The Effects Of Immigration: An Examination Of Relative Wages In California's Agriculture

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Abstract

Economic theory suggests that certain native workers experience a decrease in their wage in response to an inflow of immigrants. However, a large number of empirical studies have failed to find substantial negative effects on the wages of natives due to immigration.

In this paper, I identify three possible aggregation problems that may lead to such small estimates of the reduction in natives' wages: First, immigrants from various countries with varying characteristics are often lumped together in the literature. There are substantial differences between immigrants from different source countries, however, e.g., in terms of education. Second, Metropolitan Statistical Areas may not exhibit much across-variation in immigrant shares so that the influence of immigrants on natives' wages may not be distinguishable from other factors. Third, most previous work assumes that the effect on natives' wages is the same regardless of the industry in which a native works. This may not be a plausible assumption to make given that immigrants are heavily concentrated in some industries.

I address these issues in the following ways: First, I use a special immigrant definition to focus on a certain type of immigrant. I define an individual as an immigrant if that person entered the United States within the previous ten calendar years and if that person reports his or her ability to speak English as "Not well" or "Not at all." Second, I examine the state of California, the state that has been the state with the highest levels of immigration in recent decades. Third, I focus on the agricultural sector within California, an industry that has one of the highest shares of immigrant workers of all industries.

I examine whether modifying the research strategy typically employed in previous work by taking these three aggregation issues into consideration enables researchers to find substantial negative effects of immigration on the wages of natives. I study the impact of immigration on native agricultural workers in California by comparing their wages to the wages of native agricultural workers in a large region in the Northern part of the United States. In that comparison, regional differences in the cost of living must be accounted for. I achieve that by expressing agricultural workers' wages relative to the wages of a reference group that is chosen for its small share of immigrants.

In the comparison of relative wages, I find that low-skilled natives in California's agriculture indeed do earn lower hourly wages than their counterparts in the North of the United States, thus reconciling empirical estimates with economic theory.

1.0 Introduction

International movements of workers have been studied extensively in economics, especially in the past 15-20 years. The main focus of the existing literature is either on the effects of immigration on the immigrants or on the effects on natives[1]. This paper is concerned with the latter of the two. In particular, my research studies the influence of immigration on natives' wages (as opposed to effects on natives' employment and migration patterns, although I

[1]In this paper, I use the terms "natives" to describe all individuals who were either born in the United States or immigrated to the United States more than 20 years before the 1990 Census. I.e., the expression "natives" does not necessarily describe the group of people classified as "American Indians" in the 1990 Census.

do mention quantity effects in the interpretation of estimates). The large majority of previous studies have failed to find a substantial negative effect of immigration on natives' wages. A typical finding in the literature is that if a city has a 10 percent higher immigrant share than another city, natives' wages in the city with the higher immigrant share will only be about 0.2 percent lower than in the other city (cp. Grossman (1982), for example). Similar results were found even when the group of natives was restricted to presumably low-skilled workers such as black men (Borjas, 1987) or young blacks (LaLonde and Topel, 1991) or when native workers at the 10^{th} percentile of the wage distribution were studied (Butcher and Card, 1991).

Most of these studies seem to suffer from a number of aggregation problems, however. The first aggregation problem is that immigrants from various countries are often lumped together so that an immigrant from Mexico is treated in the same way in the empirical analyses as, say, an immigrant from China or Great Britain. There are substantial differences between immigrants from different source countries, however, e.g., in terms of education. The second potential problem is that in studies that compare wage differentials across Metropolitan Statistical Areas (MSAs), there may not be sufficient variation in immigrant shares across MSAs. The percentage of immigrants in many major MSAs is in the lower one-digit range so that the influence of immigrants on natives' wages may not be distinguishable from other factors. The third potential problem due to aggregation is that most previous work assumes that the effect on natives' wages is the same regardless of in which industry a native works. However, if immigrants are concentrated in certain industries (which, indeed they are) and if there are factors other than the wage rate that influence a worker's decision to stay in an industry or to leave it (which seems plausible, e.g., someone's experience in a certain field), "stayers" in an industry with a high immigrant concentration experience increased labor market competition.

