

Do Immigrants Work in Riskier Jobs?*

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Abstract: Media and government reports suggest that immigrants hold jobs with worse working conditions than U.S.-born workers, perhaps because immigrants work in jobs that “natives don’t want.” This study investigates whether the foreign-born are more likely to hold jobs with higher industry and occupation injury and fatality rates. We combine individual-level data from the 2003-2005 American Community Survey with Bureau of Labor Statistics data on work-related injuries and fatalities to measure whether immigrants work in more dangerous industries and occupations than natives. The results indicate that immigrants are more likely to work in risky jobs than U.S.-born workers. Differences in average characteristics, such as immigrants’ lower English language ability and educational attainment, contribute to their overrepresentation in risky jobs.

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Do Immigrants Work in Riskier Jobs?

Stylized facts suggest that the foreign-born are more likely to work in risky jobs than natives.¹ For example, immigrants are disproportionately employed in agriculture and construction, sectors with relatively high injury and fatality levels. And within those sectors, immigrants may be in riskier jobs or perform riskier tasks than natives. Anecdotal evidence supports this possibility. For example, 21 of 29 fatal construction accidents in New York City during a recent 12-month period involved workers who were immigrants or had limited English proficiency (Chan, 2006). Studies of immigrants doing reconstruction work in New Orleans after Hurricane Katrina suggest that large numbers of both documented and undocumented foreign-born workers were exposed to dangerous substances and conditions (Fletcher et al., 2006). Nationally, fatal work injuries among foreign-born Hispanic workers reached a series high in 2005 (Bureau of Labor Statistics, 2006), making this issue a pressing public policy concern. This study therefore examines whether immigrants are indeed more likely than natives to work in risky jobs, as measured by industry and occupation injury and fatality rates, and investigates the causes of any such differences.

Background

Stories of immigrants injured or killed while working in dangerous jobs abound. Dramatic recent examples include: Two Ecuadorian brothers who worked as window washers in New York fell 47 stories when their scaffolding collapsed. One died and the other was gravely injured. A migrant farm worker died of heat stroke after picking tobacco in 110 degree weather in North Carolina. His internal body temperature was recorded at 108 degrees. A 14-year-old

¹ We use the terms immigrant and foreign-born interchangeably here to refer to all individuals born outside the U.S. to parents who are not U.S. citizens except when distinguishing between illegal (undocumented) immigrants and other immigrants.

undocumented worker was partially decapitated and crushed by machinery in a plant in Tennessee. The youth, who had presented forged documents indicating that he was 19 years old, had received no safety training. Over 3000 foreign-born workers were murdered on the job between 1992 and 2005, making homicide the leading cause of workplace fatalities among immigrants.²

From a theoretical perspective, there are several reasons why immigrants might hold riskier jobs than natives. First, immigrants might have different perceptions or knowledge of job risks than natives. Immigrants may perceive work-related risks differently than natives because job conditions in the U.S. may be less risky than those in some developing countries, for example. Immigrants might therefore be more willing than natives to take risky jobs because they do not perceive them as particularly dangerous. Research has not explicitly examined this hypothesis.

In addition, lower levels of education, social capital, and English ability may lead to immigrants' having less information about job risks. Sandy and Elliott (1996) and Bender, Mridha, and Peoples (2006) note that employers may understate workplace risks to workers; this understatement may occur more among employers who hire immigrants, either intentionally or because of communication difficulties with immigrants who speak a different language. About 32% of foreign-born adults (aged 25 and older) in the U.S. do not have a high school diploma or equivalent, compared with 11% of natives (Census Bureau, 2006), and about 83% of immigrants speak a language other than English at home, with 35% of those reporting speaking English not well or not at all (Grieco, 2003). These lower average levels of education and English ability could result in immigrants being less able to understand job risks.

² The anecdotes and statistics in this paragraph are compiled from the NIOSH Traumatic Occupational Injuries website (<http://www.cdc.gov/niosh/injury/traumahispanicface.html>), the *New York Times* (December 9, 2007), and the *Chicago Tribune* (October 8, 2006).

Immigrants may also end up in riskier jobs because they lack legal documents. A survey of immigrants in Chicago concluded that undocumented immigrants are more likely than legal immigrants to say that their working conditions are unsafe (Mehta et al., 2002). Previous research also indicates that undocumented immigrants are generally a complement to natives rather than a substitute, indicating that undocumented immigrants and natives work in different jobs (Bean, Lowell, and Taylor, 1988). Undocumented immigrants are particularly overrepresented in agricultural, cleaning, construction, and food preparation jobs (Passel, 2006), which involve more dangers than typical white-collar jobs. Undocumented workers working in the meat and poultry industries hold the “most dangerous factory jobs” in America and are subject to many abuses from their employers (Compa and Fellner, 2005: A19). Workers in meatpacking and poultry processing jobs experience cuts, carpal tunnel syndrome, skin diseases, amputations, and even death.

