel12. Wages are the state fixed effects from Mincerian regressions controlling for observable characteristics (see text for more details). Regressions are weighted by the number of observations in the state. Controls include: GDP of state, exports of state to Mexico, levels of low skilled young and old workers.

Table 5: The causal effect of Mexican immigration on low skilled wages

	Low Skilled Wage				D.Low Skilled Wage	
	IV	IV	IV	IV	IV	IV
rel mexican flow census	-0.484***	-0.442***	-0.488***	-0.455***	-0.464***	-0.387*
	0.175	0.151	0.175	0.153	0.165	0.208
L.rel mexican flow census	-0.675*	-0.730**	-0.729**	-0.823**	-0.410	-0.342
	0.348	0.367	0.342	0.352	0.577	0.451
L2.rel mexican flow census		-0.179		-0.327**		0.445
		0.168		0.140		0.557
L.ln wage L			-0.206***	-0.238***		
			0.053	0.058		
State fixed effects	yes	yes	yes	yes	yes	yes
State specific trends	yes	yes	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes	yes	yes
Controls	yes	yes	yes	yes	yes	yes
P-val. of F-stat	0.003	0.001	0.002	0.001	0.002	0.001
r2	0.827	0.828	0.834	0.838	0.457	0.443
N	357	306	357	306	357	306

Notes: All regressions instrument the relative inflow of Mexicans (Mexican inflow relative to young low skilled population in state) with the interaction of the share of Mexicans by state in 1980 and a dummy for 1995. Lagged variables are instrumented by the lagged instrument. Panel regressions at the state level between years 1991-1999. 3 stars is 1%, 2 stars is 5% and 1 star is 10% significance levels. 'rel mexican flow census' is the relative inflow of Mexicans to low skilled young natives using estimates for the inflow from the US Census 2000 (see text for more details). Wages are the state fixed effects from Mincerian regressions controlling for observable characteristics (see text for more details). Regressions are weighted by the number of observations in the state. Controls include: GDP of state, exports of state to Mexico, levels of low skilled young and old workers. 'L.' denotes lagged variable.'D.' denotes differenced variable.

Table 6: The causal effect of Mexican immigration on low skilled wages

	Low Skilled Wage				D.Low Skilled Wage	
	IV	IV	IV	IV	IV	IV
rel mexican flow passel	-0.533**	-0.534**	-0.529**	-0.577**	-0.550*	-0.349
	0.239	0.236	0.243	0.228	0.321	0.352
L.rel mexican flow passel	-0.825**	-0.903**	-0.885**	-1.006***	-0.520	-0.465
	0.401	0.385	0.374	0.349	0.621	0.573
L2.rel mexican flow passel		-0.356		-0.546**		0.453
		0.261		0.220		0.667
L.ln wage L			-0.196***	-0.235***		
			0.055	0.058		
State fixed effects	yes	yes	yes	yes	yes	yes
State specific trends	yes	yes	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes	yes	yes
Controls	yes	yes	yes	yes	yes	yes
P-val. of F-stat	0.002	0.001	0.002	0.001	0.002	0.001
r2	0.826	0.829	0.832	0.838	0.459	0.445
N	357	306	357	306	357	306

Notes: All regressions instrument the relative inflow of Mexicans (Mexican inflow relative to young low skilled population in state) with the interaction of the share of Mexicans by state in 1980 and a dummy for 1995. Lagged variables are instrumented by the lagged instrument. Panel regressions at the state level between years 1991-1999. 3 stars is 1%, 2 stars is 5% and 1 star is 10% significance levels. 'rel mexican flow passel' is the relative inflow of Mexicans to low skilled young natives using estimates for the inflow from (Passel et al., 2012) (see text for more details). Wages are the state fixed effects from Mincerian regressions controlling for observable characteristics (see text for more details). Regressions are weighted by the number of observations in the state. Controls include: GDP of state, exports of state to Mexico, levels of low skilled young and old workers. 'L.' denotes lagged variable.'D.' denotes differenced variable.

Table 7: The causal effect of Mexican immigration on low skilled wages

	Low Skilled Individual Wage					
	All	Non-hispanic	Non-hispanic males	Non-hispanic white	Non-hispanic females	Non-hispanic blacks
	IV	IV	IV	IV	IV	IV
rel mexican flow census	-0.467**	-0.941**	-1.062**	-0.916***	-0.789*	-2.633
	0.236	0.424	0.433	0.309	0.466	2.408
State fixed effects	yes	yes	yes	yes	yes	yes
State specific trends	yes	yes	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes	yes	yes
Individual Controls	yes	yes	yes	yes	yes	yes
Aggregate Controls	yes	yes	yes	yes	yes	yes
r2	0.349	0.371	0.362	0.392	0.349	0.254
N	37919	33856	19345	30511	14511	3345

Notes: All regressions instrument the relative inflow of Mexicans (Mexican inflow relative to young low skilled population in state) with the interaction of the share of Mexicans by state in 1980 and a dummy for 1995. Panel regressions at the individual level on state level immigration inflows between years 1991-1999. 3 stars is 1%, 2 stars is 5% and 1 star is 10% significance levels. 'rel mexican flow census' is the relative inflow of Mexicans to low skilled young natives using estimates for the inflow from the US Census 2000 (see text for more details). Wages are individual observations. Only young low skilled workers are included in the regressions. Regressions are weighted by the sample weight as introduced in (Ruggles et al., 2008). Controls include: GDP of state, exports of state to Mexico, levels of low skilled young and old workers.Robust standard errors clustered at the state level are reported.