I address these potential aggregation problems in the following way: First, I define immigrants narrowly: I define an individual as an immigrant if that person entered the United States within the previous ten calendar years and if that person reports his or her ability to speak English as "Not well" or "Not at all." Second, I focus on California, the state that has been the state with the highest levels of immigration in recent decades. Third, I examine California's agriculture, an industry that has one of the highest shares of immigrant workers of all industries.

2.0 Data

I construct two samples from the 5% Public Use Microdata Sample of the 1990 U.S. Census of Population and Housing, one for California and one that combines Kansas, Nebraska, South Dakota, North Dakota, Wyoming, Montana, and Idaho (which I call the "North sample"). In the construction, samples are restricted to civilian workers of private for-profit companies and private not-for-profit organizations, aged 16-64, not enrolled in school, not in the armed forces, and not institutionalized at the time of the Census. In order to be included in the sample, the individuals had to have worked in 1989 and had to have positive wage or salary income in 1989. There are 388,056 individuals in the California sample and 92,957 individuals in the North sample.

For the examination of how low-skilled immigrants impact natives' wages, I define an individual as an immigrant if that person entered the United States to stay here within the previous ten calendar years or the year of the Census (i.e., 1980 - 1990) and if that person reports his or her ability to speak English as "Not well" or "Not at all."[2] According to this definition, 30.89 percent of farm managers, farm supervisors, and farm workers in California are immigrants. The source country with the by far largest share of the immigrant population is Mexico (91.01 percent of immigrants), followed by El Salvador (1.79 percent), the Philippines (0.89 percent), and India (0.79 percent).

Table 1 presents the educational distributions of natives and immigrants in my California agriculture sample which is restricted to farm managers, farm supervisors, and farm workers. It allows an inspection of how similar immigrants and natives are. Immigrants are even less educated than natives (almost three quarters of all

[2]Note that I restrict neither on citizenship nor on where outside the United States a person was born, i.e., I treat individuals the same regardless of whether they were born in Puerto Rico, Guam, and outlying areas or were born abroad to U.S. parents or are naturalized citizens or are non-naturalized immigrants.

immigrants have less than nine years of schooling compared to slightly more than half of the natives). The important result, however, is that both native and immigrant agricultural workers have low levels of education: The large majority of both groups do not have a high school diploma and are therefore quite similar in terms of the embedded human capital.

Table 1

Educational Distribution of Natives and Recent Immigrants (in the California Agriculture Sample)

	Natives	Recent Immigrants
Less than 9 Years of Schooling	35.54 %	73.66 %
9-12 Years of Schooling; no High School Diploma	17.21 %	16.14 %
High School Diploma (or GED)	20.64 %	6.68 %
Some College	17.96 %	2.89 %
Bachelor's Degree	7.38 %	0.42 %
More than a Bachelor's Degree	1.27 %	0.21 %
No. of Observations	4,256	1,902

However, formal education is presumably of relatively minor importance as a measure of immigrants' ability in general because, assuming that immigrants get the majority or all of their schooling in the source country, their schooling is probably less valuable in the United States than schooling from the United States. To investigate this claim, I regress the natural logarithm of the hourly wage[3] on the number of years of schooling[4], a quartic in experience, a gender dummy (0 = male; 1 = female), and a race dummy (0 = white; 1 = nonwhite). I carry out two separate regressions, one for individuals born in the U.S. and another one for individuals born elsewhere.[5] The regression estimates which are presented in Table 2 confirm that the rate of return to schooling of individuals who were born abroad is substantially lower than the rate of return of U.S.-born individuals. The difference between the two rates of return is highly statistically significant at all conventional significance levels.

Furthermore, as mentioned earlier, the notion that formal education is not a very good measure for immigrants' ability is probably especially true in agriculture. Almost 95 percent of immigrants in my sample are farm workers (as opposed to farm managers and farm supervisors) and it seems to be the case that the typical manual work carried out by farm workers does not use many of the skills learned by formal education and that the concept of "allocative ability" (Welch, 1970) is relevant for farmers, farm managers, and perhaps supervisors, but not for manual laborers.