Even if immigrants and natives had similar knowledge about job risks and the same legal status, immigrants might still occupy riskier jobs than natives because of differences in risk preferences or income. Immigrants may be more willing to take risky jobs because they tend to have lower incomes and less wealth than natives. Job amenities, including workplace safety, are usually viewed as a normal good, for which quantity demanded increases with wealth (Viscusi, 1978). Because immigrants have less wealth than natives, on average (Cobb-Clark and Hildebrand, 2006), they “buy” lower levels of job amenities. In other words, immigrants may be more willing than natives to trade off higher wages for worse conditions.³ In addition, Berger

³ This assumes that riskier jobs pay more, which is generally true for jobs with higher fatalities rates but not for jobs with higher injury rates, as noted by Rosen (1986), Smith (1979), and Viscusi (1993).

and Gabriel (1991) point out that immigrants may be less risk averse than natives, as evidenced by the fact that they were willing to take on the risk of migrating to the U.S.⁴

The “healthy immigrant effect” also might result in immigrants holding riskier jobs than natives. It is widely documented that upon arrival immigrants tend to be healthier than natives, although this health advantage dissipates over time (Antecol and Bedard, 2006, and references therein). Immigrants therefore might hold more physically strenuous jobs than natives, resulting in them being exposed to more workplace risks.

Despite media reports, anecdotal evidence, and theoretical implications that immigrants work under more hazardous conditions, previous research that combines the distribution of workers across industries with industry-level fatality or injury rates has not found that immigrants work in riskier jobs than natives. Using data from the 1980 Census combined with industry fatality data, Berger and Gabriel (1991) find that immigrants are employed in industries with lower average fatality rates. Hamermesh (1998) similarly combines 1991 Current Population Survey data with industry injury rates. He reports that immigrants are not more likely than white natives to work in industries with higher injury rates whereas black natives are more likely to work in such industries.

More recent studies that directly examine work-related deaths reach the opposite conclusion. An analysis of work-related fatalities data for the period 1996-2001 by Loh and Richardson (2004) indicates that work-related fatality rates are higher among the foreign-born than among natives, with fatalities particularly high among immigrants from Mexico. Supporting this conclusion, Richardson, Ruser, and Suarez (2003) note that foreign-born Hispanic workers had higher fatality rates during 1995-2000 than both Hispanic and non-

⁴ However, Bonin et al. (2008) show that—controlling for age, education, and the like—foreign nationals living in Germany but born abroad self-report lower willingness to take risks, including with regard to career, than German nationals or foreign nationals living in Germany who were born in Germany. Bonin et al. (2006) report that the immigrant-native gap in risk proclivity shrinks as immigrants assimilate into German society.

Hispanic native-born workers. The higher fatality rate among foreign-born Hispanics mainly arises from their disproportionate employment in construction and agriculture, industries with relatively high fatality rates. Death rates due to workplace homicides are also higher among the foreign-born, particularly among Asians (because of robberies at retail stores), than among natives (Sincavage, 2005).

The divergent conclusions reached by previous studies could be due to methodological differences. Hamermesh (1998) and Berger and Gabriel (1991) merge industry injury and fatality rates with individual level-data and control for observable characteristics. Loh and Richardson (2004) and Richardson, Ruser, and Suarez (2003), in contrast, simply report the number of work-related deaths per worker and do not control for differences in characteristics between immigrants and natives. Immigrants might work in industries with lower fatality rates but be more likely to experience fatalities within industries, resulting in higher overall fatality rates for immigrants. Alternatively, differences in characteristics between immigrants and natives may account for the varying findings. Immigrants may work in less risky jobs than natives with similar ages and education levels, but work in riskier jobs than the average native.

Changes over time are another potential explanation for the differing conclusions reached by previous research. Immigrants might work in riskier jobs more now than previously. Potential explanations for a relative increase in immigrants' job risk include a decline in average human capital among immigrants and crowding of immigrants into riskier jobs as the immigrant population has risen over time. In addition, conditions may have deteriorated over time in jobs that primarily employ immigrants as the number of immigrants has risen in the U.S.

To explore whether immigrants hold riskier jobs than natives, we combine data on the distribution of foreign- and native-born workers across industries and occupations with industry- and occupation-level data on work-related injuries and fatalities in the U.S. during 2003-2005.

In essence, we use the same technique as Berger and Gabriel (1991) and Hamermesh (1998) but more recent data. Our analysis thus updates their results. Like those studies, we examine the role of observable characteristics, such as education and years since migration, in whether workers hold risky jobs. Our analysis adds a measure of workers' ability to speak English, a characteristic not available in previous studies. The results indicate that immigrants are now disproportionately employed in industries and occupations with high injury and fatality rates. This marks a change from Hamermesh's (1998) injury results for 1991 and Berger and Gabriel's (1991) fatality results for 1980. Poor English ability and lower average levels of education appear to play key roles in the over-representation of immigrants in risky jobs.

Data and Methods

We use two main data sources for the period 2003-2005: individual-level data from the American Community Survey (ACS), and data on work-related fatalities and nonfatal injuries and illnesses from the Bureau of Labor Statistics (BLS) injuries, illnesses, and fatalities (IIF) program.

The ACS is a nationwide survey administered by the Census Bureau that asks about individual demographic and socioeconomic characteristics on an annual basis.⁵ We focus on a national comparison of all foreign- and U.S.-born individuals aged 16 and older who report being employed in the private sector last week.⁶ The ACS reports detailed industry and occupation for these workers as well as characteristics such as age, education, and place of birth. We define U.S. natives as people born in the U.S. or those born abroad to U.S. citizens. Immigrants are people born outside of the U.S. We do not include people born in U.S. territories or outlying

⁵ The ACS is designed to replace the long form of the decennial Census and, in essence, asks the same questions as the 2000 Census long form.