Table 8: The causal effect of Mexican immigration on share of low skilled population

	Share of Low Skilled by State and Year							
	Census estimates					Passel estimates		
			All				All	
	OLS	OLS	IV	IV	IV	IV	IV	IV
L.rel mexican flow	-1.036***	-0.155**	-0.124*	-0.177***	-0.171**	-0.163***	-0.197**	-0.188*
	0.138	0.067	0.072	0.063	0.070	0.095	0.082	0.104
L2.rel mexican flow				-0.234***	-0.238***		-0.290***	-0.276***
				0.052	0.054		0.061	0.063
rel mexican flow					0.052			0.031
					0.079			0.104
L2.rel mexican flow passel						-0.290***	-0.276***	
						0.061	0.063	
State fixed effects	no	yes	yes	yes	yes	yes	yes	yes
State specific trends	no	yes	yes	yes	yes	yes	yes	yes
Year fixed effects	no	yes	yes	yes	yes	yes	yes	yes
Controls	yes	yes	yes	yes	yes	yes	yes	yes
r2	0.511	0.965	0.968	0.968	0.968	0.968	0.968	0.968
N	357	357	408	357	357	408	357	357

Notes: All regressions instrument the relative inflow of Mexicans (Mexican inflow relative to young low skilled population in state) with the interaction of the share of Mexicans by state in 1980 and a dummy for 1995. Panel regressions at state level between years 1991-1999. 3 stars is 1%, 2 stars is 5% and 1 star is 10% significance levels. 'rel mexican flow census' is the relative inflow of Mexicans to low skilled young natives using estimates for the inflow from the US Census 2000 (see text for more details). Similarly for (Passel et al., 2012) measure. Regressions are weighted by the size of the state. Controls include: GDP of state, exports of state to Mexico, levels of low skilled young and old workers. Robust standard errors clustered at the state level are reported. The share os low skilled workers are computed using non-hispanic workers only.

Table 9: The causal effect of Mexican immigration on migration rates

	In-migration rates						Out-migration rates					
	OLS		IV				OLS		IV			
L.rel mexican flow	0.022	-0.119***	-0.145	-0.188*	-0.146**	0.183*	0.129**	-0.073	-0.026	-0.034	-0.110	-0.078
	0.040	0.041	0.092	0.097	0.070	0.102	0.058	0.059	0.085	0.110	0.108	0.183
L2.rel mexican flow census					0.061	0.157**					-0.073	0.314
					0.132	0.076					0.100	0.213
State fixed effects	no	yes	yes	yes	yes	yes	no	yes	yes	yes	yes	yes
State specific trends	no	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Year fixed effects	no	yes	yes	yes	yes	yes	no	yes	yes	yes	yes	yes
Controls	yes	yes	yes	yes	yes	yes	no	yes	yes	yes	yes	yes
Data		Census		Passel	Census			Census		Passel	Census	
r2	0.292	0.695	0.711	0.708	0.729	0.737	0.297	0.585	0.600	0.600	0.641	0.576
N	306	306	306	306	255	255	306	306	306	306	255	255

Notes: All regressions instrument the relative inflow of Mexicans (Mexican inflow relative to young low skilled population in state) with the interaction of the share of Mexicans by state in 1980 and a dummy for 1995. Panel regressions at state level between years 1991-1999. 1 stars is at least 10% significance level. 'rel mexican flow census' is the relative inflow of Mexicans to low skilled young natives using estimates for the inflow from the US Census 2000 (see text for more details). Similarly for (Passel et al., 2012) measure. Regressions are weighted by the size of the state. Controls include: (log) population, GDP of state, exports of state to Mexico, levels of low skilled young and old workers (including or excluding these controls does not change the results significantly). Robust standard errors clustered at the state level are reported. Hispanics are excluded from the computation of migration rates. Only young workers used when computing the migration rates. 1995 is excluded because CPS does not ask state of residence on previous year in 1995.

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

	First Stage		Reduced Form		Main Results			
Dep. Var.	%Δ in Lab. Force by Mex		%Δ in Native wage between 1990 and 2000					
	OLS	OLS	OLS	OLS	OLS	OLS	IV	IV
%Δ in Lab. Force by Mex					0.026	0.050	-0.029	0.019
					0.026	0.036	0.033	0.054
Pred. %Δ in Lab. Force by Mex	1.181***	0.946***	-0.034	0.018				
	0.166	0.141	0.036	0.057				
Age FE	no	yes	no	yes	no	yes	no	yes
State FE	yes	yes	yes	yes	yes	yes	yes	yes
r2	0.568	0.778	0.542	0.610	0.545	0.620	0.521	0.616
N	561	561	561	561	561	561	561	561

Notes: This table shows the first stage and the main results of regressing the percentage change in native low skilled weekly wage on the change in labor supply account for the Mexicans arriving in the US between 1991 and 2000. The predicted change uses the distribution of Mexicans within US in 1980, the aggregate age distribution of the arrivals in the 90s and the aggregate inflow of Mexicans as estimated by (Passel et al., 2012). I use ages 25 to 55 and 50+1 states. 1 star denotes significant at least at a 10% level. Robusts standard errors clustered at the state level are reported. Regressions are weighted by the number of observations in the state.