[3]An hourly wage for each individual is constructed by dividing wages or salary income in 1989 by the product of the number of weeks worked in 1989 and the usual hours worked per week in 1989. Hourly wages are top- and bottom-coded at the 98th and 2nd percentile of the resulting empirical wage distribution, respectively, separately for each of the two data sets (California and the North).

[4]Note that the rate of return to schooling relies on an approximation of years of schooling because in 1990 Census data, education is not reported by single year of schooling. In constructing years of schooling, I used the following mapping: "No school completed," "Nursery school," and "Kindergarten" = 0 years of schooling; "1st, 2nd, 3rd, or 4th grade" = 2 years; "5th, 6th, 7th, or 8th grade" = 6 years; "9th grade" = 9 years; "10th grade" = 10 years; "11th grade" and "12th grade, no diploma" = 11 years; "High school graduate, diploma or GED" = 12 years; "Some college, but no degree" and "Associate degree" = 14 years; "Bachelor's degree" = 16 years; "Master's degree" = 17 years; "Professional degree" and "Doctorate degree" = 18 years.

[5]I.e., the sample is not separated according to my definition of immigrants, but is solely based on an individual's place of birth. The reason is that it does not seem to be relevant for the issue under study whether an individual is a "real" immigrant or was born to U.S. parents abroad, whether an individual is a naturalized citizen or not, etc.

Table 2

Regression of (the Natural Logarithm) of Hourly Wages on "Years of Education" and Control Variables

	U.S.-Born		Foreign-Born	
Regressor	**Coeff. Estimate**	**t-ratio**	**Coeff. Estimate**	**t-ratio**
Years of Education	0.029755	15.981	0.0070826	2.508
Experience	0.0283223	10.402	0.0102894	2.725
$(\text{Experience})^2$	-0.0004269	-7.647	-0.000219	-2.395
Sex	-0.0762337	-3.386	-0.0026148	-0.085
Non-White	-0.0474232	-2.703	-0.0206803	-0.919
Constant	1.357121	36.617	1.588661	41.800
R-Squared	0.0874		0.0067	
No. of Observations	4,256		1,902	

These observations on the role of immigrants' formal education, in particular of those working as farm workers, lead me to use the immigrant definition introduced earlier that is not based on formal schooling. Instead, the definition is based on recency of immigration and deficiencies in the ability to speak English. The first criterion is motivated by the "assimilation" literature that started with Barry Chiswick's (1978) work who found that immigrants were at an earnings disadvantage when they first came to the United States, but that they "overtook" natives with similar measurable characteristics after a few years. Chiswick's findings were challenged in later work (Borjas, 1985), which in turn is challenged by, among others, LaLonde and Topel (1991) and Chiswick (1986). No matter how quickly immigrants really assimilate (if at all), I avoid the issue by focusing on (relatively) recent immigrants. The inclusion of the second criterion is motivated by an article by Walter McManus, William Gould, and Finis Welch (1983) in which they show (using 1976 Survey of Income and Education data) that differences associated with English language skills explain almost all of the Hispanics' wage differences that are typically attributed to ethnicity, national origin, and time in the United States.

There are two potential reservations that I have about the use of the ability to speak English: it is self-reported and lack of English language skills is probably not too detrimental to the labor market outcome of farm worker. The former lacks the objectivity that some form of administered language test would provide, but I feel that the distinction between "Well" and "Not well" which is used in my definition is much clearer than the distinction between "Very well" and "Well" or the one between "Not Well" and "Not at all." The latter reservation is confirmed by McManus, Gould, and Welch (1983) in that they find that the negative effects of poor English skills are greatest in occupations in which wages are otherwise the highest. Nonetheless, even if the negative effects of limited ability to speak English are not as pronounced for farm workers as they are for high-skill occupations, it may still have somewhat of an impact on immigrants' ability. No matter how simple a task, new workers, for instance, will probably have questions when they are taught a new task, and being fluent in English certainly aids in that process.

Both criteria need to be satisfied for an individual to be classified as an immigrant because I want to ensure that my immigrant definition captures the low-skilled segment of immigrants. I do not want to classify individuals as immigrants (for the purposes of this study) who came to the U.S. recently, but speak English "Well" or even "Very well." I also do not want to classify individuals as immigrants who have lived in the U.S. for more than ten years. Despite their limited ability to speak English, they seem to have the necessary set of skills to "make it" since they did not return to their country of origin (or emigrate to a different country).