⁶ We do not include the self-employed because of concerns about whether they are included in the BLS IIF data. We do not include non-profit and government workers because the injury data are from the private sector.

areas (e.g., Puerto Rico) in our analysis because these people are U.S. citizens by birth but have very different characteristics than other U.S. natives. The ACS asks respondents who report speaking a language other than English at home to self-assess their ability to speak English as very well, well, not well, or not at all. The ACS also asks foreign-born people what year they came to live in the U.S. We use these answers to derive numbers of years of U.S. residence for immigrants.

Injuries and Fatalities Data

The fatalities data are from the Census of Fatal Occupational Injuries (CFOI) and include deaths resulting from traumatic events on the job. The BLS compiles the CFOI data by examining source records, such as death certificates, workers' compensation reports, and Federal and State agency administrative reports. Deaths usually must be substantiated as work-related by at least two sources to be included in the CFOI. We do not focus on the primary fatal event (the event leading to the death, such as a fall) in this analysis; other studies show that homicide is the leading event for work-related fatalities among immigrants while highway incidents are the leading event among natives (Loh and Richardson, 2004). The number of fatalities is reported by industry and by occupation (not jointly by industry and occupation). We created fatality rates by dividing the number of fatalities by the number of private sector workers in that industry or occupation using data from the BLS Current Employment Statistics program for industry-level data or from the Occupational Employment Statistics for occupation-level data.⁷ Fatality rates are reported here as per 100,000 workers.

Figure 1 shows the trend in the overall fatality rate over the period 1992-2005. The fatality rate declined fairly steadily between 1994 and 2002 but leveled off in the last three years.

⁷ Agricultural employment data are annual averages based on the Quarterly Census of Employment and Wages (QCEW).

The rate during 2003-2005 corresponds to an average of 5691 work-related deaths annually. The figure also shows the percentage of fatalities that occurred among foreign-born workers, which was reasonably stable at about 11% during 1992-1998 but has since risen, reaching 18% in 2005.⁸ This proportion exceeds the representation of immigrants in the labor force, which was about 15% in 2005. Foreign-born workers thus appear to experience excess work-related mortality. During 2003-2005, about 960 foreign-born workers experienced a work-related death each year.

There are several factors underlying the substantial increase in the percentage of fatalities occurring to foreign-born workers after 1998. Loh and Richardson (2004) note that fatality rates rose for immigrants working in agricultural jobs and in manufacturing industries while fatality rates fell for natives. The increase coincides with a surge of immigrant inflows, particularly of undocumented immigrants, in the wake of economic crises in Latin America and with immigrants moving from the traditional agricultural sector to jobs in manufacturing and construction.

The industries and occupations with the highest fatality rates are largely what one would expect. The industries with the highest fatality rates are fishing/hunting/trapping, taxi service, and logging. The occupations with the highest fatality rates include farmers and ranchers, fishers and hunters, loggers, and mining machine operators.

The nonfatal injuries and illnesses data are from the Survey of Occupational Injuries and Illnesses (SOII). The SOII data are based on reports collected annually from about 176,000

⁸ The overall fatality rates and number of work-related fatalities are from the IIF program. The number of work-related deaths among foreign-born workers was compiled from unpublished data provided by the IIF program, Richardson (2005), and Seminario (2007). The IIF program defines foreign-born individuals slightly differently than in this paper. The IIF program classifies individuals born abroad to U.S. citizen parents as foreign-born. This likely accounts for a very small number of workers, however (individuals born abroad to U.S. citizen parents are less than 1% of our ACS sample).

private industry establishments.⁹ The Occupational Safety and Health Administration (OSHA) requires employers to keep logs of work-related injuries and illnesses, and the SOII data are based on these logs. Work-related injuries and illnesses included here involve at least one day away from work other than the incident day. These injuries may involve medical treatment (other than first aid), restriction of work or motion, loss of consciousness, or transfer to another job. Work-related illnesses are new cases recognized, diagnosed, and reported during the year. The BLS IIF program acknowledges that illnesses directly related to workplace activity are more likely to be reported than long-term latent illnesses, such as cancer. The SOII reports the total number of injuries and illnesses as well as by the nature of injury or illness, such as burns, fractures, and amputations. We focus on the total injury and illness rate but do report some results by nature of illness or injury.¹⁰ The BLS IIF program reports injury rates by industry but only levels for occupations; we converted the occupation data into rates as with the fatalities data.¹¹ Injury rates are reported here as per 10,000 workers.

During 2003-2005, industry injury rates in our sample averaged 142 injuries per 10,000 workers while occupation injury rates averaged about 112. In levels, this corresponds to an average of 1,269,973 nonfatal injuries per year involving days away from work. Industries with the highest injury rates include bituminous coal underground mining, air transportation, and urban transit systems. The occupations with the highest injury rates, like those with the highest fatality rates, include farmers and ranchers, fishers and hunters, loggers, and mining machine operators.

⁹ Occupational injury and illness data for coal, metal, and nonmetal mining and for railroad activities are from the Department of Labor's Mine Safety and Health Administration and the Department of Transportation's Federal Railroad Administration. The SOII survey excludes all work-related fatalities as well as nonfatal work injuries and illnesses to the self employed; to workers on farms with 10 or fewer employees; to private household workers; and to federal, state, and local government workers. (<http://www.bls.gov/iif/oshsum1.htm>)

¹⁰ For brevity, we refer to these data here as injury data, but the data include illnesses as well.

¹¹ The BLS IIF calculates the industry rates based on the number of full time equivalent workers. Because of data limitations, we calculated the occupation rates based on all workers, not full time equivalent workers.

Underreporting

The BLS data likely underestimate the incidence of work-related injuries and illnesses (Azaroff, Levenstein, and Wegman, 2002). There are several reasons for the undercount, including: workers might not report injuries or illnesses to their employers because they fear reprisal; workers might not be able to afford time away from work ; and employers might not record and report all work-related injuries and illnesses in order to keep workers' compensation rates low and to avoid triggering inspections. Work-related fatalities also might be underreported by the CFOI, in part because at least two sources must substantiate the death as work-related. The true extent of underreporting of both work-related fatalities and injuries is unknown.

Injuries and fatalities may be more likely to be underreported in industries and occupations that disproportionately employ immigrants. Immigrants, particularly the undocumented, may be less likely than natives to report a work-related injury or illness to an employer. Evidence on this issue is mixed. A survey of non-agricultural Latino immigrant workers in Alexandria, Virginia, found that all of them who had experienced a job-related injury had reported it to the employer, although most of them had not received any workers' compensation benefits (Pransky et al., 2002). A survey of unionized hotel room cleaners (mostly immigrants) in Las Vegas found that less than one-third who had experienced work-related pain had reported it to their employer (Scherzer, Rugulies, and Krause, 2005). Underreporting also might occur at the firm level. Employers that hire large numbers of immigrants, particularly undocumented immigrants, might be less likely to follow OSHA record-keeping requirements for work-related injuries and illnesses. Similarly, it may be more difficult to substantiate a death as work-related for an immigrant worker, especially for undocumented immigrants.

If differential underreporting occurs, our results underestimate any immigrant-native differences. However, any bias due to differential underreporting is diluted by our use of industry- or occupation-level injury and fatality rates that combine immigrants and natives. If underreporting is more common for immigrant workers than for natives, the bias would be greater in rates stratified by nativity than in rates for all workers.

Data Analysis

We merge the ACS and IIF data by industry and, separately, by occupation. Industry is coded in both data sources using North American Industry Classification System (NAICS) codes, and occupation using the 6-digit “occSOC” codes. We used the most detailed level possible for merging the data sources by industry; if a match could not be made at the 4-digit NAICS level, we made it at the 3-digit level, and so on. Again, only workers in the private sector who are not self-employed are included here. We were able to match about 98% of these observations in the ACS to an industry or occupation injury or fatality rate.¹²

Immigrants account for over 14% of our sample. We suspect that the immigrant sample in the ACS includes undocumented immigrants. A comparison of Department of Homeland Security (DHS) administrative records with the ACS suggests that the ACS includes a substantially larger population of foreign-born individuals than the DHS’s estimate of legal permanent residents and temporary non-immigrants (Cornwell, 2006; Hoefer, Rytina, and Campbell, 2007). One potential reason for this is, of course, that the ACS includes at least some of the undocumented immigration population, which probably numbered around 11 million in 2005 (Passel, 2006). However, like other large-scale government surveys, the ACS probably

¹² The samples are slightly different depending on whether we examine industry or occupation injury or fatality rates, as indicated by the sample sizes shown in Table 2. Table 1 shows sample means of individual characteristics for all individuals included in any specification here.

undercounts the undocumented population, particularly because it does not include people living in group quarters (Mather, Rivers, and Jacobsen, 2005). The Department of Homeland Security estimates that the ACS undercounts the unauthorized immigrant population by 10% (Hofer, Rytina, and Campbell, 2007).

Table 1 reports descriptive statistics for our sample. All of the immigrant-native differences in the weighted sample means are significant at the 1% level. Immigrants are more likely than natives to be male, married, Hispanic, and “other race” (which includes Asians and Pacific Islanders). Reflecting the bimodal distribution of education among immigrants, the percent of immigrants who do not have a high school diploma or equivalent is about 22 percentage points higher than among natives while the percent that have a college degree is similar for immigrants and natives. Almost all natives speak only English at home or report speaking English very well whereas immigrants’ ability to speak English is quite varied.

Immigrants work in riskier industries and occupations. The sample means in Table 1 indicate that the average industry injury rate for immigrant workers is about 8 injuries per 10,000 workers higher than among native workers, and the average occupation injury rate is 31 injuries per 10,000 workers higher. The average industry fatality rate among immigrant workers is about 1.8 deaths per 100,000 workers higher than among natives, and the average occupation fatality rate is almost 1.6 deaths per 100,000 workers higher. These differences are probably downward biased by underreporting of injuries in industries that employ large numbers of immigrants, as discussed above. Our exclusion of government workers, who are disproportionately native-born and whose jobs tend to be less risky (except for the armed forces), also likely leads to an underestimate of immigrant-native differences.