3.0 Interregional Wage Comparisons

It is the goal of this study to examine whether agricultural workers in California (where many immigrants reside) earn lower hourly wages than agricultural workers in the North (where few immigrants reside). An issue that needs to be addressed before such a comparison can be carried out in a meaningful way is how to account for differences in the cost of living. I consider a few possibilities in Section 3.1 and give the reasoning for choosing the approach that is used in the wage comparisons in Section 3.2.

3.1 Methodological Considerations

One possibility to account for cost-of-living differences across areas would be to adjust nominal wages by some kind of a cost-of-living index to obtain a measure for purchasing power, an approach that has been used, e.g., in Sahling and Smith (1982). One problem with this approach is that it is difficult to decide what the optimal level of aggregation for a cost-of-living index is from a theoretical standpoint, i.e., whether the optimal choice is a cost-of-living index at the level of Census tract, Public Use Microdata Area (PUMA), MSA, county, or state, just to name a few possibilities. Data availability, however, substantially reduces the choices which simplifies the decision process, but does not necessarily allow the use of the theoretically preferred cost-of-living index. More importantly from an empirical perspective, it is difficult to find an appropriate cost-of-living index in the current setting because many of the individuals in the two samples live in rural areas for which cost-of-living indices are usually not published.

In order to avoid the problems just mentioned, I use the following approach: In the comparison of native workers' wages in California to native workers' wages in the North sample, I divide the agricultural workers' average hourly wage by another appropriate wage rate (as discussed in Section 3.2). Both wage rates are calculated from the same data set. The rationale for such an approach is based on the assumption that the cost of living in a locale affects every worker there in approximately the same way.[6] A seemingly natural candidate for the divisor of such a ratio is the average hourly wage in the respective sample (or maybe the average hourly wage rate in the respective sample with agricultural workers' wages excluded). Another possibility would be to divide agricultural workers' wages by the average wage rate of workers in that data set that have the same characteristics such as sex, race, educational attainment, etc.

However, these approaches are not the best choice in the current setting because I am studying the influence of a change in the quantity of immigrant labor on natives' wage rates in one particular sector. If indeed the quantity of immigrants in a labor market influences natives' wages, then the average wage in California would be affected by the presence of immigrants since there is a substantial number of industry groups with a sizable share of immigrants.[7] In order to avoid that problem, I calculate a relative wage for agricultural workers in California by dividing their mean wage by the average wage of workers in occupations with low immigrant shares. I then divide the mean wage of agricultural workers in the North sample by the average wage of workers in the North sample in the same occupations that were used to "standardize" wages in the California sample. (That is, the "reference group" in the North is *not* chosen based on a low immigrant share in the North sample, but consists of the same group of occupations used in the California sample).[8] More formally, I construct a measure for the relative wage as

$$Wrel, CA \equiv \frac{WAg, CA}{W\,Re, CA}$$

where $w_{Ag,CA}$ is the average hourly wage of agricultural workers in California and $w_{Re,CA}$ is the average hourly wage of workers from the reference occupations with low immigrant shares.

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[6] I realize that this is a simplification. It is well-known that low-income households spend a larger share of their income on food and housing (Engel's law and Schwabe's law, respectively) while high-income households' true cost of living is more affected by luxury goods, but I believe that these differences in consumer behavior are not so severe that they would make my approach invalid.

[7] I define 57 industry groups in both the California and the North data set, roughly following the 2-digit 1987 Standard Industrial Classification. Several industry groups in the California sample have immigrant shares (defined as percentage of annual hours worked by immigrants in an industry group) which exceed 20 percent; the highest immigrant share (31.0 percent) is found in the "Apparel and other finished textile products" industry group. The highest immigrant shares in the North sample are 2.4 percent ("Food and kindred products") and 1.6 percent ("Agriculture, Forestry, and Fisheries"). All other immigrant shares in the North are substantially lower than 1 percent.

[8] I realize that agricultural workers differ substantially from, say, workers in professional specialty occupations along dimensions as education, etc. That is not a problem, however, as long as individuals in professional specialty occupations in California are similar enough to those in the North.