As a first step in investigating why immigrants tend to work in riskier jobs, Table 2 presents sample means for the injury and fatality rates by education and English ability. All four

measures are declining monotonically in education. Injury and fatality rates tend to improve with English ability, although all four measures are higher among workers who speak only English at home than among workers who speak another language at home but speak English very well. Workers who speak no English clearly face greater average injury and fatality rates than other workers.

Regression Model

The differences in sample means in Tables 1 and 2 suggest that differences in education, English ability, or other individual characteristics may explain why immigrants tend to work in riskier jobs. We estimate ordinary least squares regressions of the determinants of injury and fatality rates to examine the extent of immigrant-native differences in average injury and fatality rates when controlling for other observable individual characteristics. The basic form of the regressions is

$$\text{Rate}_{ist} = \alpha + \beta_1 \text{Immigrant}_i + \beta_2 \text{Other Characteristics}_i + \beta_3 \text{State}_s + \beta_4 \text{Year}_t + \varepsilon_{ist}, \quad (1)$$

where the dependent variable is the injury or fatality rate in individual i 's industry or occupation. The variable *Immigrant* is a dummy variable equal to 1 for immigrants and 0 for natives. The controls for *Other Characteristics* include a dummy variable equal to 1 for females, age and age squared, dummy variables for marital status (married and divorced/widowed/separated, with never married as the omitted category), dummy variables for race and ethnicity (black, other race, and Hispanic, with whites as the omitted category), and dummy variables for highest educational attainment (less than high school diploma, some college, or at least a college degree, with high school diploma as the omitted category). We also include a linear variable measuring

years since moving to the U.S. (which equals 0 for all natives) and dummy variables measuring ability to speak English (very well, well, not well, and not at all, with speaking only English as the omitted category). The regressions also include fixed effects for state of residence and survey year. The coefficients on these fixed effects are not shown here.¹³ Observations are weighted using the person weights in the ACS. Standard errors are clustered on industry or occupation.

¹³ The estimated coefficients of the state fixed effects are jointly statistically significant in the regressions. This reflects differences in the distribution of industries and occupations across states. The estimated coefficients of the year fixed effects are significant in some, but not all, specifications and do not show a clear pattern.

Results

Controlling for observable individual characteristics reduces the immigrant-native differences in injury and fatality rates. Table 3 reports the regression results. The difference in the average industry injury rate falls from 8.19 injuries per 10,000 workers (based on the sample means in Table 1) to about 5.75. The gap in the average occupation injury rate also declines, from about 30.86 injuries per 10,000 workers to 10.69. The difference in the average industry fatality rate declines from 1.79 deaths per 100,000 workers to 0.83, and the difference in the average occupation fatality rate from about 1.60 to -0.54 (or immigrants are in occupations with lower fatality rates, controlling for observable characteristics). All of the significance levels of the immigrant-native differences decline as well compared with the difference in raw means. Only the differences in the occupational injury rate and industry fatality rate are significant at conventional levels when controlling for differences in education, English ability, and the like. These results thus indicate that differences in observable characteristics can explain much of the overrepresentation of immigrants in riskier jobs.

The results in Table 3 indicate several other patterns in the distribution of workers across risky jobs. Women tend to work in safer industries and occupations, as do older workers. Blacks work in jobs with higher injury rates than whites but lower industry and occupation fatality rates. Individuals of “other race” work in safer jobs than whites, and Hispanics tend to work in jobs with higher injury rates. There is an inverse relationship between education and injury and fatality rates, as suggested by the sample means in Table 2.

The regression results indicate that workers with worse English ability tend to be in riskier jobs. The difference is most notable for workers who speak no English. One result is somewhat puzzling: workers who speak English well but also speak another language hold less

risky jobs than workers who only speak English. This result also appears in the raw sample means (Table 2). If we stratify the data by immigrant status, however, there is no significant difference in job injury and fatality rates between immigrants who speak only English and immigrants who speak English very well, controlling for other characteristics (not shown).¹⁴ Injury and fatality rates increase monotonically among immigrants as ability to speak English declines from very well to not at all.

Among immigrants, years of U.S. residence is generally negatively associated with job risk, but only the relationship with industry fatality rates reaches statistical significance in Table 3. We caution that the years since migration results capture both assimilation and cohort effects. If earlier cohorts of immigrants were more skilled than recent cohorts, then the negative coefficient on years since migration is biased and is likely too large (too negative). We do not attempt to control for cohort effects because we use only 3 years of data (see Borjas, 1985, for a discussion).

Immigrants are in riskier jobs along a variety of dimensions. Table 4 reports the immigrant-native difference in injury rates by the nature of the injury. The columns labeled “Raw” present differences in sample means, and the columns labeled “Adjusted” present the estimated coefficients on an immigrant dummy variable in regressions that control for other individual characteristics. The significance levels indicate whether the difference is statistically different from 0. Most of the raw differences indicate that immigrants are in jobs with higher injury rates. Interestingly, immigrants tend to be in riskier occupations more than they are in riskier industries—all of the raw differences are statistically significant for occupation injury

¹⁴ There is a high degree of multicollinearity between the immigrant variable and the omitted English ability category because natives compose 97% of the English-only observations. This multicollinearity might drive the result for workers who speak English very well relative to workers who only speak English when the immigrant indicator variable is included in the regressions. Alternatively, immigrant households that speak a non-English language at home but are also fluent in English might be more educated (and hence work better jobs) than other immigrant households.

rates but only a few for industry injury rates (the overall industry injury rate difference is also not statistically significant). As in Table 3, observable characteristics can explain much of the gaps. The differences are attenuated (and fewer are statistically significant) when controlling for education, English ability, and the like. The results also indicate that, when controlling for observable characteristics, immigrants are less likely to work in jobs that lead to carpal tunnel syndrome.

Robustness

We performed a number of other estimations to verify the robustness of the results shown in the tables. Stratifying the data by sex revealed some interesting differences, although we caution that the injury and fatality rates are not sex-specific. The raw immigrant-native differences in injury rates are fairly similar for both men and women (and the gap in occupational injury rates is actually greater for female immigrants than for male immigrants). Foreign-born men work in industries with higher fatality rates than do native-born men, but there is no difference among women. When observable characteristics are controlled for, immigrant women work in industries and occupations with significantly higher injury rates than native-born women, and immigrant men work in industries with higher fatality rates than native-born men.

As discussed earlier, immigrants might work in riskier jobs because of they tend to have lower incomes and less wealth. The ACS does not have good measures of wealth, but it does have measures of unearned individual income and total family income. We ran the specifications shown in Table 3 with an additional variable measuring either unearned individual income or total family income less the individual's earned income. The estimated coefficients and significance levels for the immigrant dummy variable were similar to those shown in Table 3. As expected, the "other income" variables were negatively associated with job risk.

We also tried controlling for the fraction of workers in an industry or occupation who are members of a union or the fraction covered by union representation.¹⁵ The immigrant-native differences in job risk were slightly larger in magnitude (and more statistically significant) when controlling for unionization rates except for the occupation fatality rates results, which were unchanged. The unionization rate variables were typically positively associated with job risk, indicating that worse jobs have higher unionization rates.

Immigrants who are naturalized citizens might be less likely to hold risky jobs than other immigrants. Our main results do not include an indicator variable for naturalized citizen status because it would be highly correlated with years in the U.S. (and, to a lesser extent, with English ability). If we do include a citizen indicator variable, the results suggest that naturalized citizens work in industries with lower fatality rates than other immigrants. There is little change in the other estimated coefficients in the regression. Naturalized citizen status is not significantly associated with industry or occupation injury rates or occupation fatality rates.

A final concern about our results is multicollinearity between the immigrant, years in U.S., and English ability variables. Multicollinearity can result in larger standard errors (and lower significance levels) or coefficients with the wrong sign or an implausible magnitude. We experimented with running the regressions with only one of those variables (or sets of variables, in the case of English ability) instead of all three. If only the immigrant dummy variable is included (along with the controls for gender, age, etc.), the coefficients on the immigrant variable are similar to those in Table 3 except that immigrants are significantly more likely than natives to work in industries with higher injury rates. When only years of U.S. residence is included, that variable is not significantly associated with job risk except for occupation injury rates, where the

¹⁵ The union membership and representation data are averages during 2003-2005 from the Bureau of Labor Statistics. The data are available for a total of 22 occupations and 25 industries. The ACS does not include individual's union status.

coefficient is positive. When only the measures of English ability are included, we find results similar to those reported for the other variables in Table 3. In the industry fatality rate specification, the estimated coefficients for the variables for speaking English not well and not at all become statistically significant while the estimated coefficient for the speaking English very well variable is not significant.

Conclusion

This paper examined whether immigrants work in riskier jobs, as measured by injury and fatality rates, than natives. The results clearly indicate that immigrants work in more dangerous industries and occupations. The simple immigrant-native difference in average industry fatality rates is 1.79 deaths per 100,000 workers. Evaluated at 20 million (approximately the number of immigrants employed in 2005), this implies excess mortality of 358 immigrants per year compared to the number of deaths if immigrants had the same distribution across industries as natives. The simple difference in average occupation fatality rates is slightly smaller (1.60), which implies an excess of 320 deaths each year. The simple difference in average industry injury rates of 8.19 per 10,000 workers implies an excess of 16,380 nonfatal injuries involving at least one day away from work among immigrants while the difference in average occupation injury rates of 30.86 per 10,000 workers implies an excess of about 61,720 injuries among immigrants annually.

These calculations, like all of the findings here, assume that fatality rates within industries and occupations apply equally to natives and immigrants. If immigrants actually experience higher fatality rates within industries and occupations than natives, all of our results are underestimates. Individual-level data on work-related fatalities and injuries that includes information on nativity are needed to further examine this issue. Such data would also improve

the goodness-of-fit of the models estimated here. Data on fatalities and injuries by industry and occupation jointly also would give a more accurate picture of relative job risks if immigrants and natives hold different occupations within industries.

Our results indicate that differences in observable characteristics, such as English ability and education, play important roles in why immigrants tend to work in riskier jobs. Workers' ability to speak English is inversely related to their industry injury and fatality rate, indicating that immigrants who speak English fluently work in safer jobs. These findings bolster calls for more safety training in languages other than English (National Research Council, 2003).