This measure is compared to

$$Wrel, North \equiv \frac{WAg, North}{W Re, North}$$

where $w_{Ag,North}$ is the average hourly wage of agricultural workers in the North sample and $w_{Re,North}$ is the average hourly wage of workers in the North sample in the occupations that have low immigrant shares in the California data set. Which occupations should be included in such a calculation as a reference group will be considered in Section 3.2.

Finally, I calculate such relative wages for two different types of workers: For high-skilled natives (individuals with at least 12 years of schooling who were either born in the U.S. or immigrated to the U.S. more than 20 years ago) and for low-skilled natives (individuals with less than 12 years of schooling who were either born in the U.S. or immigrated to the U.S. more than 20 years ago).

3.2 Description of Interregional Wage Patterns

As discussed in Section 3.1, a wage of a reference group by which the agricultural workers' wages can be standardized must be found in order to allow a meaningful comparison of wages across regions. It is not clear-cut in my opinion which occupations' hourly wage should be chosen.

In a first comparison, I used a group of professional specialists as a reference group that included engineers, architects, surveyors, mathematical and computer scientists, natural scientists, therapists, and workers in health diagnosing, health assessment, and treating occupations. The share of annual hours worked by immigrants (as defined earlier) in these occupations is approximately 0.5 percent.

The reference group of occupations serves its purpose if the workers in these occupations in California are similar to the workers in these occupations in the North. This is probably not an unreasonable assumption to make for professional specialists. As an empirical check, I calculate the average years of schooling for those occupations in both data sets: It is 15.7 in California and 15.3 in the North. Additionally, I look at the average years of potential experience: The value for California is 18.1 years compared to 18.0 for the North. I believe that these numbers are similar enough to justify my comparison of relative wages.

The value of $w_{rel,CA}$ is 0.56 for low-skilled natives compared to a value of 0.69 for $w_{rel,North}$. That is, after accounting for regional wage differences, low-skilled agricultural workers in California do indeed earn less than their counterparts in the North. The opposite pattern is observed for high-skilled workers in agriculture where $w_{rel,CA}$ is 0.51 compared to a value of 0.45 for $w_{rel,North}$.

Since it does not seem to be a clear-cut issue which occupations should be used as a reference group, I tried various specifications. When I use technicians—which are also quite similar across the two data sets in terms of education (14 versus 14.3 years) and experience (16.7 versus 16.9 years)—as a reference group, the results are similar: $w_{rel,CA} = 0.64$ versus $w_{rel,North} = 0.69$ for low-skilled workers, $w_{rel,\ CA} = 0.65$ versus $w_{rel,North} = 0.59$ for high-skilled workers.

In another approach, I sorted occupations by their immigrant share and included more and more occupations in the reference group in increasing order of their immigrant share: First, I only used occupations with an immigrant share of zero. Then I used as reference group all occupations with an immigrant share of less than 1 percent in California. Next, I added occupations with an immigrant share of up to 2 percent and, finally, those occupations with an immigrant share of less than 10 percent. The results differed somewhat quantitatively, but I found the same qualitative result in all cases: The relative wage of agricultural workers in California is lower than in the North for low-skilled workers, but higher for high-skilled workers.

4.0 Summary and Policy Implications

Empirical estimates of the negative wage effects of immigration are small compared to what most researchers expect based on economic theory. I identify three ways in which data are typically aggregated in this strand of the literature. I then present way to address each of the three potential problems. In order to allow meaningful wage comparisons across areas, I construct several variants of relative wages for agricultural workers in two areas of the United States. After I account for regional differences in the cost of living, I find that low-skilled natives in California's agriculture earn lower hourly wages and high-skilled natives in California earn higher hourly wages than their counterparts in the North of the United States. Thus, I am able to reconcile empirical results with economic theory.

Such results have important policy implications. It is generally believed that immigration is beneficial to the United States as a country. However, this paper shows that there are distributional issues associated with immigration. High-skilled natives, as complementary input factors to immigrants, directly benefit via increased wages. Low-skilled natives, however, are put at a disadvantage (in the form of reduced wages) because of immigration. These results must be taken into consideration by policymakers whenever possible changes to the laws that govern immigration are discussed. 🕮

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Notes