McHugh, Gelatt, and Fix (2007) estimate that about 750,000 immigrants, or about 2.5% of the adult foreign-born population, are illiterate. This suggests that simply posting safety instructions in languages other than English would not be sufficient to eliminate disparities in workplace risks. Instead, safety regulations might need to require posters with pictures.

The findings here raise a number of intriguing questions. Previous research using similar methods but earlier data does not conclude that immigrants work in industries with higher injury or fatality rates (Berger and Gabriel, 1991; Hamermesh, 1998). Examining why there now appears to be more sorting of immigrants into riskier jobs, perhaps because of a decline in immigrants' skills or to large immigrant inflows, is an interesting area for future research. Whether immigrant inflows affect working conditions, with larger influxes possibly leading to downgrading of conditions and more injuries and workplace deaths, is also a key area for future work. Another interesting issue is whether immigrants earn the same compensating differential—if any—as natives for working in risky industries and occupations. If immigrants are more willing to accept risky jobs because they underestimate workplace risks due to a lack of information, then they might not earn the same compensating differential as natives and some form of government intervention might be warranted.

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Figure 1
Overall Fatality Rate and Fatalities to Foreign-Born Workers

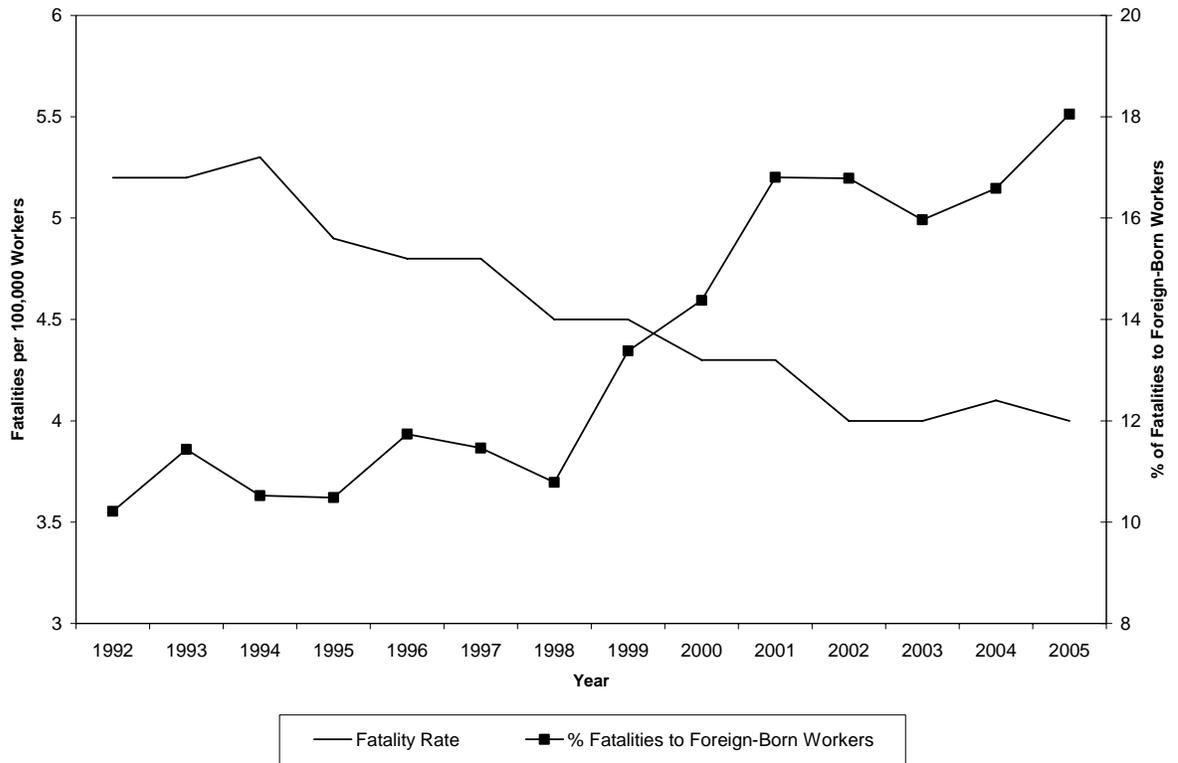


Table 1
Descriptive Statistics for ACS Sample

	Natives		Immigrants	
	Mean	SD	Mean	SD
<u>Individual characteristics:</u>				
Female	0.47	0.50	0.39	0.49
Age	39.13	13.48	38.44	11.94
Married	0.53	0.50	0.62	0.48
Divorced, widowed, separated	0.16	0.37	0.12	0.32
Never married	0.31	0.46	0.26	0.44
White (non-Hispanic)	0.81	0.40	0.18	0.38
Black (non-Hispanic)	0.11	0.31	0.08	0.27
Other race (non-Hispanic)	0.02	0.14	0.24	0.42
Hispanic	0.07	0.25	0.51	0.50
No high school diploma	0.10	0.31	0.32	0.47
High school diploma	0.31	0.46	0.24	0.43
Some college	0.33	0.47	0.19	0.39
College degree	0.25	0.43	0.25	0.43
Years in U.S.	--	--	15.71	11.40
Speaks only English at home	0.93	0.25	0.15	0.36
Speaks English very well	0.06	0.23	0.32	0.47
Speaks English well	0.007	0.083	0.21	0.41
Speaks English not well	0.004	0.062	0.22	0.41
Speaks English not at all	0.001	0.025	0.10	0.30
N	1,492,416		215,223	
<u>Injury and fatality rates:</u>				
Industry injury rate	140.55	87.99	148.74	84.92
Occupation injury rate	108.83	118.50	139.69	129.15
Industry fatality rate	4.71	9.57	6.50	12.19
Occupation fatality rate	5.93	56.79	7.54	66.95

Note: Observations are weighted using the person weights in the ACS. The sample only includes individuals aged 16 and older who are employed in the private sector and not self-employed. Injury rates are per 10,000 workers, and fatality rates per 100,000 workers.

Table 2
Average Injury and Fatality Rates by Education and English Ability

	Industry Injury Rate	Occupation Injury Rate	Industry Fatality Rate	Occupation Fatality Rate
No high school diploma	166.86	175.72	8.26	10.45
High school diploma	158.40	146.12	6.09	7.47
Some college	140.01	102.86	4.23	5.03
College degree	110.63	53.74	2.84	3.74
Speaks only English at home	140.51	108.46	4.69	5.90
Speaks English very well	133.43	100.80	4.38	5.38
Speaks English well	152.53	145.42	6.36	7.44
Speaks English not well	166.35	184.35	8.53	9.88
Speaks English not at all	176.16	210.27	12.46	13.69

Note: Injury rates are per 10,000 workers, and fatality rates per 100,000 workers.

Table 3
Relationship between Individual Characteristics and Injury and Fatality Rates

	Industry Injury Rate		Occupation Injury Rate		Industry Fatality Rate		Occupation Fatality Rate	
	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE
Immigrant	5.747	4.384	10.687*	5.985	0.828**	0.404	-0.535	1.060
Female	-28.986**	11.679	-64.315***	14.611	-4.197***	1.064	-7.265***	1.548
Age	1.784**	0.746	2.036**	0.794	0.143**	0.072	0.137**	0.063
Age ²	-0.019**	0.008	-0.024***	0.008	-0.002***	0.001	-0.002**	0.001
Married	1.741	2.343	-3.294	2.679	0.422**	0.202	0.675**	0.239
Divorced, widowed, separated	6.036***	1.750	5.061***	1.890	0.561***	0.200	0.657***	0.176
Black	9.058	6.485	15.507**	7.450	-0.723*	0.421	-1.526**	0.742
Other race	-11.428***	4.313	-11.932***	3.707	-1.639***	0.451	-1.526***	0.742
Hispanic	5.218***	1.644	11.316***	2.809	0.360	0.364	-0.013	0.515
No high school diploma	6.370	4.101	17.008***	4.661	1.353**	0.622	2.215**	1.081
Some college	-15.442***	4.173	-36.735***	5.844	-1.511***	0.417	-1.955***	0.539
College degree	-45.605***	9.211	-87.597***	13.265	-3.140***	0.876	-3.703***	1.179
Years in U.S.	-0.172	0.141	-0.211	0.153	-0.025*	0.013	0.026	0.047
Speaks English very well	-2.009	1.431	-5.796***	1.525	-0.351*	0.196	-0.386**	0.185
Speaks English well	5.124**	2.574	15.096***	2.702	0.369	0.336	0.244	0.261
Speaks English not well	6.936	4.802	29.478***	7.402	1.186	0.738	1.139	0.787
Speaks English not at all	11.064**	5.149	42.687***	14.478	4.329	2.871	4.199*	2.391
Adjusted R ²	0.093		0.208		0.090		0.006	
N	1,707,639		1,699,721		1,706,030		1,704,027	

* p < 0.01; ** p < 0.05; *** p < 0.01 Note: Regressions also include controls for state and survey year. Observations are weighted using the person weights in the ACS. Standard errors are clustered on industry or occupation.

Table 4
Immigrant-Native Differences in Injury Rates by Nature of the Injury

	<u>Industry Injury Rate</u>		<u>Occupation Injury Rate</u>	
	Raw	Adjusted	Raw	Adjusted
Sprains and strains	1.054	1.751	10.348***	4.093
Fractures	0.866	0.635	2.440**	0.966
Cuts and punctures	2.411***	1.475***	5.211***	2.268**
Bruises	0.715*	0.436	2.724***	0.681
Heat burns	0.352*	0.305*	0.750**	0.311*
Chemical burns	0.131***	0.064*	0.308***	0.094**
Amputations	0.139**	0.029	0.303***	0.047
Carpel tunnel syndrome	0.005	-0.105**	0.279**	-0.124**
Tendonitis	0.053	0.001	0.183***	0.007
Multiple traumatic injuries	0.423*	0.243	0.869**	0.148
Pain	0.388	0.244	2.283***	1.029*
Back pain	0.177	0.140	0.847***	0.438*
<u>All other injuries</u>	<u>1.677</u>	<u>0.999</u>	<u>5.203***</u>	<u>1.481</u>

* p < 0.01; ** p < 0.05; *** p < 0.01

Note: Columns labeled "Adjusted" control for other individual characteristics (see Table 3), state and survey year. Observations are weighted using the person weights in the ACS. Significance levels are based on standard errors clustered on industry or occupation.